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Editorial Foreword

It gives me immense pride and pleasure to present the inaugural issue [Volume 1, No. 1–December 2017] of ICMA Pakistan's Research Journal, a multi-disciplinary bi-annual Journal covering major disciplines of relevance to the business and accounting profession. ICMA Pakistan is probably the pioneering professional accounting body in the region having its Research Journal recorded permanently in the ISSN Register of ISSN Centre, France. The 8-digit ISSN allotted to ICMA Pakistan is 2519-5328. The Editorial Board of the Journal consists of leading academicians and scholars in the field whereas the Panel of Reviewers comprises Associate and Assistant Professors in different HEC-recognized Universities.

The Research and Publications Directorate issued call for research paper submissions from members of the Institute, academicians, mostly from RDI partner institutions with whom ICMAP has signed MoUs and other authors and writers. These research papers were called in the areas of accounting and finance; management and leadership; business and economics; information systems and qualitative analysis. The articles received were reviewed in line with the editorial guidelines and then forwarded to experts for peer review. In the light of comments received from the reviewers, research papers have been finally selected for publication in the first issue of Journal.

We hope that bringing out of this Journal would encourage research efforts in our members, especially those who are in teaching profession and employed in the academic institutions. We also expect to have contributions in this Journal from PhD faculty of our RDI partner institutions & other leading Universities in the country. The Research and Publications Directorate will also be contributing one research paper in every issue of Journal. In this first issue, it has contributed a paper which examines the efficiency of power regulatory agencies in costing and tariff setting in SAARC countries.

We owe a special debt of gratitude to the inaugural authors who submitted papers for the first issue of ICMAP Research Journal and the peer reviewers who willingly spent their time, effort and knowledge in reviewing the papers. I would also like to place on record the dedicated efforts put in by the Research and Publications Directorate in making this possible.

I sincerely hope and expect that the published research papers in the Journal would encourage further submissions. In this context, I would urge upon the professionals and researchers to send quality research papers to make it a high standard research publication. Any suggestion to improve the Journal will always be welcomed.

Mohammad Iqbal Ghori, FCMA
President ICMA Pakistan and
Chief Editor – Research Journal

Contents

FACTORS INFLUENCING ABC IMPLEMENTATION IN CEMENT SECTOR OF PAKISTAN

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Abstract

This study aims to find out the factors influencing the practices specially implementation of Activity Based Accounting (ABC) in the cement sector of Pakistan. The study is based on primary data collected through convenience sampling technique. Closed ended questionnaire has been used as data collection instrument, the reliability of which was checked through Cronbach's Alpha. The econometric tool of binary logistic model was applied for the identification of factors. ABC method classifies costs, based on various cost drivers. By implementing ABC system, indirect costs can be precisely allocated to various products manufactured in an organization; in doing so, an organization can go for cost reduction by controlling overheads.

Organizational size, organizational structure, organizational culture, management behavior and technical issues were identified from preliminary literature review as important factors to have an influence on ABC practices in an organization. These factors were subsequently incorporated in the questionnaire. The results from Binary Logistic Regression suggests that from identified factors organizational size, organizational structure, organizational culture, and technical issues are not significantly influencing the implementation of ABC practices in the cement industry of Pakistan. Only management behavior is resulted from the analysis as significant influential factor in this regard. It can be concluded from the findings that behavior elements play vital role for the adoption and successful implementation of ABC system for the firm in Pakistan in case of cement sector. These findings are important for creating an insight among professionals as well academician regarding costing preferences and practices prevailing in Pakistan.

Key Words: Activity Based Costing, Binary Logistic Regression, Organizational Culture, Organizational Structure, Management Behavior

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1. Introduction

In the contemporary complex industrialized setup precise and accurate costing is needed for better financial decision making. It is argued that the conventional costing results distort costing information, whereas ABC system can yield far better costing information. It is therefore ABC can be used as alternative to the conventional costing system. In ABC system, variety of cost drivers is identified for the allocation of overhead cost to final goods and services. Various studies such that Yanren et al. (2008) and Banker et al. (2008) have been conducted on ABC and showed the accuracy of ABC system in cost allocation. Several variables can be identified as cost drivers such as machine hours, direct labor hours, utility consumption, covered area, number of employees in a department, and payroll size. This is not an exhaustive list, management is supposed to select key cost drivers among a large set of identified variable depending upon the nature of cost, and can be used for allocation of overheads. Previously, in conventional costing, only machine or labor hours were used as blanket rates for such allocation due to which effect of indirect costs is not appropriately reflected in individual products.

Selection of cost driver is a very sophisticated work. The process of selection may different from company to company, industry to industry, and even nature of operating may affect this process. Shander et al (2010) conducted a research to accurately determine the cost of blood in a surgical population from a health system perspective; an activity-based costing (ABC) model was constructed. Tasks and resource consumption (materials, labor, third-party services, and capital) related to blood administration were identified prospectively at two US and two European hospitals. Process frequency (i.e., usage) data were captured retrospectively from each hospital and used to populate the ABC model.

1.1 Background of the Study

Cooper and Kaplan (1988) have discussed various factors influencing ABC implementation and its success. These are primarily organizational factors including adequate resources, training and top management supported. Gosselin (1997) found organizational structure and Baird et al.(2007) found organizational culture as significant factors in successful implementation of ABC system. According to Anderson's (1995) case study on General Motors, technological factors were the most significant ones that have impacted on the ABC success whereas the study of Shields (1995) have shown behavioral and organizational variables as more significant factor as compared to technical variables.

1.2 Significance of Research

According to Supitcha (2001), it's not necessary that one accounting method that is effectively adopted in one country is also successful in another country. Hardly any research has been done on ABC implementation within the Pakistan's context and therefore it will be beneficial to study whether the ABC could be implemented effectively in Pakistan or not, and its successful implementation will be affected by the same factors as are in western countries. In order to fill this research gap, this study was carried out to examine the variables affecting successful implementation of ABC with reference to Pakistan. We are initiating sector wise studies on ABC implementation in Pakistan. We have already conducted a research on textile sector in this regard and now we are presenting an evaluation of ABC implementation factors in cement sector of Pakistan.

2. Literature Review

Using a sample from cement sector of Pakistan, this paper aims to provide significance and impact of five different factors namely behavioral elements, organizational culture, organizational structure, technical factors and firm size on the successful implementation of ABC system. These variables are in the form of constructs, which are identified through literature review. In the following discussion, constructs wise studies are presented:

2.1 Activity Based Costing

ABC is one of the techniques for allocation of costs over various departments and products. Cooper and Kaplan (1988) highlighted that the conventional costing results in distorted costing information and introduced ABC system as alternative to the conventional costing system. ABC system a variety of cost drivers is identified for the allocation of overhead cost to final goods and services. Since then various studies such that Cooper and Kaplan (1992), Innes et al. (1995, 2000), Bjornenak (1997), Banker et al. (2008), McGowan (1998), Yanrenet al. (2008) have been conducted on ABC and showed the accuracy of ABC system in cost allocation. According to Majid et al. (2008), machine hours or direct labor hours are used for allocation of overheads in conventional costing, due to which effect of indirect costs is not appropriately reflected in individual products. Recent trends in ABC include Time Based Approached. Study by Gervais, Levant, and Ducrocq (2010) heighted these new approaches.

2.2 Organizational Structure

According to Damanpour (1991) implementation of innovation depends upon organizational structure. Gosselin's (1997) research showed that diffusion of innovation process is affected by organizational structure. Thompson (1965) viewed that the concentration of decision-making power hinders innovation whereas its distribution of power facilitates innovation. Burns and Stalker (1961) discussed two types of organizational structure i.e. mechanistic structure and organic structure. According to Gosselin (1997), formalization and centralization are considered to be two important components of organizational structure. Formalization means standardization of procedures, rules and regulations whereas centralization represents the control of decision making at the top management level. Aiken and Hage (1971) termed high centralization and stringent formalization as bureaucratic control, which inhibits innovation (Pierce &Delbecq, 1977).Mechanistic organizations have more bureaucratic control as compared to organic organizations. Gosselin (1997) related organic organizations with informal structure and delegated control. Zmud's (1982) studied the impact of formalization and centralization on the adoption of new software and showed that the less formalized structure is only beneficial at the initiation stage. However, more formalized structure is required for successful implementation of latest software. Although, above mentioned studies are not directly addressing ABC implementation and the arguments developed for the successful adoption of innovation can be related to the implementation of ABC as well. In an exclusive study on ABC implementation, Gosselin (1997) has found that ABC can be implemented more successfully in mechanistic organizations.

2.3 Organizational Culture

Prior researches have shown that successful implementation of business practices are generally influenced by cultural factors. Landry and Wood (1997) have argued that for a successful implementation of a business practice in an organization, it should be made compatible with the organizational culture; otherwise it might be less likely to succeed. Organizational culture has a significant effect on ABC implementation as Byrne et al. (2009) has stated that "uncaring culture"in an organization leads to ABC failure. Baird et al. (2007) used innovation, attention to detail, team orientation and outcome orientation to study the relationship between organizational culture and success implementation of management activity.

Organizational culture has been defined in many ways. Baird, Harrison and Reeve (2007) have used the same definition about organizational culture in their study to examine the effect of organizational culture on ABC implementation as given by Higginson and Warder (1993); viz. a set of shared norms; values and beliefs that head everybody in the same directions. The results of the study indicate that successful implementation of ABC is associated with vibrant organizational culture among Australian business units.

2.4 Behavior Elements

Bhimani and Pigott (1992), and Innes and Mitchell (1995b) have discussed behavioral elements in the implementation of ABC system and found that it has significant influence on successful implementation of ABC. Norris (1997) has also found that behavioral factors to be influential in ABC success. Shields and McEwen (1996) also argued that the failure in implementing ABC is due to the ignorance of behavioral factors. Organizational theory claims that behavioral factors, referred in Shields (1995), play a fundamental role in accomplishment of managerial accounting and control system (Krumuwiede, 1998; Ruhanita et al., 2006).Shields and Young's (1989) have identified several behavioral variables such as performance evaluation approach, compensation strategies, competitive strategies, top management support, clarity of the objectives, non-accounting ownership, adequate internal resources and training.

According to Shields (1995); McGowan and Klammer (1997); Krumuwiede (1998a); and Lana and Fei (2007), top management support is considered to be one of the most important factors in the success of ABC. Shields (1995) have stated that the support of top management plays an important role in using ABC information to correspond it with non-accountingstaff and encourage them to use this information. Cooper et al. (1992) have surveyed eight organizations; they argued that only accounting employees keep the ownership of ABC in most of the companies. They suggested that ABC could be implemented more effectively if non-accounting employees takepart at the initial stages of ABC implementation. Tait and Vessey (1998), and Ruhanita et al.(2006) have shown that the availability of well trained employees could affect the success of any management policy. Chong ruksut (2002) argued that the adequate resources, particularly internal resources are requiredat designing as well as at implementation stage of ABC. The term internal resources, in general, refer to the funds, time, and employees' knowledge. Clarke and Mullins (2001); and Mehmet and Douglas (2001) have related internal resource withthe successful implementation of ABC. According to Shields and McEwen (1996) employees could be induced to implement ABC only when this system is linked with performance evaluation and compensation so that employees have a feeling that ABC system could show their performance fairly.

2.5 Technical Factor

Lana and Fei (2007) have discussed technical variables that effects successful implementation of ABC. These variables include data collection for cost basis, cost activity identification, involvement of experts, software packages and other cost data. The intrinsic difficulties with ABC design and implementation is one of the significant reasons for not adopting ABC. The time-consumption and complexity are identified as significant factors in the implementation of Activity Based Costing. Besides these factors, difficulty in selecting appropriate accounting software's and accumulation of cost drivers 'information are also found influential in ABC implementation. Chung et al. (1997) also reported similar sort of results. Shields (1995) and Krumwiede (1998) also investigated technical factors along with behavioral factors but results supported behavioral factors over technical factors for the successful implementation of ABC whereas Anderson's (1995) study suggested reciprocal results. Research carried out by Pierce and Brown (2004) on different sectors in Ireland exhibited that ABC implementation is restrained due to many factors including lack of software support, perceived complexity and difficulty identifying key cost drivers.

2.6 Firm Size

Findings of researchers are not uniform in this respect. Size (computed by strength of employees) does not affect the decision related to ABC implementation or non-implementation (Bjornenak, 1997). Krumwiede (1998) studied a sample of manufacturing firms of U.S.A. to investigate the impact of factors like size of firms, cost distortion chances, training, and strategic support etc. on various implementation phases of ABC system. Cohen, S. et al., (2005) have also studied and found no difference among ABC adopter and non-adopters with respect to size of the company, calculated both as employees' strength and average of sales revenue; whereas findings of Brown et al. (2001) suggest the positive relationship between the choice to adopt or reject ABC and firm size. A considerable adoption rate for ABC has been seen among the large Dutch firms on the basis of employees' strength (Groot, 1999). Research carried out by Pierce and Brown (2004) on different sectors in Ireland was divided into three parts. The reasons mentioned in the third part which were related to ABC deniers include small size of organization. Findings of Innes and Mitchell (1995) and Innes et al. (2000) have also showed significant relationship of size with ABC implementation.

3. Methodology

This study is an explanatory research as it shows the effect of different factors on ABC implementation. Data has been collected through questionnaire from 10 out 22cement companies in Pakistan. We have adopted a questionnaire, which was developed by Robbins (1983) and subsequently improved and used by Shields's 1995 and Gosselin, 1997. As per prior studied, the response rate of questionnaire is not very high. We have employed convenient sampling technique to circulate the questionnaire in cement companies. Questionnaires were sent through email and also by hard copy. Reliability of questionnaire is checked through Cronbach's Alpha. We have incorporated binary logistic regression as a statistical tool to find out the significance of factors affecting ABC practices. The estimates of binary logistic regression are based on maximum likelihood method.

3.1 Dependent Variable

Dependent variable in this research is a dichromatic variable with yes and no options on the adoption ABC. Since the dependent various is of categorical nature therefore logistic regression model is applied.

3.2 Independent Variable

Following are the independent variables of this study:

I. Organizational Structure
II. Organizational Culture
III. Behavior Elements
IV. Technical Factor
V. Firm Size

These variables are measured likert scale.Data analyses are performed on SPSS.

3.3 Regression Model

$$FOL = \alpha + \beta_1 OS + \beta_2 OC + \beta_3 BO + \beta_4 TEC + \beta_5 EMP$$

Where,

FOL: Following ABC system

OS: Organizational Structure

OC: Organizational Culture

BO: Behavior Elements

TEC: Technical Factor

EMP: Firm Size (in terms of No. of Employees)

3.4 Hypotheses

Following hypotheses are tested in this study:

Null Hypothesis

Organizational Structure, Organizational Culture, Behavior Elements, Technical Factor, and

Firm Size plays no significant role in the implementation of ABC

Ho: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$

Alternative Hypothesis:

H_1: Organizational Structure has significant impact on implementation of ABC. **($\beta_1 \neq 0$)**

H_2: Organizational Culture has significant impact on implementation of ABC. **($\beta_2 \neq 0$)**

H_3: Behavior Elements has significant impact on implementation of ABC. **($\beta_3 \neq 0$)**

H_4: Technical Factor has significant impact on implementation of ABC. **($\beta_4 \neq 0$)**

H_5: Firm Sizehas significant impact on implementation of ABC. **($\beta_5 \neq 0$)**

4. Data Analysis

4.1 Reliability of Questionnaire

Cronbach's Alpha is a good tool to measure the reliability of questionnaires or psychometric test. It provides lower bound of the internal consistency for the constructs on the basis of inter-correlations of the items' scores in the questionnaires. The minimum expectable value of Cronbach's Alpha is 0.7 for each construct. In Table I, the Cronbach's Alpha of our adopted questionnaire almost confirms the reliability test for each construct as most of the values are above 0.7. There are two constructs viz. following ABC (FOL) and organizational culture (OC), which are have Cronbach's Alpha 0.679 and 0.683 respectively, although values are lesser than 0.7 but greater than 0.65, which may be considered as acceptable. Cronbach's Alpha has is not appropriate for single item questions, that's why Cronbach's Alpha score is applied to EMP, this is a non-opinion based variable in our questionnaire.

Table I

Reliability Statistics		
Construct	Cronbach's Alpha	N of Items
FOL	0.679	7
OS	0.864	10
OC	0.683	6
BE	0.754	10
TEC	0.714	8
EMP	N/A	1

4.2 Data Collection

Questionnaires are send through email, almost 60 different respondents, working at key positions in accounting department of 22 cement companies, were approached, we have received only 34 responses. Thus, our response ratio is 57%.

4.3 Results of Binary Logistic Regression

Results exhibit that only behavioral elements are significantly influencing on the implementation of activity based costing. Exp (B) of behavioral elements construct shows that there are almost 28percent chances for implementation of ABC. As far as Organizational Structure, Organizational Culture, Technical Factor, and Firm Size are concerned, they are not significant at 5% level.Mcfadden R square (Pseudo R square) of the model is 46%. Our model has been tested for multicollinearity among independent variables through VIF.

Table II

Variables in the Equation						
	B	S.E.	Wald	Df	Sig.	Exp(B)
Constant	-4.9819	5.9466	0.7722	1	0.4422	0.0121
OS	-0.4708	1.5708	0.099	1	0.8415	0.7172
OC	-2.101	1.4135	2.4321	1	0.1507	0.1628
BE	3.5585	1.6203	5.3042	1	0.0308	27.9345
TEC	0.3718	0.8954	0.1903	1	0.7458	1.5433
EMP	-1.1902	0.7799	2.5674	1	0.1397	0.3729

5. Discussion

From the above results, size of the firm in terms of number of employees is playing no significant role in the implementation of ABC, which is line with the findings of Hicks(1999).According to him ABC is beneficial for both small and large firms. Organizational structure also shows an insignificant relation with ABC, according to Gosselin (1997), in decentralized firms managers resist implementation of ABC due to fear of changes in existing system.One possible reason for this insignificance might be the Asian environment, as the factor which shows significant relation in Western culture might not show the same result in Asian environment and the research was done to explore these types of reasons. Technical factorare also proved to be insignificant for ABC implementation in our study, whereas behavioral elements show significant influence on ABC implementation. Thefindings rein line with the findings ofKrumwiede (1998), Krumwiede and Roth (1997), and Shields (1995). According to them ABC success is more related to behavioral elements as compare to technical factors.

6. Conclusion and Recommendations

The study has investigated the role of various aspects of a company including organizational structure, organization culture, behavior elements, technical factor and firm size on the adoption and successful implementation of ABC. This study is conducted on the cement sector of Pakistan. In the context of cement sector of Pakistan, hardly any research has been conducted to investigate factors influencing on ABC implementation. All the above mentioned factors behave quite differently not only sector wise but country wise as well. Thus, the findings from this study were expected to different from previous studies conducted in other regions. However, the results of the study are not too different from previous researches. We can conclude that only behavioral element of the organization has significant influence on the successful implementation of ABC in the cement sector of Pakistan.

Further research can be done to other sectors with similar factors. Other variables which affect the implementation of ABC can also be investigated in the context of Pakistan; such as non-integration of ABC with current costing system (Chen et al. 2001), high implementation cost (Bescos et al., 2002), management support (Cohen et al., 2005), satisfaction level with the existing cost system Nguyen and Brooks (1997), and time consumption (Askarany &Yazdifar, 2007).

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IMPACT OF CHANGE IN US REAL INTEREST RATES ON PROFITABILITY OF 'BIG FOUR' PAKISTANI PRIVATE COMMERCIAL BANKS

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Abstract

The fundamental purpose of this paper is to investigate the effect of changes in US real interest rate on the profitability of Pakistani commercial banks by scrutinizing the annual reports of the 'BIG FOUR' private commercial banks of Pakistan for the period 2006 to 2015. In this paper, the independent variable is the US real interest rate whereas the dependent variable is the profitability of private commercial banks. The paper uses Pearson Correlation Method to study the effect of changes in US real interest rate on the profitability of 'BIG FOUR' private commercial banks of Pakistan. The findings of this paper report that there is a negative correlation between changes in US real interest rates and the three variables of banks' profitability. However, the Coefficient of Determination states that the magnitude of variation between the two variables is relatively small and many other factors apart from US real interest rates impact the profitability of banks, which can be studied further in future research.

Keywords: Interest Rates, Profitability of Banks, US Real Interest Rates, Pakistani Banks

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1. Introduction

Over the past couple of decades the banking sector of Pakistan has seen tremendous growth. This has been primarily due to the fact that the banks were privatized in the 1990s and banking industry saw a significant increase in the number of news banks both local and as well as multinational banks. These events also led to a significant increase in the profitability of the banking sector in Pakistan and have also contributed towards the economic growth and stability in Pakistan as indicated by the major economic indicators. However, post 2007 the massive growth of the banking sector has somewhat shrunk, and the banking sector started to face liquidity and solvency pressures; deteriorating the performance of the banking and financial industry. If commercial banks have sufficient volume of liquidity to return their obligations then they can cope with this scenario effortlessly. Due to the increased competitiveness in the banking industry, commercial banks feel necessitated to pay higher rates to their depositors in order to increase their liquidity. To solve this dilemma the State Bank of Pakistan (SBP) has lowered both the statutory liquidity Requirement (SLR) and cash reserve requirement (CRR) on demand and time deposits. Furthermore, the commercial banks are also allowed to generate money through borrowing from other financial institutions, rather than just developing its own resources. Moreover, the government also relies heavily on the banking sector to borrow money. The over reliance of the government on the banking sector has also put a huge burden on the commercial banks and the economy overall. In order to ease the liquidity and solvency problems of the banks the government should try to limit their reliance on commercial banks and decrease the amount of money borrowed from them. In the past decade, the US interest rates saw a decline due to recession and the global financial meltdown. However, for the past couple of years the rates has started to move upwards. Nonetheless, the Pakistani interest rates have reacted quite the opposite to its US counterpart. Moreover, many studies have been published investigating the correlation between local interest rates on the profitability of local commercial banks, which is why this paper chooses to investigate the impact of US interest rates on the profitability of Pakistani commercial banks.

1.1 Problem statement

This study sought to explain the effect of US real interest rate on the profitability of 'BIG FOUR' private commercial banks of Pakistan.

1.2 Research Questions

The problem statement can be broken down into two questions:

i. The effect on the banks' profitability due to the increase in US real interest rates?
ii. The effect on the bank's profitability due to the decrease in US real interest rates?

1.3 Research scope and limitations

This study looks into the factors that affect the profitability of private commercial banks of Pakistan. The keen focus of the research is to study the impact of US interest rates on Pakistani Banking Sector. The research covers the data of past 10 years i.e. from 2006 to 2015. To look into the profitability of the banking sector in Pakistan, the study chooses the 'BIG FOUR' private commercial banks of Pakistan. To gauge the profitability of the banking sector the study will take the net income after tax, RoA and RoE of each of the four banks for each year from 2006 to 2015. However, due to time constraints and the large number of banks in the banking sector the study does not include the whole banking sector and has included four banks with the highest market share only. Furthermore, the study only takes into account the profitability of banks and US interest rates of the past decade rather than the inception of the banking industry in Pakistan.

2. Literature Review

There have been numerous researches conducted on the effect of bank's profitability with respect to changes in interest rates. However, these studies look at the effect of changes in local interest rates on local banks' profitability. This study wants to build on these prior researches and want to analyze the effect of changes in US real interest rates on the banking sector of Pakistan. This is very important since the United States is the largest economy in the world has tremendous influence on the global economy. Moreover, due to the war in terror and the political outlook of the Middle East there is also a growing alliance of United States with Pakistan both on the economic and political front.

The first such research that looked upon the effect of changes in real interest rates on the banks' profitability was conducted by Demirgüç-Kunt and Huizinga (1999). Their study concluded that as the real interest rates increase so does the interest margin and hence the banks' profitability. Their research finds this especially true for the banking sector of developing countries since the demand deposits in low income countries pay well below the market interest rates. Moreover, Albertazzi and Gambacorta (2009) suggest that there is a significant relationship between the net interest income and the slope of the yield curve for the banking sector in the 10 OECD countries selected for their research. According to English (2002) and Hanweck and Ryu (2005) there is a significant relationship between the banks' profitability and the changes in interest rates. They also concluded that the slope of the yield curve also has a direct relationship with the profitability of the banking sector.

The profitability of banks has been examined in various researches with respect to many other factor and determinant both internal and external. Ramadan et al. (2011) has studied the effect of both internal and external factors on the Jordanian banks. The research suggested that banks profitability is related to high lending, effective management and the capitalization of the banks, whereas size played very little part in maintaining a relationship with the banks' profitability.

Pasiouras and Kosmidou (2007) studied the effect of financial market structure on UK commercial banks' profit. The research suggested that there is a strong relationship between the banks' capital and profitability of the banks. Moreover, effective management and size of the bank also played a vital role in making the bank more profitable.

Javaid et al. (2011) investigated the impact of equity, loans, deposits and assets on the profitability of the Pakistani commercial banks. The study's results suggested that there is a strong relationship between loans and equity on the profitability of the banks, whereas assets and deposits do not have a significant impact on the profitability of the banks.

However, very few studies have worked to find a relationship between interest rates and banks' profitability and majority of the relationships found in research papers are the byproducts of studies conducted on the effect of interest rates on general profitability of an organization. This research focuses on the correlation that US interest rates have with the profitability of Pakistani banking industry. This is important since the sample of banks selected for this research hold large portfolios of foreign currency accounts, and any changes in US interest rates should have an impact on the profitability of these banks.

2.1 Real Interest Rates

The amount of money received or paid on the usage of funds can be called interest. However, real interest rates can be defined as inflation adjusted interest rate i.e. $i_n = i_r + \pi$; where, i_n = nominal interest rate, ir = real interest rate and π = inflation.

2.2 Increasing Effect

As the interest rates increase so does the cost of borrowing increases which increases the cost of doing business. Since the costs of doing business increases the company faces a decline in their profitability and subsequently their market share also decreases. However, as the interest rates increases banks increase the rate they charge from borrowers more as compare to the interest rates they pay to their depositors. This causes the banks' spread to increase which ultimately increases their profitability. Moreover, with the increasing interest rates banks receive more returns on their investments as well. Furthermore, it has been observed that with the rise interest rates the borrower of funds tends to face the burden high interest rates and does not influence the bank's profitability Samuelson (1945). The rise in interest rates tends to reduce the investors and borrowers Khawaja, Musleh, (2007). Nevertheless, the downside of rising interest rates, especially US interest rates, is it makes the foreign currency transaction more expensive for the banks and decreases their profitability. Still, it will be interesting to observe the behavior of Pakistani banks' profitability with respect to real interest rates of United States.

2.3 Decreasing Effect

The decline in interest rates tends to increase the number of borrowers as it makes the cost paying back the loan much easier. Although, this is really helpful in economic growth of a nation as it allows people to take more loans and use these funds to invest in rising sectors of the economy. However, it reduces the number of depositors since they don't get much return by keeping their money in the bank. Though, studies conducted earlier have shown a direct relationship between changes in interest rates and banks' profitability. Nevertheless, keeping in view that this study focuses on the impact of changes in US real interest rates on banks' performance in Pakistan, it will be interesting to see what relationship is formed between the two.

2.4 Profitability of Banks

In order to gauge the profitability of banks, this paper looks at the Profit after Taxation (PAT), Return on Assets (ROA) and Return on Equity (ROE) of each of the 'BIG FOUR' banks from the year 2006 to 2015. ROA and ROE are considered by many researchers and professionals to be the measure of profitability. However, in order further examine the relationship between US real interest rates and banks profitability this paper has also considered Profit after Taxation to be an independent variable.

3. Methodology

For this study the population is the private commercial banking industry of Pakistan. However, due to time and economic constraints the sample of the study is the 'BIG FOUR' private commercial banks of Pakistan i.e. Habib Bank Limited, United Bank Limited, Muslim Commercial Bank and Allied Bank Limited. These four banks have the largest portfolio of depositors as well as a diversified portfolio of investment both in local as well as foreign markets. For measuring the profitability of these banks the research will take net profit after tax as its dependent variable and the real interest rate of United States as its independent variable. To further gauge the relationship between profitability of banks and US real interest rates. The research has also considered two more measures of banks' profitability i.e. average Return on Assets of the banks and the average return on Equity of the banks. The research will be conducted using secondary data which is available on each of the banks' annual report and the real interest rate of US is taken from the World Bank Group's website. The time period of this research will cover the years from 2006 to 2015 that is ten years.

Furthermore, the research will use Pearson Correlation Method to establish a relationship between the independent and the dependent variables. The Pearson Correlation Method gives a number between the ranges of -1 to +1 and measures the degree of correlation between the two variables. If the correlation gives a positive number it means that there is a direct relationship between the two variables i.e. as the independent variable increases/decreases the dependent variable increases/decreases. Whereas, if the correlation gives a negative number it means that there is an indirect relationship between the two variables i.e. as the independent variable increases/decreases the dependent variable decreases/increases. However, the correlation comes out to be zero then there is simply no relationship between the two variables. The strength of the relationship is measured by the minimum and maximum values of the range i.e. -1 or +1. The more the correlation coefficient is closer to the two extremes the stronger the relationship between the two variables.

The research also used the Coefficient of Determination to study the degree of impact that US real interest rates have on each measure of profitability of banks. The Coefficient of Determination show how good a correlation between the two variables really is. This is because the scale of Pearson's Correlation Coefficient is not linear and does not mean that a Correlation Coefficient of 0.6 is twice as good as 0.3 rather it is far better. Hence, the greater the Coefficient of Determination the stronger the correlation gets and the stronger the impact of independent variable gets on the dependent variable

4. Results & Analysis

The formula for Pearson Correlation Coefficient is:

$$r = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2 \sum(y-\bar{y})^2}} \rightarrow \text{Equation 1}$$

However, rearranging the above formula gives us the following formula, which can be more easily used for the purpose of this research:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(\sum x^2 - n\bar{x}^2)(\sum y^2 - n\bar{y}^2)}} \rightarrow \text{Equation 2}$$

Table I: Effect of US real interest rates on Banks' average Profit after Tax

Year	Interest Rate (%)	Change in Interest Rate (X)	Avg. Profit after Tax (Rs.)	Change in Profit (Y)	(XY)	x2	y2
2006	4.7		9675201				
2007	5.2	0.09615	9471494	-0.02151	-0.00207	0.00925	0.00046
2008	3.1	-0.67742	11136452.5	0.14951	-0.10128	0.45890	0.02235
2009	2.5	-0.24000	11376425.25	0.02109	-0.00506	0.05760	0.00044
2010	2.0	-0.25000	13288576.25	0.14389	-0.03597	0.06250	0.02071
2011	1.2	-0.66667	16696278.25	0.20410	-0.13607	0.44444	0.04166
2012	1.4	0.14286	18487446	0.09689	0.01384	0.02041	0.00939
2013	1.4	0.00000	19723942.75	0.06269	0.00000	0.00000	0.00393
2014	1.6	0.12500	23796200.75	0.17113	0.02139	0.01563	0.02929
2015	2.2	0.27273	25695656.5	0.07392	0.02016	0.07438	0.00546
n=10		**Σx = -1.19735**		**Σy=0.90171**	**Σxy=-0.22506**	**Σx2=1.14310**	**Σy2=0.13369**

According to the data in Table 1 and Equation 2it is calculated that there is a strong negative correlation between the US real interest rate and the Profit after Taxation (PAT) of the 'BIG FOUR' banks of Pakistan. This means that whenever the US real interest rate increase/decrease there is a strong tendency that the profitability of banks in Pakistan will decrease/increase. This is because according to the calculations the Pearson Correlation Coefficient comes out to be -0.684. This is in line with what the research suggests, as the banks' core function is lending and borrowing which condenses as interest rates rise. Nevertheless, if we square the Correlation Coefficient to find out the Coefficient of Determination we can conclude that almost 50% i.e. r^2= 0.468 variance in the average profit after tax of Pakistani banks is due to the US real interest rates, still 50% variance in the average profit after tax of Pakistani banks is due to other factors. However, there aren't many researches that focused on US real interest rates as their independent variable.

Table II: Effect of US real interest rates on Banks' average ROA

Year	Interest Rate (%)	Change in Interest Rate (X)	Avg. ROA	Change in Profit (Y)	(XY)	x2	y2
2006	4.7		2.59				
2007	5.2	0.09615	2.18	-0.18807	-0.01808	0.00925	0.03537
2008	3.1	-0.67742	2.09	-0.04306	0.02917	0.45890	0.00185
2009	2.5	-0.24000	2.03	-0.02956	0.00709	0.05760	0.00087
2010	2.0	-0.25000	2.14	0.05140	-0.01285	0.06250	0.00264
2011	1.2	-0.66667	2.33	0.08155	-0.05436	0.44444	0.00665
2012	1.4	0.14286	2.09	-0.11483	-0.01640	0.02041	0.01319
2013	1.4	0.00000	2.01	-0.03980	0.00000	0.00000	0.00158
2014	1.6	0.12500	2.09	0.03828	0.00478	0.01563	0.00147
2015	2.2	0.27273	1.92	-0.08854	-0.02415	0.07438	0.00784
n=10		**Σx = -1.9735**		**Σy = -0.33264**	**Σxy = -0.08480**	**Σx2 = -1.14310**	**Σy2 = -0.07147**

According to the data in Table 2 and Equation 2 it is calculated that there is a strong negative correlation between the US real interest rate and the average Return on Assets (ROA) of the 'BIG FOUR' banks of Pakistan. This means that whenever the US real interest rate increase/decrease there is a strong tendency that the averageROA of banks in Pakistan will decrease/increase. This is because according to the calculations the Pearson Correlation Coefficient comes out to be -0.535. This relationship also holds with what the past research suggests. Nevertheless, the relationship between US real interest rates and banks' average ROA has weakened as compared to the relationship between US real interest rates and banks' Profit after Taxation. Nonetheless, if we take the Coefficient of Determination we can conclude that almost 30% i.e. r^2= 0.286 variance in the average RoA of Pakistani banks is due to the US real interest rates, still 70% variance in the average RoA of Pakistani banks is due to other factors. Here we can summarize that there is a larger variance among the average RoA of Pakistani banks and US real interest rates.

Table III: Effect of US real interest rates on Banks' average ROE

Year	Interest Rate (%)	Change in Interest Rate (X)	Avg. ROE	Change in Profit (Y)	(XY)	x2	y2
2006	4.7		34.99				
2007	5.2	0.09615	26.16	-0.33754	-0.03246	0.00925	0.11393
2008	3.1	-0.67742	23.84	-0.09732	0.06592	0.45890	0.00947
2009	2.5	-0.24000	23.31	-0.02274	0.00546	0.05760	0.00052
2010	2.0	-0.25000	23.06	-0.01084	0.00271	0.06250	0.00012
2011	1.2	-0.66667	24.88	0.07315	-0.04877	0.44444	0.00535
2012	1.4	0.14286	23.11	-0.07659	-0.01094	0.02041	0.00587
2013	1.4	0.00000	21.92	-0.05429	0.00000	0.00000	0.00295
2014	1.6	0.12500	21.45	-0.02191	-0.00274	0.01563	0.00048
2015	2.2	0.27273	20.96	-0.02338	-0.00638	0.07438	0.00055
n=10		**Σx = -1.9735**		**Σy = -0.57145**	**Σxy = -0.02719**	**Σx2 = -1.14310**	**Σy2 = -0.13923**

According to the data in Table 3 and Equation 2 it is calculated that there is a weak negative correlation between the US real interest rate and the average Return on Equity (ROE) of the 'BIG FOUR' banks of Pakistan. This means that whenever the US real interest rate increase/decrease there is some tendency that the average ROE of banks in Pakistan will decrease/increase, however, it is not very likely that the change in US real interest rate will have a great effect on average ROE of Pakistani private commercial banks. This is because according to the calculations the Pearson Correlation Coefficient comes out to be -0.324. This relationship also holds with what the past research suggests. Although, the relationship between US real interest rates and banks' average ROE has weakened considerably as compared to the relationship between US real interest rates and banks' Profit after Taxation and the relationship between US real interest rates and average Return on Assets. Moreover, the Coefficient of Determination in this situation is only about 10% i.e. r^2= 0.104 variance in the average RoE of Pakistani banks is due to the US real interest rates, still 90% variance in the average RoE of Pakistani banks is due to other factors. Here we can summarize that there is a much greater variance among the average RoE of Pakistani banks and US real interest rates.

5. Conclusion

This research paper chose to study the effects of changes in US real interest rates on the profitability of private commercial banks of Pakistan. The study used Profit after Taxation, ROA and ROE of 'BIG FOUR' private commercial banks of Pakistan as its dependent variables. The findings of the research paper suggests that there is negative correlation between US real interest rates and the three measures of profitability selected for the study. The correlation between US real interest rates and profit after taxation and ROA are strong, however, the correlation between US real interest rates and ROE is weak. However, after finding the Coefficient of Determination of each of the three measures of profitability of banks and US real interest rates we can further conclude that although the correlations among the measures of profitability of banks and US interest rates are strong, nonetheless, there is a much greater variation that there are other factors that play a vital role in determining the profitability of the banks, There are certain shortcomings of this research such as the number of Pakistani banks selected for this study were only four, although these four are the market leaders of the Pakistani banking industry. Moreover, the study only analyzed the data from the past decade i.e. 2006 to 2015. The same research can be conducted using data from other industries as well and using more international macroeconomic factors to further investigate the effects of the interest rates on profitability.

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AN INVESTIGATION OF ISLAMIC CALENDAR EFFECTS ON STOCK RETURNS: A COMPARATIVE ANALYSIS OF ISLAMIC AND NON-ISLAMIC STATE

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Abstract

Purpose: *The purpose of this study is to identify the persistence of Islamic months in determination of the returns and volatility of stocks in stock markets of Islamic (Pakistan) and non-Islamic State (India).*

Design / methodology:*The data comprises of daily returns of KSE-100 and BSE-Sensex index for a period of 17 years from May 08, 1997 to November 05, 2013 in Georgian Calendar and Muharram 01, 1418 H to Zilhaj 30, 1434 H in Hijri Calendar. The ADF (Augmented Dickey-Fuller) test is used to check the unit root in the series. Ordinary Least Square Regression and GARCH (1,1) regression techniques have been applied for testing the Islamic calendar effect.*

Findings: *The findings revealed positive Rabi-ul-Awwal and Shawwal effect in mean stock returns of KSE and BSE respectively. However, the stocks were found less volatile in Rabi-ul-Awwal and Ramadan in Karachi Stock Exchange, and more volatile in Muharram and Shawwal in Bombay Stock Exchange.*

Practical implications: *These findings will help investors in designing strategies making trading decision to get maximum profit using the monthly effect of Islamic Calendars.*

Originality: *The literature highlighted that Islamic Calendar Effect persist in equity markets of Islamic countries, however we propose that it can also persist in Non-Islamic country with a significant Muslim Population. To the best of my knowledge, this is the first study to test comparatively the Islamic calendar effect on Islamic and non-Islamic country.*

Keywords: KSE-100 Index, BSE Sensex, Islamic Calendar effects, OLS regression, GARCH Model (1, 1)

JEL Codes: G14, G15

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1. Introduction

Stock market is a place where listed securities are bought and sold for either investment or speculation[1].Fame (1970) proposed that the stock prices are adjusted immediately with the arrival of new information in the stock market, phenomenon termed as Efficient Market Hypothesis (EMH).Although EMH was widely supported in the early years, research has revealed another phenomenon which contradicts EMH, known as 'Market Anomalies'. Anomalies cannot be elucidated in the light of conventional asset pricing models besides; they also defy the weak form of market efficiency (Parikh, 2009).

Broadly, there are three forms of anomalies or seasonal effects: Calendar, Technical and Fundamental. The calendar effects are recurring anomalies in market returns, determined by the calendar period (Panait, 2013).

Watched (1942) was the first person to conduct the revolutionary work on seasonality by reporting seasonality in stock returns (Dash, *etal.,* 2011). Much research has already been done on Gregorian calendar anomalies; for instance, 'The January Effect'Haugen, and Lakonishok (1992), 'The month of the year effect' Cadsbyand Ratner (1992) and 'The day of the week effect' Cross (1973).

Increasing research in the recent past shows that security returns also react to variables associated to causes such as the biorhythms, weather, social identity, and beliefs (Bialkowski,*et al.,* 2010). Some researches attested the fact that spiritual beliefs affect investor mood, which in turn molds the behavior of the stock market. The researchers contributing to this aspect includeFrieder and Subrahmanyam (2004) who investigated the effect on U.S equity market during the sacred

[1]Source: Book 'Introduction to Business' by Prof. M. SaeedNasir

days of Jewsof Rosh Hashanah and Yom Kippur, Lakonishok andSmidt (1988) who examined stock returns around the Christian holy days of Good Friday and Christmas and many others who explored the impact of holy months of Islamic Calendar on stock returns. Holy months like Ramadan, Muharram and Zulhajjhave been particularly researched due to increased level of religious activities during these months Husain (1998), Al-Ississ (2010)etc. This research also focuses on Islamic calendar anomalies, that is, seasonal patterns of the Islamic calendar.

Although some research has been conducted in the recent past demonstrating the effect of Islamic months on the stock markets of Islamic countries around the globe, no research has been conducted to demonstrate their effect on the stock markets of non-Islamic countries with a significant Muslim population. This research aims to investigate the impact of Islamic months of Muharram, Rabi-ul-awwal, Rajab, Sha'aban, Ramadan, Shawwal and Zulhajj on the stock markets of Pakistan (Islamic country) and India (non-Islamic country) from 1997 to 2013.It is particularly interesting to assess a predominantly non-Islamic country for the prevalence of any Islamic month effect since no research has been directed towards this subject until now.

India is a predominantly Hindu country with 13.4[2] percent of Muslim population. It is located in South East Asia and is one of Pakistan's neighboring countries. India and Pakistan share nearly the same culture and comprise of religiously devoted, practicing inhabitants. This comparative analysis will bring into limelight the effect of aforementioned Islamic months on the stock returns of both of these regions of Sub-Continent.

Although all Islamic months are sacred, we limit our research to the seven particularly special months namely, Muharram, Rabi-ul-awwal, Rajab, Sha'aban, Ramadan, Shawwal and Zulhajj due to their religious importance. Muharram is a solemn month for Muslims due to the martyr of Hazrat Imam Husain R.A. Given the gloomy investor mood during this month, a negative effect on the returns of Muslim financial markets has been observed. Rabi-ul-Awal is especially significant due to the birth of Prophet Muhammad PBUH, the last prophet of the Muslim Ummah, on 12 Rabi-ul-Awal, 571 A.D, which is known as 'Eid Milad-un-Nabi'. Muslims celebrate this month by decorating their houses, streets and shops to mark the arrival of their beloved Prophet in the world. The prices of goods, particularly provisional goods, increase during this month due to increased consumption level of people. Rajab and Sha'abanare significant due to the occurrence of 'Shab-e-Miraj' and 'Shab-e-Barat' respectively during these months. People mostly observe fast and offer 'Nawafil' on these two days to maximize their good deeds. During the month of Ramadan, Muslims all over the world observe fast from dawn till dusk. Some Muslims also visit Saudi Arabia to Perform Ummrah. The optimistic mood during Ramadan results in anaffirmative investor sentiment, consequently a positive valuation effect is seen on equity markets existing in Islamic countries(Bialkowski,*et al.,* 2010).During the first ten days of Zulhajj many Muslims visit Saudi Arabia to perform Hajj, the fifth pillar of Islam. Moreover, on the 10th of Zulhajj Muslims observe 'Sunnat-e-Ibrahimi' in which they slaughter cattles. During this month, the consumption of people increases which decreases their purchasing power. Keeping in view the importance of these months, we attempt to observe whether or not these months have any effect on the returns of stocks. The purpose of this study is to identify the persistence of Islamic months in determination of the returns and volatility of stock in stock markets of Islamic and non-Islamic State. These findings will help investors in designing strategies making trading decision to get maximum profit using the monthly effect of Islamic Calendars.

2. Literature Review

Recently, calendar anomalies have been a topic of much interest to researchers mainly because of the fact that it contradicts the much supported Efficient Market Hypothesis. Unlike Gregorian calendar anomalies, the seasonal patterns of different religious calendars have not been researched much. For instance, few of the relevant studies include a study of the Pakistani stock market to investigate the prevalence of conventional and Islamic anomalies conducted by Iqbal, et al. (2013), they investigated the conventional and Islamic calendar anomalies in Karachi stock exchange by taking into account daily and weekly data for the period of 20 years from 1992 to 2011. They applied Ordinary Least square (OLS) technique to observe results. Findings confirmed a positive Friday while a negative Monday effect and a significant half month, turn of the month, the month of the year, and Ramadan effect in Karachi Stock Exchange (KSE).

Akrami (2012) examined the effect of Ramadan on the abnormal returns of stocks of 199 companies listed in the Tehran Stock Exchange from 2005 to 2010 by using Variance analysis and repetitive measures. Stocks' abnormal returns were kept as dependent variable; results concluded that the abnormal returns differ significantly before, during and after Ramadan. Similarly, Azimi (2012) proved a significant relationship between Muharram and Safar Months and Stock Return by studying 175 firms listed in the Tehran Stock Exchange from 2006 to 2010.

[2]According to the Census of India, 2001.

Al-Hajiehet al.(2011) surveyed the Islamic Middle Eastern stock markets and observed a positive and significant Ramadan effect in the majority of the countries due to positive investor sentiments during this month. They applied GARCH model collected data from the largest market in the Muslim world i.e. Saudi Arabian stock market.

Mustafa (2011) affirmed that there is Ramadan effect in Karachi Stock Market whereas; there is no after Ramadan effect in KSE by observing daily data for the period of December 1991 to December 2010 with the application of OLS technique.

Ramadan effect was also explored by Bialkowski, et al. (2010) in 14 predominantly Muslim countries over the years 1989-2007. He found that the returns on stock during Ramadan are nine times higher and less volatile in comparison to the rest of the year. Moreover, results also attested the fact that Ramadan has no effect on the volume of trading. Likewise, Al-Ississ (2010) scrutinized the financial markets of 17 Muslim countries to explore the effect of Ramadan and Ashoura on their everyday returns, running pooled fixed effects panel regression model across all the examined financial markets. He found that the more sacred days of Ramadan yield a positive impact on returns while Ashoura days yield a negative one.

Seyyed (2005) investigated Ramadan effect, using GARCH model, in Saudi Arabia from 1985 to 2000 using GARCH model. They found that that returns during the month of Ramadan are same as other months while volatility moves downward during Ramadan. Similar results were observed by Husain (1998) in Pakistani Stock Market.

3. Data and Methodology

The sample data comprises of daily closing values of KSE-100 Index and S&P BSE SENSEX Index from Karachi and Bombay Stock Exchange respectively. The study covers a period of 17 years from May 08, 1997 to November 05, 2013 in Georgian Calendar and Muharram 01, 1418 H to Zilhaj 30, 1434 H in Hijri Calendar. The data have been sourced for sample period from the official websites of Karachi and Bombay Stock Exchange respectively, thereby yielded a total of 3933 observations of KSE-100 index and 4107 observations of S & P BSE SENSEX Index. The Georgian calendar dates were matched with Hijri calendar from the working paper of State Bank of Pakistan (Riazuddin, 2012).

However, the data for KSE-100 index does not include the values from January 01, 2008 through June 30, 2008 due to trading rule imposed in the market, which may influence the results. KSE-100 Index and S & P BSE SENSEX Index are both value-weighted market Indices, published by the Karachi Stock Exchange of Pakistan and Bombay Stock Exchange of India respectively. The reason behind taking Indices instead of individual stocks is that seasonality can be easily revealed in market Indices or large stock portfolios than in individual stocks (Officer, 1975). All data have been carefully screened for any missing values and correctly assembled. The summary of indices and total number of observations are given in Table 1.

Table I: Sample Indices and Observations

Indices	Observations
KSE-100 INDEX	3933
S & P BSE SENSEX	4107

All the statistical tests and regression used in the study have been performed in statistical software E-views "Econometric Views" 6.0.

In order to explore the impact of Islamic holy months of Muharram, Rabi-ul-awal, Rajab, Sha'aban, Ramadan, Shawal and Zulhajj on the stock returns in stock markets of Islamic and Non-Islamic State following hypotheses will be tested in the study:

H_1: Karachi and Bombay Stock Exchange are inefficient markets.

H_0: Karachi and Bombay Stock Exchange are efficient markets.

H_2: Islamic Calendar anomaly persists in stock returns of Karachi and Bombay Stock market or at least one β is not equal to zero.

H_0: Islamic Calendar anomaly does not persist in stock returns of Karachi and Bombay Stock market or $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$

3.1 Daily Return on Indices

Firstly, the daily returns on Indices are computed by using Natural Log Approximation Formula (Mehdian and Perry, 2001). The formula is given in equation 1.

$$R_{Index,d} = \ln Index_d - \ln Index_{d-1} (1)$$

Where, $R_{Index,d}$ is continuously compoundedreturnonIndexonday'd', $Index_d$ istheclosingvalue of stock market Indexonday'd', $Index_{d-1}$ istheclosingvalueof stock market Indexonday'd-1'. The return for any trading day followed by a non-trading day is calculated using the value of previous trading day. These logarithmic stock returns are usually normally distributed (Strong, 1992).

3.2 Unit Root Test (Augmented Dickey-Fuller Test)

Secondly, the Unit root test will be employed to test the occurrence of stationarity in both the indices return series. The ADF (Augmented Dickey-Fuller) test will check the unit root in the series. If the unit root is found to be present in the return series, it will be proved that returns follow random walk. The ADF test is applied in AR equation (see equation 2).

$$Y_t = \rho Y_{t-1} + \mu_t \quad (2)$$

It tests the null hypothesis of unit root.

H_0: Unit root is present in the returns or returns are non-stationary.
H_1: Unit root is not present in the returns or returns are stationary.

The ADF test is applied by taking optimal lags based on Schwartz Info Criterion (SIC). The maximum lag length is set by Eviews to 30. Moreover level and trend are selected for testing unit root of the return series following (Keong*et al.*, 2010) If the unit root is not proved in the return series, it means that the returns do not follow random walk and there is possibility of anomalies trend in the market.

3.3 Ordinary Least Square Regression

Ordinary Least Squares (OLS) technique is widely used to test the anomalies. First, the study applies the standard methodology of month-of-the-year effect to test Islamic calendar effect using OLS. The specification presented in equation 3 will be followed:

$$R_{index} = \alpha + \beta_1 Muh + \beta_2 Raa + \beta_3 Raj + \beta_4 Shab + \beta_5 Ram + \beta_6 Shaw + \beta_7 Zuh + \varepsilon_t (3)$$

Where, R_{index} is thereturn on KSE-100 Index and S & P BSE SENSEX, MuhrepresentsMuharram, Raa represents Rabi-ul-Awal, Raj represents Rajab, $Shab$ represents Sha'aban, Ram represents Ramadan, $Shaw$ represents Shawwal and $Zulh$represents Zulhajj. These Dummy variables of Islamic Calendar Months take the value 1 for the corresponding month's return otherwise 0. $\alpha$is the mean return on non-corresponding months and $\beta$is the excess return on corresponding month, relative to non-corresponding months. The *t*-test of β expresses if the corresponding month effect is significant.$\varepsilon_t$is the error term. The F-test is used to test the hypothesis of presence of Islamic Calendar anomalies in stock return series.

The regression equation is also tested for two common problems that usually violate regression assumptions;heteroscedasticity and autocorrelation of the error term. Heteroscedasticity is said to be present if the error term varies from one observation to another. On the other hand, autocorrelation is a problem of serial correlation between the error terms. Both problems violate the validity of OLS estimator. Moreover, the normality of the error term is also tested.

The standard regression model considers only the mean returns and does not take into account the time varying volatility of returns and volatility clustering which is mostly present in financial time series data. The GARCH model takes into consideration not only mean returns but also volatility (Parikh, 2009).

3.4 Generalized Autoregressive Conditional Heteroscedastic(GARCH) Model:

Engel (1982) proposed Autoregressive Conditional Heteroscedastic (ARCH) model, which allows the forecasting of systematic variance of returns over time. It provides accurate forecasting of volatile conditional variance (Keong*et al.*, 2010). According to the model the lagged squared residuals of returns determine conditional variance. The conditional variance $h_t$estimated using lagged values of conditional variance and squared residuals as proposed by Bollerslev (1986). This model is named as GARCH. GARCH model has been most widely used for successful estimation of conditional variances in modeling of

financial time series. The variance of next period can be best determined by weighted average of the previous average variance series. Moreover, the variance is determined by the most recent residuals with declining weights of past squared residuals. GARCH family models are considered to be the best fit for determining seasonal anomalies in return series involving autocorrelation and heteroscedasticity (Choudhry, 2001). The time varying volatility in residuals is estimated using ARCH-LM test.

The GARCH (1,1) model captures the conditional variance (risk or volatility of returns). The GARCH (1,1) models that are applied to study the month-of-the-year effect on volatility of returns (Choudhry, 2001) using equation 4.

$$h_t = c + v_1 Muh + v_2 Raa + v_3 Raj + v_4 Shab + v_5 Ram + v_6 Shaw + v_7 Zulh + \propto \varepsilon_{t-1}^2 + \beta h_{t-1} \quad (4)$$

Where h_t represents the conditional variance, v_1 to v_7 are the coefficients of Dummy variables of Islamic Months and represent the size and direction of the effect of particular Islamic Month on the Stock returns volatility.

3.5 Hypothesis Testing

The hypotheses regarding Efficient Market Hypothesis is tested using the results of ADF test. If the Unit root is not proved in the return series ($p<0.1$), the returns are stationary and hence do not follow random walk. More specifically, weak form of Efficient Market Hypothesis is not present.

The hypotheses regarding the effect of Islamic Calendar Months in return series and volatility is tested using the t-test statistics. The null hypothesis presents $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7$. If atleast one ofthe β is found significantly different then null hypothesis will be rejected and alternative hypothesis will be accepted as a prove of particular month effect in sample market. The p-value of the t-statistics will be used to prove the effect of each Islamic Month.

4 Results

4.1 Unit Root Test

The empirical results of Augmented Dickey-Fuller test for unit root confirmed that both KSE-100 Index and BSE Sensex return series are stationary at 1st difference. Moreover, the ADF test statistics is also greater than test critical values. The results are shown in Table 2. Since the unit root is not proved in Karachi and Bombay Stock market, the series are stationary. It provides evidence that both KSE and BSE stock returns do not follow random walk. Hence, the null hypothesis "Karachi and Bombay Stock Exchange are efficient markets" is rejected and thus alternative hypothesis "Karachi and Bombay Stock Exchange is inefficient markets" is proved. The stationary in the return series is also evident from figure I and II.

Table II: Results of Unit Root Test

Indices	Test Statistics	Critical value	Remarks
KSE-100 INDEX	-25.88809	-3.410953	Stationary at Level
BSE SENSEX	-28.27228	-3.410904	Stationary at Level

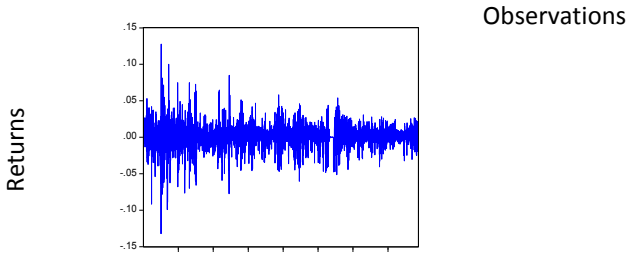


Figure I: Line Chart of KSE-100 Index Returns

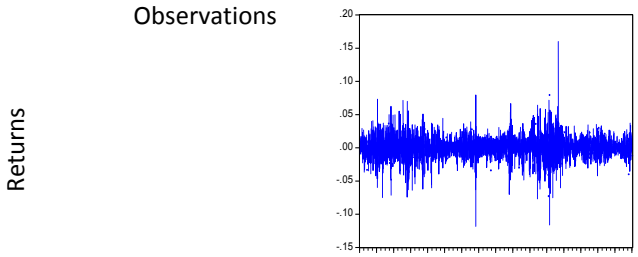


Figure II: Line Chart of BSE SENSEX Index Returns

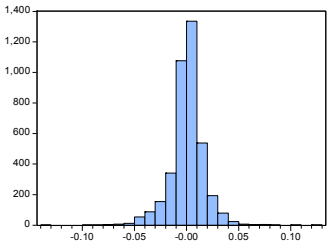
4.2 Summary Statistics

The descriptive statistics of the index return series are tabulated in Table 3. The mean stock return of the Karachi Stock Exchange is better as compared to Bombay Stock Exchange. However, the value of standard deviation depicts that both the markets are equally risky. The kurtosis of both the indices shows leptokurtic distribution since the values are higher

than 3. The JarqueBera test is applied to test normality of return series. The probability of JarqueBera rejects the null hypothesis of normality at 1% significance level for both KSE and BSE return series. The histograms of return series also supported the presence of higher peak than normal distribution as shown in Figure III and IV.

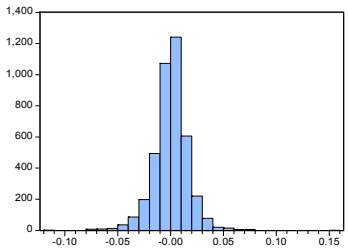
Table III: Descriptive Statistics of Return Series

Indices	N	Mean	Std. Dev.	Skewness	Kurtosis	JarqueBera	Prob.
KSE-100 Index	3933	0.000718	0.01629	-0.37459	8.5627	5162.942	0.0000
BSE SENSEX Index	4107	0.000419	0.01643	-0.13604	8.5500	5283.759	0.0000



KSE-100 Index Returns

Figure III: Histogram of KSE-100 Index Returns



BSE SENSEX Index Returns

Figure IV: Histogram of BSE SENSEX Index Returns

Table 4 portrays the descriptive statistics of return series based on the Islamic months. The results show that Karachi Stock Exchange has positive returns in all the tested months except Zulhajj. Moreover, it can be observed that Rabi-ul-Awwal and Zulhajj offer the highest and lowest return respectively. Examining the month based return series of BSE SENSEX Index it can be observed that mean return of Muharram is lowest and that of Shawwal is highest.

Table IV: Descriptive Statistics of Month Based Returns

	Muharram	Rabi-ul-Awwal	Rajab	Sha'aban	Ramadan	Shawwal	ZulHajj
KSE-100 INDEX							
Observations (N)	311	323	347	351	327	317	291
Mean	0.000828	0.002137	0.000139	0.000798	0.001690	0.001600	-0.00027
Std. Dev.	0.015078	0.020491	0.016779	0.014949	0.013169	0.014813	0.014165
Skewness	-0.838515	-0.00783	0.264593	-0.23756	-0.450176	-0.17406	-0.61586
Kurtosis	5.105748	6.334044	8.109948	4.960615	4.615676	7.627291	4.811390
BSE SENSEX INDEX							
	Muharram	Rabi-ul-Awwal	Rajab	Sha'aban	Ramadan	Shawwal	ZulHajj
Observations	330	346	351	347	344	338	334
Mean	-0.0000415	0.001459	0.000729	0.001350	0.000927	0.001601	-0.00067
Std. Dev.	0.018872	0.018092	0.015990	0.012454	0.014582	0.017644	0.016649
Skewness	-0.272932	-0.82711	-0.20919	-0.28930	0.441738	-1.31857	-0.30134
Kurtosis	5.648359	9.850234	4.731765	3.674085	4.829986	10.98648	6.106950

Note: the values are Significant at '*' 1%, '**' 5%, '*' 10% level**

4.3 OLS Regression Results:

The results of OLS regression for Islamic Calendar effect for the Karachi and Bombay Stock Exchange are presented in Table 5.

It is evident from the results that the OLS estimate of Rabi-ul-Awwal (0.001795) is significant at 10% level in KSE. However, in BSE the Shawal coefficient (0.001678) is found significant at 10% level. It proves the mean returns of Rabi-ul-Awwal and Shawwal are significantly different from other months mean returns in KSE and BSE respectively. The effects of both the months are found positive.

However, we can observe that the values of $R^2$for both return series are very small and F values are also insignificant. Besides the residual series is also found non-normal, unfitting the OLS model. Moreover, when the residuals are tested for serial correlation using ARCH LM test, the p-value (0.000) proved the persistence of serial correlation in residuals. Due to these problems in error term, OLS is an inappropriate model and cannot adequately capture the varying volatility and volatility clustering of index returns series (see Fig 1 and 2).

Table V: OLS Regression Results

KSE-100 INDEX								
	C	MUH	RAA	RAJ	SHAB	RAM	SHAW	ZH
Coefficient	0.000341	0.000487	0.001795	-0.0002	0.000456	0.001349	0.001258	-0.00057
t-Statistics	0.854291	0.483256	1.81058***	-0.21069	0.476521	1.367255	1.259015	-0.54268
R-squared	0.001742	F-statistic		0.976716	Prob(F-statistic)			0.446216
BSE SENSEX INDEX								
	C	MUH	RAA	RAJ	SHAB	RAM	SHAW	ZH
Coefficient	-7.68E-05	3.53E-05	0.001536	0.000806	0.001426	0.001003	0.001678	-0.00059
t-Statistics	-0.19381	0.035759	1.587329	0.837977	1.475687	1.034283	1.716647***	-0.60133
R-squared	0.001946	F-statistic		1.141856		Prob(F-statistic)		0.33347
Note: Significant at '*' 1%, '**' 5%, '***' 10% level								

4.4 GARCH (1, 1) Regression Results:

The conditional variance is estimated using GARCH (1, 1) model which is used to capture the Islamic Calendar effect on the stock index returns volatility. The Bollerslev and Wooldridge robust standard error is also computed for estimates. Moreover, the Berndt-Hall-Hall-Hausman (BHHH) algorithm is used to prevent default in iteration process (Parikh, 2009).

The residual series is also estimated and tested for serial correlation using ARCH LM test. The results confirm that the null hypothesis of no serial correlation cannot be rejected at 5% level up to 1 lag. This indicates that the volatility of the market returns has been fully reflected in the return series.

The findings reveal that in Karachi Stock Exchange the stock returns are least volatile in Ramadan (-0.000007). The volatility is also lowerin Rabi-ul-Awwal (-0.000004The p-value is also less than 0.01. It provides that the volatility of stock returns in the months of Rabi-ul-Awwal and Ramadan is lower and significantly different. Hence, negative Rabi-ul-Awwal and Ramadan effect is proved in KSE. Results of Ramadan are consistent with (Seyyed, 2005) and (Hussain, 1998) but contradicts (Al-Ississ, 2010).

In Bombay Stock Exchange positive Muharram and Shawwal Effect is proved. The coefficients of Muharram (0.000006) and Shawwal (0.000009) are found significant at 5% and 1% respectively. This means that the returns in BSE are more volatile in Muharram and Shawwal as compared to other Islamic Months. Moreover, the model is also best fit in both KSE and BSE estimation, since the values of R^2 are more than 90% and F-statistics are also significant.

Since the evidence of Islamic Calendar is proved in both the stock markets. The null hypothesis $\beta 1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$ is rejected. Hence, the alternative hypothesis "Islamic Calendaranomaly persists in stock returns of Karachi and Bombay Stock market or At least one β is not equal to zero" is proved.

Table VI: GARCH (1,1) Results

	Karachi Stock Exchange		Bombay Stock Exchange	
C	-0.000012	-2.14167	-0.000024	-4.98935
β	0.947888	44.89802	0.965089	109.0601
α	0.00003	8.58435	0.000032	7.303665
MUH	-0.000003	-0.9018	0.000006	2.050511**
RAA	-0.000004	-0.44548*	0.000003	0.79185
RAJ	-0.000012	-2.44185	0.000001	0.388185
SHAB	-0.000005	-1.60953	0.00000	0.131623
RAM	-0.000007	-3.21024*	0.00000	0.021649
SHW	-0.000006	-1.40968	0.000009	1.920102*
ZH	-0.000005	-1.22768	0.000002	0.78176
R-squared	0.936837		0.971085	
F-statistic	6453.634		15284.3	
Prob(F-statistic)	0.00000		0.00000	
Note: Significant at '*' 1%, '' 5%, '***' 10% level**				

5 Conclusion

This study investigates the persistence of Islamic calendar anomalies on the stock returns and volatility in Karachi and Bombay Stock Exchange. These findings will help investors in designing strategies making trading decision to get maximum profit using the monthly effect of Islamic Calendars. Findings conclude that the Karachi and Bombay Stock markets are inefficient markets, since the return series have varying volatility. OLS estimate revealed that mean return of Rabi-ul-Awwal is positive and significantly different in KSE. Moreover, in BSE the mean return of Shawwal is positive and significantly different. It proves positive Rabi-ul-Awwal and Shawwal effect in KSE and BSE respectively. This implies that due to the positive investor mood during the months of Rabi-ul-Awwal and Shawwal, the trading activities increase which ultimately result in an increase in returns.

Whereas, according to ARCH model the returns volatility is significantly lower in Rabi-ul-awal and Ramadan in KSE. Whereas, while a significant positive Muharram and Shawwal effect is seen in BSE due to greater volatility of returns as compared to other months. This is the first study to explore a non-Islamic State for the prevalence of any Islamic calendar effects however, the equity markets of other non-Islamic states with a significant Muslim population namely; NASDAQ, LSE, etc.still remain unexplored. In future, it will be particularly interesting to conduct research examining the effect of Islamic months on these stock markets.

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PERFORMANCE COMPARISON OF ISLAMIC MUTUAL FUNDS IN PAKISTAN AND MALAYSIA

Hummaira Jabeen[1] and Muhammad Walid[2`]

Abstract

This study covers several performance dimensions of Islamic mutual funds in Pakistan and in Malaysia and also link between fund size and performance is analyzed afterwards. Time span for the study is from January 2007 to December 2015. This whole time period covers global financial crisis as well, so performance was analyzed in bull and bear market. For performance measure five different ratios are employed namely Sharpe ratio, Treynor ratio, Jenson Alpha, Sortino ratio, and Information ratio and for finding link between fund size and fund performance Pearson Correlation is employed. It is found that crisis is having direct impact on fund performance and fund managers in both markets are risk averse most of the time, they are not performing well in comparison of market and performance in comparison of risk free securities is good in both countries and a negative link is found between fund size and fund performance.

Keywords: Islamic mutual funds, Sharpe ratio, Treynor ratio, Jenson Alpha, Sortino ratio, Information ratio, Pearson Correlation.

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1. Introduction

Markowitz (1952) was the first to toss the concept of investment optimization those targets at contemporaneous buildup of investor's capital and reduction of the risk of adverse events. His well-known modern portfolio theory states that an investor can reduce its portfolio risk by varying its portfolio. This theory without changing the returns lessens portfolio's riskiness. Lintner, (1965) and Elton & Gruber (1977) were holding view that by expanding the investment horizon, investors can lower their exposure to the risk of single assets. Thus leading us to hypothesize that enhancement in investment performance gained by diversification in lessen when there exists a correlation in investments.

A financial instrument that pays profit to investors based on their respective investments is known as a mutual fund. These funds are regulated by an operation policy that guides the management of fund in making their investment decision. (Sakakibaraa, Matsuib, Mutoha, & Inuzuka, 2015).

According to a study anticipated 72 % of people residing in Muslim-majority countries are not user of conventional financial products (Honohon, 2007). The types of investment that are made in accord to the shari'ah-islamic law, is Islamic finance. It focuses more on carrying out the instructions of Quran rather than maximizing the returns (Hayat & Kraeussl, 2011). They are based on Mudaraba or Wakalaagreements. Islamic equity funds have to adhere to the Islamic rules which inflict a set of guidelines that rule eachphase of a Muslim's life, including dealings with others in business world. (Rania & Ezzedine, 2015).

The Islamic financial system rested on five key principles, which include the forbidding of interest-riba, uncontrolled uncertainty-gharar, speculation-maysir, risk and return sharing, and the forbiddingof investing in immoral industries. These guidelines are having far reaching outcomes for Muslim investors. Asitindicates that Muslims are forbidden from investing in futures, options and other speculative type derivatives. Islamic guidelines also put a limit on many other structured financial products (Rania & Ezzedine, 2015), (Shanmugam & Zahari, 2009).

In Islamic finance, it is legitimate to take entrepreneurial risk and profit. This means that financing in mutual funds is permitted, provided that they cling to the five key Islamic finance codes. Since the code of not receiving or paying any interest is too preventive for most otherwise worthy companies. (Hayat & Kraeussl, 2011)For this reason, screening process is applied on Islamic financing; screening steps for Islamic financing includes following two steps.

At first level, in non-financial filtering only those companies are selected which are violating any Islamic rule in their operations.

At second level, filter is applied on financial characteristics of companies. This is done by using ratio analysis by Muslim jurists. In this process certain limit are followed and decisions are taken according to those limits (Rania & Ezzedine, 2015).

This study is covering Malaysian and Pakistani Islamic mutual fund industry. Reason of choosing such markets are several. These both markets are emerging by nature and Islamic countries by nature but if we look at operations of Islamic financing, Malaysia is considered as hub of Islamic financing. It has Islamic financing since 1983 and soon after first Islamic bank it offered first sukuk in 1990. Shariah advisors in the form of Commission Malaysia and Bank Nagara and Malaysian International Islamic Financial Center based in Kingdom of Saudi Arabia also exist there. There full fledge Islamic market exists of Islamic funds and Shairah based index as well national and international (Raslan, 2008). This indicates that Malaysia is in stronger position in terms of Islamic financing.

When we look at Pakistani Islamic mutual fund market, this market seems to be in its early stage. It commenced its operations in 1995 when al Meezan investment management limited was founded. Since then number of Islamic products keep of increasing but still gap exists in many dimensions. Such as, Pakistan is not having any Islamic based index and treasury bills. But from many existing studies sign of hope can be seen (e.g. (Shah & Hijazi, 2005), (Zaheer, Mir, & A., 2011). For this reason, in this study it is focused to compare the performance of a developed Islamic financial market with a developing Islamic market. This study will be helpful for all those whose investors who don't invest in traditional investment avenues due to religious reasons.

Rest of the paper is organized as follows. Section two deals with literature review whereas section three deals with data and analysis than conclusion.

2. Literature Review

Literature of mutual funds is very vast. Researchers have done a lot of work for unfolding the risk and return characteristics from different angels. Studies specific of these countries majorly have analyzed market at national level and analyzed performance of fund. Such as Annuar (1997) with his colleagues examined the performance of Malaysian mutual funds and found that funds outperformed the Kuala Lumpur Composite Index (KLCI) and fund managers are having poor market timing ability. Ahmad (2001) presented a survey in his study without any empirical analysis that Islamic funds are performing better than market. Zaher and Hassan (2001) also conducted similar study and concluded that returns on ethical investments are better than conventional mutual funds. Abdullah (2007) and his colleagues found that conventional funds perform well in bear market and Islamic funds during bull market.

Studies on Pakistani markets are very rare. The few those are available covering very short time span and short sample in study as Ali et.al, (2012) studies fifteen mutual funds from 2005 to 2009 and concluded that performance of mutual funds are not up to the mark in Pakistan. Zaheer et.al, (20II) in his study concluded that persistency exists in performance of conventional funds not in case of Islamic funds. Shah et.al, (2005) after analyzing Pakistani mutual fund industry concluded that this industry is having very little stake in comparison of whole financial industry and performance of this sector is satisfactory.

This paper adds to the works on Islamic finance in several means. First, a brief summary on the nature of Islamic investing by debating the characteristics of Islamic investment is provided. Second, analyze is done in a thorough empirical way for finding the performance and risk-return characteristics of Islamic Mutual funds over the period January 2007 to December 20 I5.Thirdly link between fund size and performance is also under consideration and last but not the least impact of recent financial crisis is checked also.

3. Data and Methodology

In this paper mutual funds in Malaysia and Pakistan are analyzed and compared for the period of 2007-2015. Data on Pakistani mutual funds is downloaded from mutual funds association of Pakistan, on market and of 12 month T-bills from statistical bulletin of State Bank of Pakistan. In case of Malaysia data on funds and 12-month treasury bills is collected from Bursa Malaysia and on market from international monetary funds (IMF).

For analysis purpose, multiple ratios are employed namely Sharpe measure; Jensen differential measure; Treynor measure; Sortino measure and Information measure and correlation is found by employing Pearson Correlation. For analysis purpose, ratios have been mostly used (see e.g. (Abdullah, Mohamed, & Hassan, 2007), (Shahid, 2007). In this study, objective is to analyze the performance, so for this purpose widely used approach is to use ratio analysis.

3.1 Sharpe Measure:

This is developed by Nobel laureate William F. Sharpe in 1966. It is used for finding risk-adjusted performance (Sharpe, 1994). The Sharpe ratio formula is:

$$\text{sharpe ratio} = r_p - r_f/\sigma \quad \text{(Eq.1)}$$

Where,

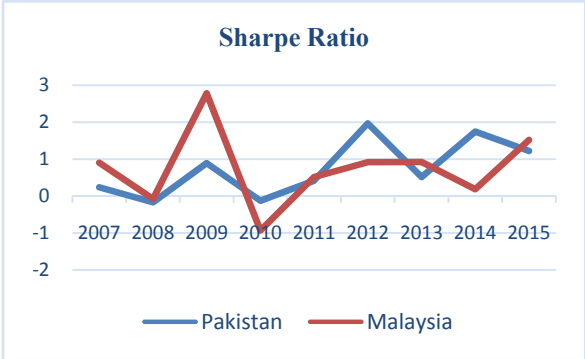
r_p= portfolio return,

r_f = risk free rate,

σ = standard deviation.

Higher Sharpe ratio is desirable; it indicates that fund is performing well. Ratio more than one indicates that portfolio is producing very high return and having very low volatility.

Figure 1



3.2 Treynor Measu re:

This measure was developed by Jack Treynor, very similar to Sharpe ratio, also known as reward to volatility ratio (French, 2003).

$$\text{Treynor Measure} = r_p - r_f/\beta \quad \text{(Eq. 2)}$$

Where,

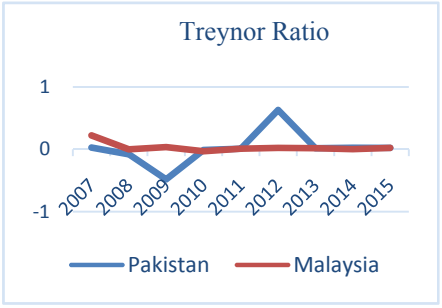
r_p = portfolio return,

r_f = risk free rate,

β = beta.

Treynor ratio measures the additional probable return of a portfolio in comparison to systematic risk (George & Ferson, 2006). Treynor in combination of Sharpe ratio present the ability of managers in diversifying of portfolio (Lalith & Tanweer, 2005).

Figure 2



3.3 Jenson Differential Measure:

Jensen's measure was developed by Michael Jensen in 1967 and is used for finding the difference of portfolio return from the return predicted by Capital Asset Pricing Model (CAMP) (Jensen, 1967). It estimates the ability of fund manager's in forecasting the fund's return (Shahid, 2007). Its formula is as follows:

$$\alpha = r_p - [r_f + \beta_p(r_m - r_f)] \text{(Eq. 3)}$$

Where,

r_p = expected total portfolio return,

r_f = risk free rate,

β_p = beta of the portfolio,

r_m = expected market return.

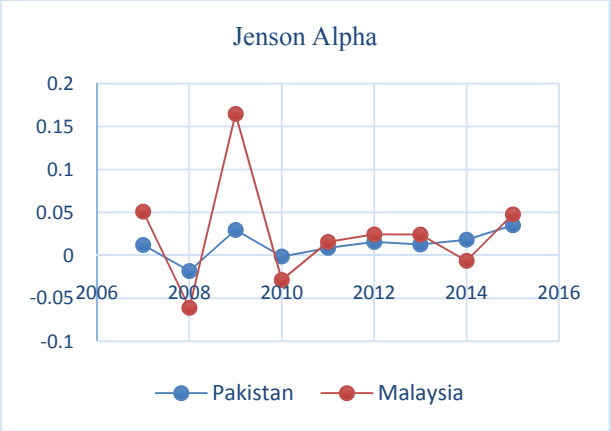


Figure 3

3.4 SortinoRatio:

This was introduced by Frank Sortino in 1944 presented as modified form of Sharpe ratio. It employs downside risk for finding the fund performance (Nafees et al., 2011). The formula of Sortino measure is as follows:

$$\text{Sortino ratio} = r_{p-}r_f/\,DR \quad \text{(Eq. 4)}$$

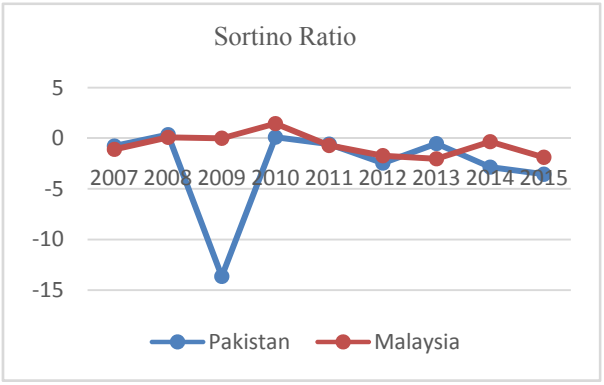
Where,

r_p = portfolio return,

r_f = risk free rate,

DR = downside risk.

Figure 4



3.5 Information Ratio:

This is also known as Appraisal ratio. This ratio uses Jensen' alpha and unsystematic risk of a managed portfolio for evaluation (George & Ferson, 2006). Information measure was introduced by Thomas Goodwin in 1998. Formally, the information ratio (IR) is calculated as:

$$\text{Information ratio} = r_p - r_m/\sigma \quad \text{(Eq. 5)}$$

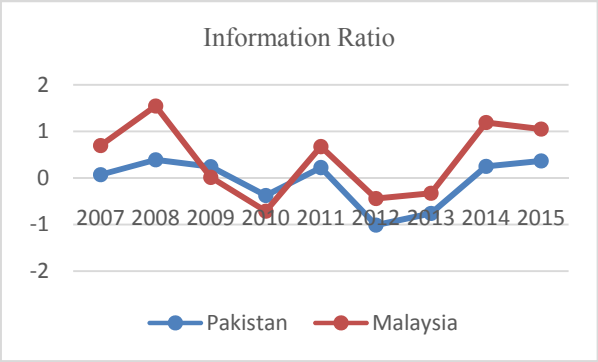
Where,

r_p = portfolio return,

r_m = market return,

σ = standard deviation.

Figure 5



3.6 Pearson Correlation Coefficient:

It is standard measure for finding the degree of association between variables. It is calculated by using following formula.

$$r = \Sigma x_{i1} x_{i2}/nS_1S_2 \quad \text{(Eq. 6)}$$

4. Analysis

Sharpe ratio or risk adjusted performance of Pakistan is having mixed trend in overall time period. Starting from 2007, it is low indicating impact of global crisis 2007. It's been negative during and after crisis time indicating direct impact but very good condition start to happen except year 2013, indicating strong risk adjustment of funds (refer figure. 1).Performance of Malaysia is not so much outstanding in comparison of Pakistan. Impact of crisis can also be seen here. But its intensity is low in starring but it become severe right after crisis. After that strong position is showing except year 2014. So in comparison can be said that risk adjusted performance is not very different in both cases. Same direction exists for both economies.

Treynor ratio or risk adjusted performance of fund over per unit of systematic risk or reward to volatility ratio have not been much high in both markets indicating a risk averse strategy of fund manager. During crisis, it's been negative and interesting point in that this is slightly better in case of Pakistan indicating good position of Pak funds in comparison of market (refer figure. 2).

Jensen alpha results indicate that by comparing expected return of managed portfolio with benchmarked portfolio, position is not different than Treynor ratio. It's been negative or very low during the study time period, shoeing that manager's forecasting ability is not very good. During crisis time period, it may attribute to global downturn of economies but latter on its very low in both economies, indicating weak performance of funds in comparison of benchmark portfolio (refer figure. 3).

Sortino ratio or downside risk adjustment of both markets is negative most of the time, showing bad risk adjustment of funds. Sortino ratio having reverse link in both causes. Here, condition of Malaysia is better than Pakistan (refer fig. 4).

Information ratio or appraisal performance is not much high in both economies (refer figure 5).

In comparison of market information is having negative and Jensen and Treynor direct and moderate link, in case of Pakistan. While in case of Malaysia, negative link except in information ratio. Overall analysis indicates that at some instant regardless of crisis performance is negative, no doubt crisis are having an impact on performance but fund managers are risk averse that's why return for most of the time is not very much good. Despite of bad condition, sign of hope exists here, cause with the passage of time it is increasing trend is seen in both countries.

Results of Pearson correlation coefficient moderate link between fund size and risk adjusted performance is found. A negative link is found between fund size and performance of Islamic mutual funds.

Table I: Summary Statistics

Malaysia					
Year	Sharpe Ratio	Treynor Ratio	Jenson Ratio	Sortino Ratio	Information Ratio
2007	0.899580122	0.222152685	0.050949926	-1.098268626	0.627008951
2008	-0.079977173	-0.001856574	-0.061004874	0.090657649	1.155348735
2009	2.778996742	0.035548065	0.164852473	0	-0.227744157
2010	-0.932495791	-0.031567266	-0.028547043	1.445893882	-0.337415328
2011	0.516149757	0.009319361	0.015755985	-0.70918031	0.450388029
2012	0.91498671	0.023131292	0.024589445	-1.724061159	0.56809837
2013	0.920707521	0.017010911	0.02439585	-2.02970117	0.432021274
2014	0.184247203	0.002623098	-0.006312486	-0.341745198	0.939847908
2015	1.518841138	0.021425974	0.047879399	-1.880136609	0.683091967

Pakistan					
Year	Sharpe Ratio	Treynor Ratio	Jenson Ratio	Sortino Ratio	Information Ratio
2007	0.237347921	0.027477141	0.012259874	-0.764969921	0.070363845
2008	-0.170224711	-0.080279177	-0.018104664	0.35990866	0.390293163
2009	0.893896494	-0.482947132	0.02967864	-13.65144563	0.241327633
2010	-0.126524232	-0.010311013	-0.001273697	0.110894726	-0.376596211
2011	0.414064336	0.009709137	0.008778499	-0.565862951	0.223670058
2012	1.966736614	0.631036507	0.01583357	-2.451253053	-1.01120684
2013	0.515602027	0.016316387	0.012861427	-0.519440958	-0.761047327
2014	1.745641021	0.024226394	0.018302144	-2.850751983	0.250714423
2015	1.219733421	0.022374974	0.035156074	-3.552381788	0.367174567

Table II: Pearson Correlation Analysis of Pakistani Mutual Funds

	Information	Jenson	Net Assets	Sharpe	Sortino	Treynor
Information	1					
Jenson	0.041589	1				
Net Assets	(0.137335)	0.581605	1			
Sharpe	(0.230198)	0.662019	0.666449	1		
Sortino	(0.228198)	(0.633313)	(0.021533)	(0.347673)	1	
Treynor	(0.651488)	(0.084173)	0.292014	0.456828	0.535123	1

Table III: Pearson Correlation Analysis of Malaysian Islamic Mutual Funds

	Information	Jenson	Net Assets	Sharpe	Sortino	Treynor
Information	1					
Jenson	(0.4804575)	1				
Net Assets	0.24630833	(0.0548437)	1			
Sharpe	(0.1694591)	0.92177761	0.08090421	1		
Sortino	(0.4244242)	(0.2310988)	(0.4852366)	(0.4682407)	1	
Treynor	0.13767887	0.3397332	(0.4155014)	0.29495005	(0.3092589)	1

5. Conclusion & Discussion

Despite the growing interest in Islamic finance in general, and Islamic mutual funds in particular, academic research on Islamic equity investment portfolios is limited. The primary aim of the present study is to fill the existing gap and extend the literature on Islamic investment portfolios, in order to contribute to the development of Islamic finance. The study has analyzed the performance of Islamic mutual funds in Pakistan and of Islamic financial hub-Malaysian Islamic unit trust industry for the period of 2007 to 2015.

Funds in Pakistan market were compared with Malaysian fund market; it was revealed that there is not any significant difference in their risk and returns. Starting from 2007, in year 2007 apparently seems to be that Pakistan's market is better and Malaysian is not but reality is that funds in Malaysia were flourishing with registered growth of 84% in NAV to RM16.86 billion (FMUTM, 2007) and also its market so that's why it seems to be it is not prospering. Its total share like Pakistan's fund market was low in that year but its NAVs was satisfactory in 2007 in Malaysia and same year Islamic funds showed growth in the market of Pakistan as well.

In year 2008 globally financial crisis was seen and these crises were having direct impact on fund market. In this year islamic funds in Pakistan indicated downward trend while crisis becomes blessing for Malaysian islamic unit trust, this year for the first time islamic share was more than conventional in Malaysia and that year islamic fund's was 26.8% of total financial industry of Malaysia (FMUTM, 2008). Global crisis was not having much effect upon islamic funds so this sector gain momentum and it continued in year 2009 as well Malaysian funds account 27% (FIMM, 2009) of market this year and like last year it account a major portion of industry and showed increment overall. In case of Pakistan crisis showed direct impact and its industry showed downward attitude.

Crises were lessening in coming years, so their direct impact can be seen on fund market. Condition of market start to stabilize and 27% growth was observed in Malaysian Islamic market like last year (FIMM, 2010), 28% in year 2011 (FIMM, 2011) and like trend in coming years. So this showed that in overall period Islamic mutual fund industry flourish in Malaysia while in case of Pakistan effect of 2008-09 crises can directly be seen and boom is observed after 2009, starting from 2010 and onwards.

The purpose of this study was to analyze the performance of Islamic mutual funds in Pakistan and Malaysia. To meet this purpose, empirically data is analyzed and results are drawn. From analysis, it is found that crisis is having direct impact on fund performance and fund managers in both markets are risk averse most of the time, they are not performing well in comparison of market and performance in comparison of risk free securities is good in both countries and a negative link is found between fund size and fund performance. This whole study indicates that future of both markets in Islamic equities is bright.

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Accounting of Optimum Working Capital in Pakistan: Evidence from Manufacturing Sectors

Saqib Hussain[1]

Abstract

The persistence of this study is to scrutinize the relationship between working capital effectiveness (Cash Conversion Cycle and Current ratio) and corporate performance and in particular, to determine their significance of working capital optimum (inverted U-shaped curve or U-shaped curve) where performance could be achieved maximum or minimum across the seven industrial sectors namely Cement, Food, Tobacco, Oil and Gas Exploration, Textile, Pharmaceutical and Fertilizer Sector. Panel data have been used from 2006 to 2014 of manufacturing firms in Pakistan (Karachi stock exchange index 100). The study reveals the assigned levels with the help of inverted U-Shaped or U-Shaped curves working capital management of each sector. If each sector of firms sustains the assigned level of working capital then they will get optimization level of the performance. Our result examined that, if manager sustain the given assigned level of cash conversion cycle and current ratio then they can know and achieve the optimize profits and also create positive value for shareholders by maximization of profit.

Keywords: Profit after tax, Cash conversion cycle and Current ratio

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1. Introduction

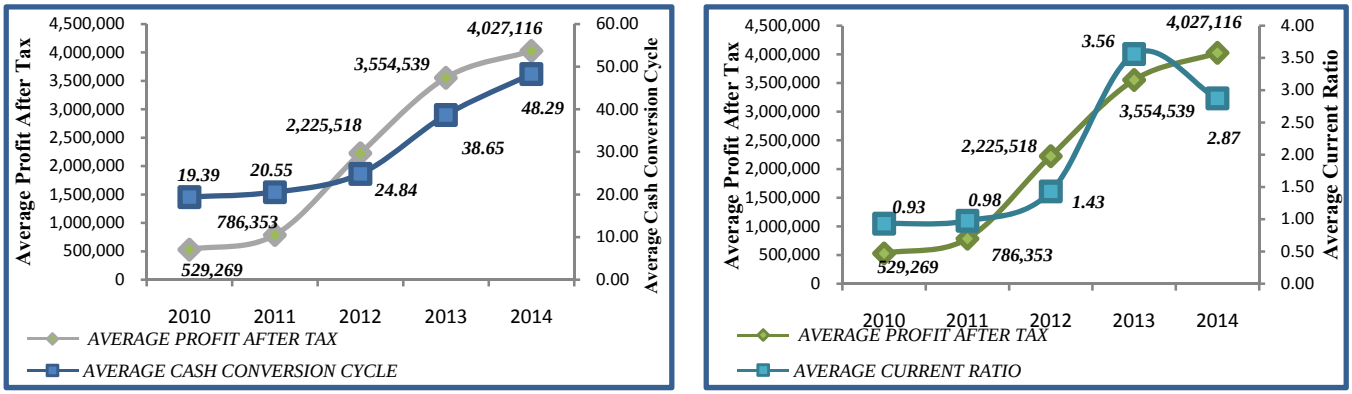
The literature on investment decision grew through much theoretical and empirical contribution. There are so many studies available that show a direct relation between investment & firm value (Burton, Lonie, & power 1999; McConnell & Muscarella, 1985). Authors like (smith 1980;Kim& Chung 1990) all they did suggest that working capital decision would be affected on the performance. Pervious study tells us that Working capital is a very important perspective.In2011 Haq et al did investigate that working capital management would directly effect on the effectiveness of the firm. As a consequence working capital increase the shareholders' value (Ernst & young, 2009) working capital plays significant role in every corporate sector. Firms try to achieve optimum level of working capital because this techniques indicate the firms are able to meet their operating expenses and can also pay their short term liability or not. Further higher working capital indicate that money is locked up in working capital/current assets (Deloof, 2003)in additional higher working capital might also hamper the ability of the firm to take up other value-enhancing projects.

More importantly optimum level of working capital requirement depends on the nature of the firms because different business will have different working capital requirement For instance, manufacturing firms heavily invest in spare parts and tools because their account receivable would be large while Food restaurants inventory level would be large for the goods of resale and receivable level is lower other than the manufacture (Ukaegbu 2014). There are three basic concept of cash conversion cycle, that is inventory period, receivable period & payable period, firm can efficiently working, if they maintain their working capital level. Investigation papers show the importance of these three major perspectives that if account receivable and inventory period would increase firm will face imbalance in the level of working capital, similarly account payable period is short then firms can face below & above optimum level of working capital (Ukaegbu 2014;Enqvist, Nikkinen 2014).

1.1 Research Background

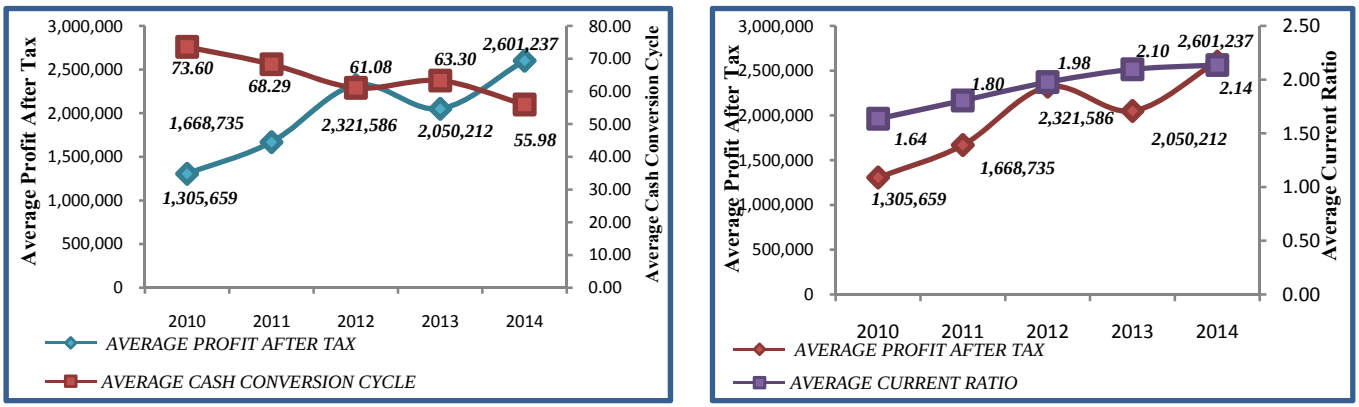
We will analyze below, the relationship between the working capital management and firm performance in the non-financial KSE 100 index by taking average of each sector, what would be optimum or minimum level of the working capital where firm performance could be maximized or minimized like inverted U-Shaped curve or U-Shaped curve. Two graphs will be representing from the each sector, in which we have used three variables. Average cash conversion cycle or average current ratio will be represent on the secondary axis and average profit after tax on the primary axis in the against of different year. We will analyze of seven sectors through of graphs without use Panel least Square method, regression, multi-regression or any other special quantitative or qualitative technique for the finding of optimum level.

Figure 1.1: *Cement Sector for the Sample of Seven Firms*



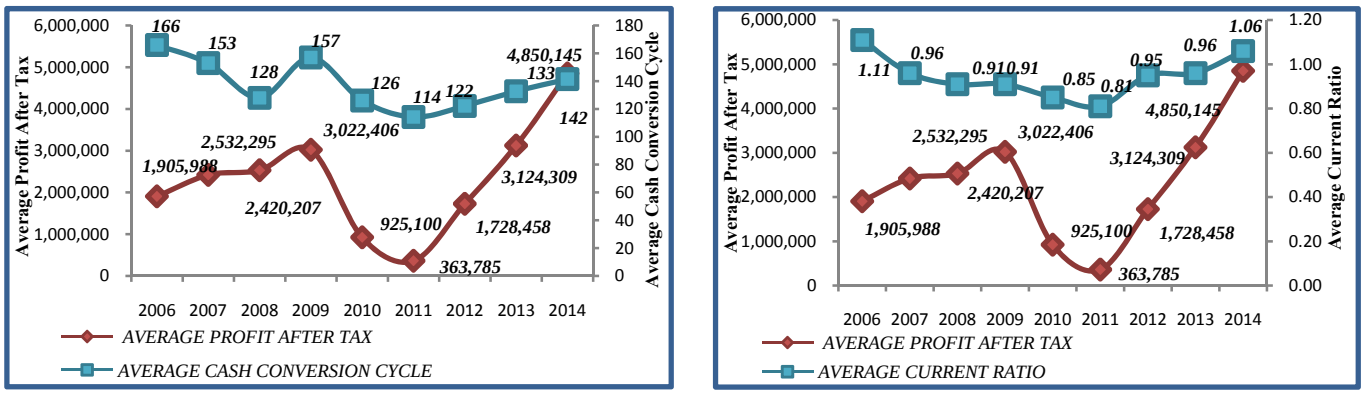
Source: Authors Construction

Figure 1.2**:** *Food Sector for the Sample of Five Firms*



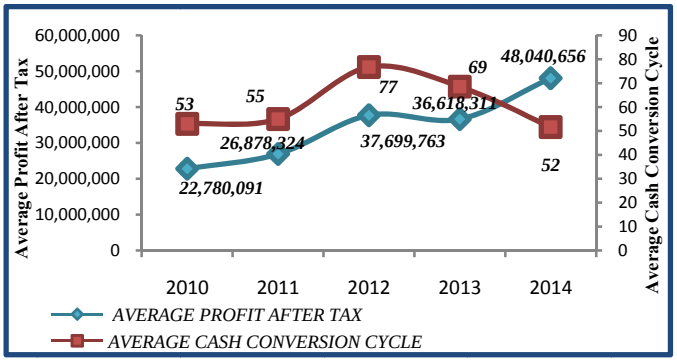
Source: Authors Construction

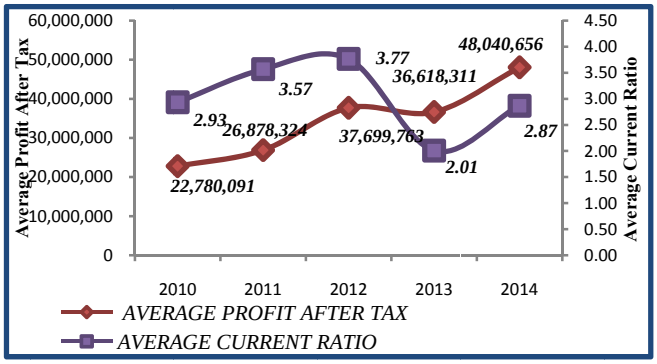
Figure 1.3**:** *Tobacco Sector for the Sample of One Firm*



Source: Authors Construction

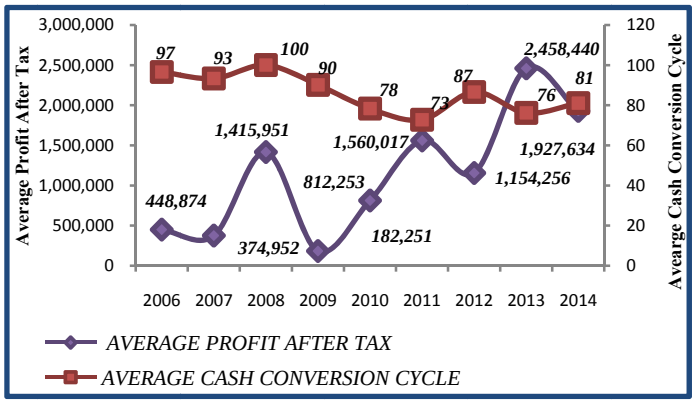
***Figure 1.4**: Oil and Gas Exploration Sector for the Sample of Four Firms*

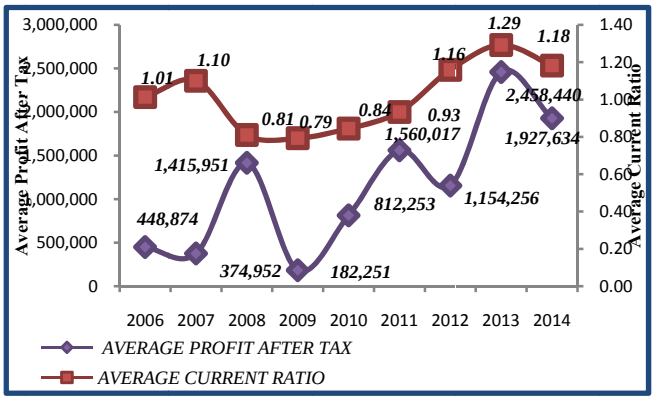




Source: Authors Construction

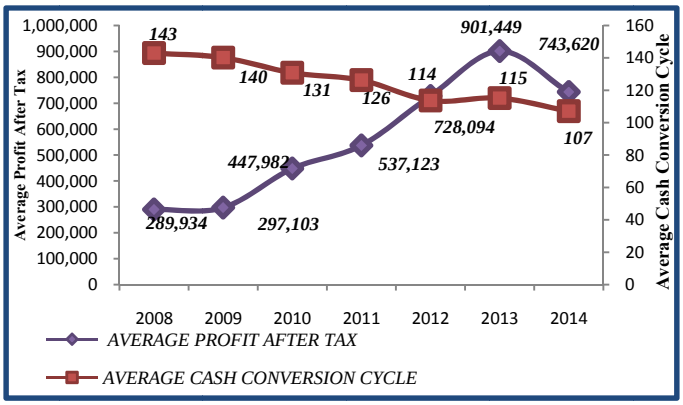
***Figure 1.5**: Textile Sector for the Sample of Four Firms*

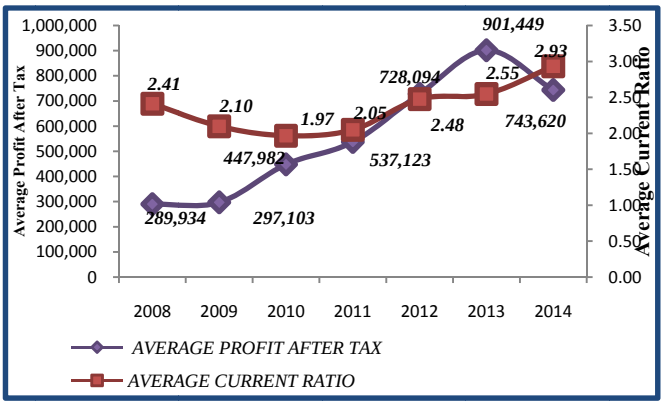




Source: Authors Construct

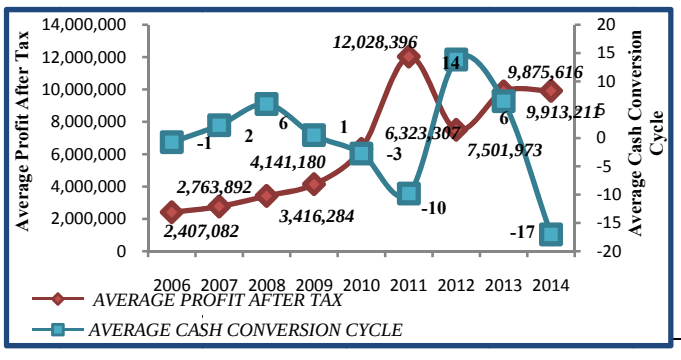
***Figure 1.6**: Pharmaceutical Sector for the Sample of Four Firms*

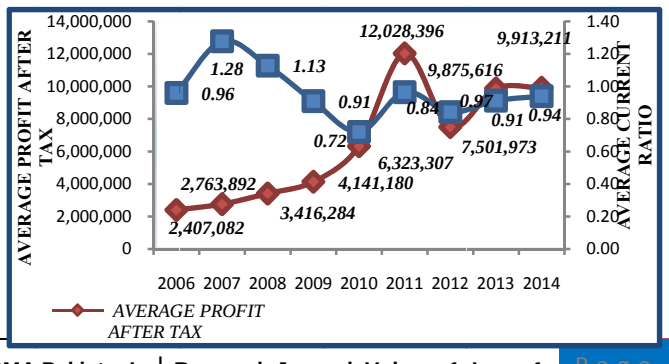




Source: Authors Construction

***Figure 1.7**: Fertilizer Sector for the Sample of Four Firms*





We have investigated above figures of the seven sectors in Pakistan (KSE 100 index non-financial firm), above in the graphs we didn't get any optimum point in the contradiction of cash conversion cycle or current ratio, where performance of the firm could be optimized. After this research we will be able for the optimum point, where profitability will be maximized or minimized. As per our knowledge there arises the need of the research as the first to analyze the functional form of this relation in the Pakistan non-financial firm whose registered in the KSE-100 index, in which we will investigate and examine relationship between the variable (PAT, CCC, CR) by the taking of non-linearity relation from the help of U-shaped or inverted U-shape (Quadric Function).

Many studies have been done in the past related to the impact of the optimum working capital on the firm's performance, profitability & investment[3]. Many researchers did give scientific result about the variable of Cash conversion period, account receivable period & account payable period, which these entire items is increased or decreased, and then what would be effect on the corporate performance & profitability[4]. Some of the researchers also did suggest how should be firm approaches regarding working capital & what would be the decisions about working capital in the Recession & Boom[5]. Additionally we have different theory which provide information that manufacturing firm optimum working capital ratio should be 'two 'rather than less than or more than two. Otherwise firm will not face comfortable liquidity position or bear finance & opportunity cost. The theory also stat that optimum working capital will depend on the business nature (it is not necessary that every firm of optimum working capital of two)[6]. However they only determined the optimum working capital toward industry, finished Good firm and covered different areas of the world.

Therefore the objective of this paper is to finding the optimum level of working capital and examines impact of optimum level of cash conversion cycles or current ratio on net income of a firm. The rest of this paper is structured as: Section 2reviews the previous literature, Section 3examines the data and the methodology for the current research, Section 4presents results from the data analysis, Section 5concludes.

2. Literature Review

Deloof (2003), this study related to the impact of working capital management and Profitability. The main aim of this research paper is investigate the relationship between the working capital management and firm profitability in Belgium. They have used 1009 non-financial firms' data during the period of 1992-1996. They have used Pearson's correlation and Correlation analysis for the purpose of finding relationship between the working capital and Profitability. In this research independent (working capital management) variable are account inventory days, account receivable period, account payable period, cash conversion cycle (CCC) while dependent (profitability) variable is gross operating income. He found there is negative significant association between the inventory days of period, account receivable days of period, and payable days of period and profitability. There is a conclusion of large firms if these three items will be reduced then Belgium firms profitability and shareholder value will be enhanced.

S. Banos-Caballero *(*2013), investigates linkage between working capital management & corporate performance for the sample of non-financial UK companies. They did investigate a large and statistically significant inverted U-shaped relation between corporate performance and working capital. This paper examine the net trade cycle, if net trade cycle would be double then firm performance would be negative in which inverted U shape relation exist between the working capital & firm performance . The sample comprise non-financial quoted firm from the united kingdom for the period 2001-2007 using the ordinary lest square& the two stage least square estimation method, working capital measure by the net trade cycle, sales and return on asset This paper also analyze weather the optimum level of working capital sensitive, therefore this paper finding indicate that at working capital levels below the optimum level then higher sales would be effected, contrariwise the opportunity & finance cost effected dominate when the firm has a working capital level below from the optimum level. The finding shows that the optimum is lower firm more likely to financial constraint. They did investigate a large and statistically significant inverted U-shaped relation between corporate performance and working capital. In this research paper coefficient of the net trade cycle variable is positive ($\beta>0$) but square of the net trade cycle is ($\beta<0$), this relation represent the inverted of U-shape. Further they did find turning point in their research paper is 66.95 days as called optimum level of working capital.

[3]Deloof, M., (2003),S.Banos-Caballero (2014)& Burton, Lonie, & power (1999)
[4]B.Ukaegbu (2014),MohmmadShaukat Malik &MahumBukhari (2014), Abuzayed, B. (2012)
[5]J.Enqvist et al (2014), Richards, V.D., Laughlin, E.J (1980)
[6]Management of working capital Chapter 7 the institute of chartered accountants of India, CA-IPCC-Chapter of Financial management.

3. Data Collection and Methodology

In this study, two models will be representing. In which we will use two independent variables that will measure the working capital management (cash conversion cycle, current ratio) and one dependent variable measure the performance of the mentioned sectors (Profit after tax). Many authors have explained the cash conversion cycle or current ratio that these variables are effective for the measurement of working capital management (Enqvist, Graham,Nikkinen 2014;Baños-Caballero, García-Teruel, Martínez-Solano 2013).

Abbreviations; (for further reference)

CCC = Cash Conversion Cycle ,CR = Current Ratio PAT = Profit after

Cash conversion cycle and current ratioare formula (Nikolai, Bazley, and Jefferson; Mclaney5th Edition, 201, p.310) given below,

$$cashconversioncycle = Noofdaysinventory + Noofdaysreceivable - Noofdayspayable$$

i. $$Noofdaysinventory = \frac{365}{inventoryturnoverratio}$$

$$Inventoryturnoverratio = \frac{costofgoodsold}{averageinventory}$$

ii. $$Noofdaysaccountreceivable = \frac{365}{receivableturnoverratio}$$

$$Receivableturnoverratio = \frac{Netsales}{averagereceviable}$$

iii. $$Noofdaysaccountpayable = \frac{365}{payableturnoverratio}$$

$$Payableturnoverratio = \frac{costofgoodsold}{averagecreditorpayable}$$

iv. $$currentratio = \frac{currentasset}{currentliability}$$

The dependent variable is profit after tax (Net Income), according to authors, profit after tax is essential for the shareholder. Net income is referring to the bottom line or retrains earning as appraised of the profitability of the business enterprise after reducing the all cost. This is the important factor as it reduces the company's interest payment of the debt and tax expenses. This is also used to calculate Economic value added (EVA). Some researches (Chen andL.Dodd 1997)explain the economic value added concept on the new cooperate performance measure, according to them EVA is the most useful measure of cooperate performance. The idea behind of the EVA is, if business enjoys be profitability (PAT) then only Shareholder wealth is enhanced. There are two objective of the EVA (Economic Value Added) according to (Houle 2008), first is to maximize shareholders wealth and second is as under cover the cost of capital. Equation given below of the EVA according to (Houle 2008),

Cement Sector	*Attock Cement Of Pakistan*	*Fauji Cement Company*	*Lucky Cement Company*	*Cherat Cement Company*	*Kohat Cement Company*	*D.G Khan Cement Factory*	*Pioneer Cement Company*
Food Sector	*Engro Food*	*Rafhan Maize*	*RafhanMaimurree Brewery*	*Nestel Food Company*	*National Food Company*		
Tobacco Sector	*Pakistan Tobacco Company*						
Oil And Gas Exploration Sector	*Paksitan Oilfield Limited*	*Oil and Gas Development Company*	*Mari Petroleum Limited*	*Pakistan Petroleum Limited*			
Textile Sector	*Gulahmed Textile Company*	*Nishat Textile Company*	*Nishat(Chunian) Textile Company*	*Kohinoor Textile Mill Limited*			
Pharmaceutical Sector	*GlaxoSmithKline Pakistan Limited*	*Abbot Pakistan Limited*	*Searle Company*	*Ferozsons Company*			
Fertilizer Sector	*Fauji Fertilizer Bin Qasim*	*Fatima Fertilizer*	*Fauji Fertilizer*	*Engro Fertilizer*			

EVA = Profit after Taxes (PAT) – (Capital investment x Cost of Capit

3.1 Data Collection source and Sample Size

We have developed secondary data from the financial statement to investigate the involvement between working capital management and profitability. In our research include non-financial firms in Pakistan listed in the Karachi stock Exchange 100 thus, for the principle of this research. Seven sectors are employed for the purpose.

Table 3.1: Sample of Seven Sectors of the Firms (Karachi Stock Exchange index-100)

The data taken to carry out this study was of the cement sector year (2010 to 2014), food sector (2010 to 2014), tobacco sector (2006 to 2014), oil and gas exploration sector (2010 to 2014), textile sector (2006 to 2014), Pharmaceuticals sector (2008 to 2014) and fertilizer sector from (2006 to 2014). To analyze the time series data, Panel ordinary least square method technique is used as a statistical technique. Data associated to these seven sectors was collected from a very reliable and dependable source i.e. "Audit/Published Financial Statement as given on their relevant website.

3.2 Hypothesis Model

The study has two different model equations which are as follows

Model 1 $PAT = \beta_o + \beta_1 CCC + \beta_2 CCC^2 + e$

Model 2 $PAT = \beta_o + \beta_1 CR + \beta_2 CR^2 + e$

Y is showing as the dependent variable of the performance in the model 1 and 2. Cash conversion cycle and current ratio its squares is showing as two independent variable after the technique optimum or minimum point can be found where profitability achieve maximum or minimum of the firm beside the idea of cash conversion cycle and current ratio. Time Series error component is error (e). The quadric function concept on this model will be applied to find optimum point in both models. Theory of the Quadric Function has the concept of U-shaped and inverted U-shaped. Quadric function is a special case of the polynomial model (Aiken and west 1991;DeMaris 2004). We could be found the optimum level with the help of inverted U-shaped (β1> 0, β2< 0) and bottom/minimum point with the help of U-shaped (β1 < 0, β2> 0) that is according to Quadric Function. Many researchers used this concept in their research (Barios-Coballero 2014; Bruyn, Bergh, Opschoor 1998) and explained the existing relationship between the variables that is a U-shaped or Inverted U-shape. The turning point is found the help of given formula (-β1/2β2).

3.3 Hypothesis

Inverted U-Shaped or U-Shaped does not exist in the relation between working capital management and firm performance.

4. Empirical Evidence

We are representing each sector result given below each table will exemplify two models.

4.1 Cement Sector

As a result Panel least square method table 4.1 of displaying 7 non-financial firms (Cement sector) listed in Pakistan, across the Karachi Stock Exchange 100 index for a period of five year from the 2010 to 2014.

Table 4.1: *Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Cement Sector*

Cash Conversion Cycle				***Current Ratio***			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	- 631367.8	-0.860005	0.3962	C	-402229.0	- 0.438194	0.6642
CCC	137068.3	4.038991	0.0003	CR	1500376.	1.615595	0.1160
CCC^2	- 752.1435	-2.855545	0.0075	CR^2	29369.12	0.159415	0.8743
R-squared	0.401635						
F-statistic	10.73955			R-squared 0.505007 F-statistic 16.32371			
Prob.(F-statistics)	0.000270			Prob.(F-statistics) 0.000013			
Source : Author Estimation							

The table reveals that the inverted U-Shape curve does subsist between the working capital management and firm performance in the model 1 and its null hypothesis is rejected as a result is insignificant, revealing optimum level of performance besides the idea of net trade cycle (CCC). According to the coefficient, optimum level is 91.11 days giving implication to the cement sector in which if sustain the cash conversion cycle then it will get optimum performance. Shareholders value and their profits will be maximized if cement sector sustain their cash conversion cycle on the assigned level, on the contrary sector will face decreasing performance if cash conversion cycle will be below from the assigned level.

However null hypothesis is accepted of model 2 as result is insignificant there is no any U-shaped or inverted U-shaped curve subsist between the working capital management and firm performance in the model 2 beside the idea of current ratio.

4.2 Food Sector

As a result Panel least square method of table 4.2 of displaying 5 non-financial firms (Food sector) listed in Pakistan, across the Karachi Stock Exchange 100 index for a period of five year from the 2010 to 2014.

Table 4.2: *Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Food Sector*

Cash Conversion Cycle				***Current Ratio***			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	1641269	2.402622	0.0252	C	7141532	4.148983	0.0004
CCC	66667.10	2.785283	0.0108	CR	- 4593276	- 2.715892	0.0126
CCC^2	- 631.6885	-3.566099	0.0017	CR^2	773920.7	2.247285	0.0350
R-squared	0.431112			R-squared	0.339400		
F-statistic	8.335969			F-statistic	5.651530		
Prob.(F-statistics)	0.002020			Prob.(F-statistics)	0.010455		
Source : Author Estimation							

The table reveals that their inverted U-Shape does subsist between the working capital management and firm performance in the model 1. Hence null hypothesis is rejected as a result of significant, in which case we can recommend optimum level of performance besides the idea of cash conversion cycle. According to the coefficient, optimum level is 5.27 days where we can give implication to the food sector, if firms will sustain their cash conversion cycle on assigned level then they will get maximum performance. Manager scan enhance shareholders value and maximize their profit if they sustain their cash conversion cycle on 5.27 days. Otherwise performance of the firm will decrease if cash conversion cycle goes below the assigned level.

However model 2 is also significant and according to research design U-shaped does exist between the working capital management and firm performance. We can also recommend minimum level of the performance besides the idea of current ratio. Our result is indicated by the quadric relation, minimum level is 2.96times, where we can give implication to the food sector, that if firms will retain their current ratio on the times of 2.96 then they will get at least minimum performance. In the indication of U-shaped curve, current ratio will be raised from the assigned level and performance will also increase vice versa.

4.3 Tobacco Sector

As a result Panel least square method table 4.3..1 of displaying 4 non-financial firms (Tobacco sector) listed in Pakistan, across the Karachi Stock Exchange 100 index for a period of nine years from the 2006 to 2014.

Table 4.3: *Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Tobacco Sector*

Cash Conversion Cycle				*Current Ratio*			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistic*	*Prob.*
C	- 77260182	- 3.163353	0.0195	C	- 66721361	- 66721361	0.1014
CCC	1117617.	3.180615	0.0191	CR	.3608	1.892749	0.1072
CCC^2	- 3864.036	- 3.093990	0.0213	CR^2	- 66425401	- 66425401	0.1258
R-squared							

	0.683628			R-squared 0.583706 F-statistic 4.206445 Prob.(F-statistics) 0.072144	
F-statistic	0.683628				
Prob.(F-statistics)	0.031666				
Source : Author Estimation					

The table reveals that there inverted U-Shape does subsist between the working capital management and firm performance in the model 1 and its null hypothesis is rejected as a result of significant, in which we can recommend optimum level of performance beside the idea of cash conversion cycle. According to the coefficient, optimum level is 144.61 days giving implications to the tobacco sector that can sustain its cash conversion cycle on the assigned level to get maximum performance. Shareholders value and their profit can only be maximized if they will sustain their cash conversion cycle on the assigned level otherwise decrease in the cash conversion cycle from the assigned level then performance will also decrease.

However null hypothesis is accepted in the model 2, the table reveals that there is an inverted U-shape between the working capital management and firm performance according to quadric function but there is a delinquent in significance of value because of which inverted U-shaped does not exist between the working capital management and firm performance. Regardless of the current ratio recommended optimum level cannot be achieved.

4.4 Oil and Gas Exploration Sector

As a result Panel least square method table 4.4 of displaying 4 non-financial firms (Oil and Gas exploration Sector) in Pakistan, across the Karachi Stock Exchange 100 index for a period of five year from the 2010 to 2014.

Table 4.4:
Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Oil and Gas Exploration Sector

Cash Conversion Cycle				*Current Ratio*			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	61188177	4.954542	0.0001	C	- 23728810	- 0.856286	0.4037
CCC	- 1407240.	- 2.891039	0.0102	CR	24139786	1.478312	0.1576
CCC^2	7909.886	2.745138	0.0138	CR^2	- 1284476.	- 0.621823	0.5423
R-squared	0.331542			R-squared 0.415745 F-statistic 6.048430 Prob.(F-statistics) 0.010378			
F-statistic	4.215828						
Prob.(F-statistics)	0.032594						
Source : Author Estimation							

The table reveals that there U-Shape does exist between the working capital management and firm performance in the model 1 and its null hypothesis is rejected, in which we can recommend minimum level according to the quadric relation which is 88.94 days where firm's performance will be minimized. If cash conversion cycle will be increase from the assign level then performance increases vice versa, cash conversion cycle will be declined from the assigned level but performance also increases at 88.94 days. "The firm performances involuntarily increase when cash conversion cycle decreases"

However null hypothesis is accepted of model 2 and its result is insignificant. the table reveals that there is an inverted U-shape between the working capital management and firm performance according to quadric function but there is a delinquent in significance of value because of which inverted U-shaped does not exist between the working capital management and firm performance. Regardless of the current ratio recommended optimum level cannot be achieved.

4.5 Textile Sector

As a result Panel least square method table 4.5 of displaying 4 non-financial firms (Textile sector) listed in Pakistan, across the Karachi Stock Exchange 100 index for a period of nine years from the 2006 to 2014.

Table 4.5:

Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Textile Sector

Cash Conversion Cycle				*Current Ratio*			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	1.7908	0.277859	0.7829	C	- 2.4909	- 7.147808	0.0000
CCC	- 5829135.	- 0.389918	0.6991	CR	4.3109	6.325385	0.0000
CCC^2	35372.02	0.441944	0.6614	CR^2	- 1.7209	- 5.302609	0.0000
R-squared	0.008879			R-squared 0.641093 F-statistic 29.47285 Prob.(F-statistics)0.000000			
F-statistic	0.147823						
Prob.(F-statistics)	0.863152						
Source : Author Estimation							

The table reveals a U-shape between the working capital management and firm performance according to quadric relation. Null hypothesis is accepted of the model 1and its result is insignificant. U-shaped does not exist between the working capital management and firm performance because of significance value, in which minimum level cannot be assigned so as the firm's performance in the cash conversion cycle.

However model 2 is significant, null hypothesis is rejected, there is exists inverted U-shaped between the working capital management and firm performance the with recommend optimum level of current ratio. Our result is sustain on Quadric Function theory where optimum level of current ratio is 1.25times where we can confer implication to the textile sector then firms will acquire maximization of performance. Shareholders worth can be maximized with the help of assign level of current ratio.

4.6 Pharmaceuticals Sector

As a result Panel least square method table 4.6 of displaying 4 non-financial firms (Pharmaceuticals Sector) in Pakistan, across the Karachi Stock Exchange 100 index for a period of five year from the 2008 to 2014.

Table 4.6:

Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Pharmaceutical Sector

Cash Conversion Cycle				*Current Ratio*			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	3219431	8.213487	0.0000	C	-2166500	-1.962647	0.0609
CCC	- 30265.88	- 4.555114	0.0001	CR	2126045	2.748012	0.0110
CCC^2	75.20053	3.017840	0.0058	CR^2	-311947.1	-2.580783	0.0161
R-squared	0.717399			R-squared	0.247891		
F-statistic	31.73193			F-statistic	4.119936		
Prob.(F-statistics)	0.000000			Prob.(F-statistics)	0.028412		
Source : Author Estimation							

The table reveals that there U-Shape does exist between the working capital management and firm performance in the model 1 and its null hypothesis is rejected, in which we can recommend minimum level according to the quadric relation which is 201.23 days where firm's performance will be minimized. If cash conversion cycle will be increase from the assign level then performance increases vice versa, cash conversion cycle will be declined from the assigned level but performance also increases at 201.23 days. "The firm performance involuntarily increases when cash conversion cycle decreases" (Ukaegbu 2013;Makori, Ambrose Jagongo, 2013; Ayub 2015; Lazaridis and Tryfonidis, 2006; García-Teruel and Martínez-Solano, 2007; Falope and Ajilore, 2009). As evident the U-shaped this happens when it lowers from the assigned level.

However model 2 is significant and its null hypothesis is rejected, there is exists inverted U-shaped between the working capital management and firm performance the with recommend optimum level of current ratio. Our result is sustain on Quadric Function theory where optimum level of current ratio is 3.4times where we can confer implication to the pharmaceuticals sector then firms will acquire maximization of performance. Shareholders worth can be maximized with the help of assign level of current ratio.

4.7 Fertilizer Sector

As a result, Panel least square method of table 4.7 of displaying 4 non-financial firms (fertilizer sector) listed in Pakistan, across the Karachi Stock Exchange 100 index for a period of nine years from the 2006 to 2014.

Table 4.7:

Estimation Result Cash Conversion Cycle or Current Ratio Firm Performance Relation of Fertilizer Sector

Cash Conversion Cycle				*Current Ratio*			
Variables	*Coefficient*	*t-statistics*	*Prob.*	*Variables*	*Coefficient*	*t-statistics*	*Prob.*
C	6304519	4.961121	0.0000	C	1150059	0.427524	0.6718
CCC	7466.462	0.138696	0.8905	CR	10301996	2.401978	0.0221

CCC^2	354.8393	0.349475	0.7290	CR^2	- 3517791.0	-2.332319	0.0259
R-squared	0.003720			R-squared 0.151362 F-statistic 2.94293 Prob.(F-statistics) 0.066668			
F-statistic	0.061606						
Prob.(F-statistics)	0.940361						
Source : Author Estimation							

The table reveals that there is no any inverted U-Shape or U-shape is subsist between the working capital management and firm performance, because of which we can't recommend the maximum or minimum performance of the firm. Null hypothesis is accepted, model 1 is insignificant, beside the idea of cash conversion cycle.

However model 2 is significant, null hypothesis is rejected in which we can recommend optimum level. In additional our result is sustaining the inverted U-shaped relation optimum level is 1.46times where we can confer implication to the fertilizer sector, in case if firm will sustain their current ratio on the assessment of 1.46 then firms will acquire maximum performance. If current ratio is below than the assigned level then firm performance will decrease.

5. Conclusion

This investigation has found that there is an assigned level of optimum working capital relationship between the firm performances where sectors can achieve maximum or minimum profits. In addition, we found that there is a significant result of inverted U-Shaped curve or U-shaped Curve between the working capital management and firm performance behalf of this we assigned level of each sector in the contradiction of cash conversion cycle and current ratio. According to result, if cash conversion cycle or current ratio is decreased from their assigned level, then profit after tax will decreases a significant result of concave relationship between the working capital management and firm performance. Similarly as our significance results of u-shaped curve is indicating that its current ratio or cash conversion cycle will increase and decrease but profit after tax will increases.

A firm must have policy to accelerate cash conversion cycle and current ratio. Cement, Food, Tobacco sectors is an optimum level is 91.11, 5.27, 144.61 days respectively with the significant value, concave relationship subsist between the working capital management and firm performance and on this assigned level sectors can achieve maximum performance beside the idea of cash conversion cycle. However Oil and Gas Exploration and Pharmaceutical sectors optimum level is 88.94, 196.29 days respectively with the significance value but in this sector u-shaped relationship exist between the working capital management and firm performance on this assigned level sectors will achieve minimum performance beside the idea of cash conversion cycle, result is insignificant of the textile sectors in which we cannot be achieve optimum level in the contradiction of cash conversion cycle.

In additional Textile, Pharmaceuticals and fertilizer sectors is optimum level is 1.25, 3.6, 1.46 times respectively with the significance value, concave relationship exist between the working capital management and firm performance on this assigned level sectors can achieve maximum performance beside the idea of current ratio. However Food sector optimum level is 2.9 times with the significance value but in this sector u-shaped relationship exist between the working capital management and firm performance on this assigned level sectors will achieve minimum performance beside the idea of current ratio, further our result is insignificant of the cement, Tobacco and Oil and Gas Exploration sectors in which we cannot achieve optimum point beside the idea of current ratio. This paper therefore recommends that managers can enhance value for their shareholders by maintaining the assigned level of cash conversion cycle and current ratio. The cash conversion cycle and current ratio measures how operative administrators are in managing the working capital.

Our findings indicate that profit will be optimum, after it as maintaining the inventory turnover period, account receivable period and account payable period for assigned level. This supports the idea that at lower than level of working capital, managers would prefer to increase the investment in working capital in order to increase firms' sales as perspective of increasing profit for the shareholder value maximized.

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IMPACT OF EMPLOYEE ORIENTATION ON JOB PERFORMANCE AND JOB SATISFACTION IN ISLAMIC BANKING

Adnan Asghar Ali[1] and Dr. Asif Kamran[2]

Abstract

The purpose of this paper is to analyze the Human Resource Department functionality in terms of practicing new employees' orientation (NEO) and training program at Islamic banking sector and analysing the impact of (NEO) program towards banks employees' job performance and satisfaction. This is a qualitative research work for which primary data was collected by the structured close-ended questionnaire based on five points Likert scale. The population of this study is anyone who has attended orientation and training session at the time of hiring in their respective banks. A simple random sampling method was used to select 213 employees from targeted Islamic banks of district Hyderabad. Collected data were analysed for testing research hypotheses by different instruments Cronbach's alpha, Normality, Factor analysis, t-test and Pearson correlation. The findings of this study have confirmed that Islamic banks exist strong culture of employees' orientation and adopt advanced technological tools and methods for training. The study also revealed that (NEO) has significant impact on job performance and satisfaction. Further, the study showed a positive correlation between the independent and dependent variables. The conducted study validates the previous studies about the significance of (NEO) program in Islamic banking sector that enhanced the employee performance and satisfaction. The research findings reinforce that (NEO)is necessary for every organization because it largely influences job performance and satisfaction, and thus the overall functioning increases the firm's performance.

Type of Paper: Empirical

Keywords: New employee orientation, Job performance, Job satisfaction, Employee socialization, Islamic banking.

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1. Introduction

No-doubt that orientation and training is necessary for every newly hired employee in any organization. Without training and orientation there are numerous things which can be risky for employee and also have a negative impact on the firm and new workers. Orientation program is one of the prime methods for making know new comers with their workplace, job, co-workers, culture/structure and policies of organization. Different scholars have found that fruitful (NEO) programs help new workers turn out to be understood with firm's culture and help them understand their duties. In general context it is found that at the time of joining an organization, reams of papers are handed over to the employees about pay plans, terms and conditions and benefits but employees' orientation program go beyond during this all the process. Employee's orientation program is one of the prime methods for making new comers know their workplace, job, coworker, culture/structure and policies of the organization. The new employee orientation (NEO) is considered to be one of the neglected functions in many organizations, so it is important for an organization to have sorted out and composed orientation program with providing appropriate and related information and direct in an efficient way which will guarantee the new employees fitted with all information they need to have in an organization.

1.1 Statement of Problem

At time of joining in organization, reams of papers handover to employees about pay plans, terms and conditions and benefits but employees' orientation program go beyond during this all process. Employee's orientation program is one of the prime methods for making know new comers with their workplace, job, coworker, culture/structure and policies of organization. The new employee orientation (NEO) is considered one of the neglected function in many organizations, so a well-planned orientation program, whether it is one day or six months, will help not only in retention and satisfaction of employees, but also enable them deliver their optimum.

1.2 Objectives

The objectives of this study are:

i. To identify the method and procedure of orientation program.

ii. To analyze the impact of orientation program on job performance, job satisfaction and their relationship. The following questions are answered in this study:

ii. Does new employee orientation program have impact on job performance?

iv. Does new employee orientation program have impact on job satisfaction?

v. Is there any significant relationship between orientation and job performance and job satisfaction?

1.3 Hypotheses

The research hypothesis are as under:

H1: Orientation program significantly influences new employees' job performance

H2: Orientation program significantly influences new employees' job satisfaction

H3(a): Orientation program positively correlate with job performance

H3(b): Orientation program positively correlate with job satisfaction

1.4 Research Methodology

Data were gathered by the close-ended questionnaire through simple random sampling method with selected population 213 employees of respective banks (Soneri Bank, Meezan Bank, Bank Alflah, Bank Islami and Dubai Islami Bank). Further, the data were analyzed to answer the objectives by applying different tests as Cronbach's alpha, Factor analysis, t-test and Pearson correlation.

2. Literature Review

Orientation can be seen as an extraordinary sort of preparing intention to help new employees to find out about their job responsibilities, to be with their colleagues/co-workers and to settle in their work situation (Bennett). The (Holton) claims that "well-supervised and encouraged new worker growth generally is a powerful strategic lever when systematically applied. The initial couple of weeks on an occupation are especially basic, influencing impressions, emotions, states of mind, and employment fulfillment. The fifty-to-sixty percent of new appointees leave their employments within the seven months of after joining, and given the high expense of procuring new representatives, due to the high cost of turnover, it is needed to hold a trained employee, that's why it becomes a significant part of new hiring orientation (Wanous). Studies have confirmed that orientation training programs have a giant impact on corporate performance and should be a core strength of any firm (Korbut). By delivering orientation, institution will reap long term relation with employees and this strategy additionally keeps the worker faithful and keeps up great association with the organization (Dolan).The (Ayeni and Phopoola) have found a solid relationship between orientation, job performance and satisfaction. Positive and significant relationships are found between new hired employee orientation, organizational commitment/employee performance and job satisfaction (Narimawati). The (Brayfield and Crockett) determined that there was not a strong relationship between new hired employee orientation, job performance and satisfaction. The (Brayfield and Crockett) survey was with narrow degree of scope or limited by the little number of available studies for analysis at that period (just nine studies were analyzed into that reported a relationship between individual job performance and satisfaction) and all the studies were the based on subjective surveys. Different scholars have different approaches towards defining job satisfaction. The degree level people's job satisfaction can range from high level satisfaction to high level dissatisfaction. Employees have various approaches about their works like tasks, compensation, subordinates and colleagues (George). It is the key element that prompts affirmation, pay and the accomplishment of various goals that lead to an opinion of satisfaction (Kaliski). As per model of (Lawler and Porter), the extrinsic, intrinsic motivation and benefits are not straightforwardly associated with job satisfaction, because of the workers views in regards master pay of works. (Locke and Latham) gave some distinctive model of job fulfillment. According to the (Rue, L.W and Byars), job satisfaction is not dependent only on single factor but there are several factors that influence employee satisfaction, such as co-workers, nature of work, pay, management and opportunities.

3. Results and Analysis

The coefficient of cronbach's alpha is measured 0.844 as shown in Table 1 and factor analysis extraction measured valuesof all queriesare greater than 0.60 hence all questions are eligible for analysis and data is normally distributed as shown in Figure 1and 2.

Cronbach's Alpha	N of Items
.844	28

Table I: Reliability Statistics

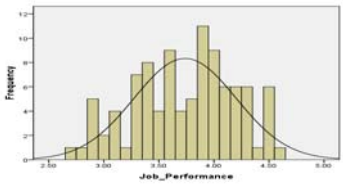

Figure 1: Job Performance

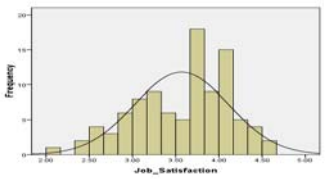

Figure 2: Job Satisfaction

The Table 2 and 3 reveals that job performance and satisfaction p-values 0.000 are significant and concluded that new hired employees' orientation program has significant impact on employees' job performance and satisfaction.

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Job Performance	15.660	196	.000	.73814	.6446	.8317

Table II: One-sample t-test results of job performance

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Job Satisfaction	10.230	196	.000	.56804	.4578	.6783

Table III: One-sample t-test results of job satisfaction

Finally, the Table 4 revealed that 0.39 is significant and variables (orientation program and job performance) are moderately correlated similarly in Table 5the measured p-value is 0.474 which also significant but both variables (orientation program and job satisfaction) are strongly correlated with each other.

		Orientation Program	Job Performance
Orientation Program	Pearson Correlation	1	.390**
	Sig. (2-tailed)		.000
	N	197	197
Job Performance	Pearson Correlation	.390**	1
	Sig. (2-tailed)	.000	
	N	197	197
**. Correlation is significant at the 0.01 level (2-tailed)			

Table IV: Pearson correlation between employee orientation and job performance

		Orientation Program	Job Satisfaction
Orientation Program	Pearson Correlation	1	.474**
	Sig. (2-tailed)		.000
	N	197	197
Job Satisfaction	Pearson Correlation	.474**	1
	Sig. (2-tailed)	.000	
	N	197	197
**. Correlation is significant at 0.01 level (2-tailed)			

Table V: Pearson correlation between employee orientation and job satisfaction

4. Limitation of Study

Really, it is difficult to gather sufficient data due to official restrictions and public dealing in banking sector. For this study the data were obtained from different Private Islamic banks of district Hyderabad as: Soneri Bank, Meezan Bank, Bank Alfalah, Bank Islami and Dubai Islami Bank.

5. Conclusion and Policy Implications

This research work found that an organizational factor, (NEO) program is very much necessary for new hired employees in Islamic banking sector. The findings of this study have confirmed that selected banks exist strong culture of employees' orientation by adopting advanced technological tools for employees' training. The study also revealed that (NEO) has significant impact on job performance and satisfaction further, it shows a strong and positive correlation between the independent and dependent variables. The banking sector always require a competitive advantage for their growth and this is only possible, when high rate of retaining trained human capital. There is a future course for Islamic banks to make strategies for employees training and development and setup distinctive sessions occasionally for the improvement.

Following suggestions should be considered for future research work:

1. This research work is limited at Islamic banks of district Hyderabad. Thus, it is recommended to select other districts' Islamic banks like Jamshoro and Matyari districts.

2. This research work is valid only for Islamic banking (NEO) program, for future work comparison (NEO) program effect in both Commercial/Retail and Islamic banking sector.

3. The research work is needed to enhance the scope of work towards other sectors like education or hotel industry.

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ADOPTING LEAN PRODUCTION IN PACKAGING DEPARTMENT OF FRITO-LAY (LAYS) TO REDUCE THE LABOR COST

Dr. Yousaf Ali, Dr. Muhammad Sabir, Engr. M. Abdullah Khalid And Ubaidullah Mumtaz

Abstract

The packaging department is facing a number of challenges that intimidate the very existence of many well-established companies. Lean manufacturing or lean production is an efficient tool for the cost reduction. This research is an attempt to study issues and challenges affecting to lean production practices in firms with special devotion to gear industries. The main objective of this paper is to minimize the cost of a production plant in order to enhance the profit and to produce finished goods that meet the customers' requirements with minimum cost, and hence, most efficiently. Linear programming approach has been used in this paper for optimization of labor subjected to certain constraints. A case study has been conducted at Pepsi (Frito-Lays) plant, where four different categorized products are produced. Each product has been assigned with different quantity of resources. Certain constraints are formulated, i.e. value added time, non-value added time, space, daily wage & some based on the production rate which in turn depends on market demand. The effect of a different variable on the production and cost is also analyzed in this paper. The paper concludes that the application of linaer programming can be successfully implemented in a packaging department to improve productivity and to reduce production cost by reducing adding value. The information presented will be of interest to general packaging departments.

Keywords

Lean Production, Labor optimization, Linear programming and Sensitivity Analysis

1. Introduction

The economy of an industry grows if managerial decisions increase the output either by cost minimization or output maximization(Ezema & Amakom, 2012). Industrial growth pressurizes management to find an optimal plan, organize, lead, and control the production so that the economy is improved. Besides, various decisions are needed to be taken in order for an industry to run efficiently. Various models have been developed that help in analyzing such type of decision-making problems. Linear programming is one of the most famous techniques that is used to evaluate an optimum outcome and make a decision in a situation that is restricted by limited resources or uncertainties, known as the constraints. The optimization process is a constant process. It is clear that optimization in industrial systems is crucial for the competitiveness of any industry in a highly competitive economic environment. In this paper linear programming has been used to optimize labor in the packaging department of Frito-lays (Pepsi), Pakistan, which is responsible for the supply of corn chips, potato chips and other snack foods for Pakistan, Afghanistan & Malaysia.

2. Literature Review

Linear programming is a very diverse method that can be used to make various management decisions. According to(Ezema& Amakom, 2012)literature supports the development of linear programming and regards it as a very practical tool to evaluate problems such as allocation of limited resources. Linear programming is a mathematical model that was developed by a mathematician, George Dantzig in 1947 for the U.S air force in order to efficiently allocate resources among the force. "Simplex Method" a mathematical tool, which is an extension of Linear Programming was also developed (Dantzig, 1953). When there are a number of activities to be performed by limited resources; the allocation of these resources must be donein such manner that the problem or activity is executed in the most efficient manner. According to (Charnes, Cooper, & Henderson, 1958) such kind of a problem is known as an optimization problem. They consider Linear Programming as single-objective constrained optimization technique. The reason according to themis that Linear Programming archives only one objective of either maximization or minimization. (Gupta and Hira, 2009) claim that linear programming consists of a

linear optimization function that consists of known variables. This objective function is subjected to a number of equations or inequalities which are known as the constraints. The objective function might denote cost, profit, production capacity or any other function which needs to be optimized. The constraints are due to different factors such as the production capacity, labor hours, storage capacity, and so on.

The Lagrangian method is put forward by(Dowling, 2001). He states that this method must be used for an optimization problem subjected to a single inequality constraint, while agraphic optimization technique is usually used for two constraints, and linear programming model can be used for many inequality constraints.(Dwivedi, 1980)supports Dowling; he postulates that linear programming can be used for decision making in business, and it helps in measuring difficult economic relations providing an optimum solution. (Sarggeaunt, 1965) categorizes linear programming under three titles: (1) blending and mix determination problems, (2) scheduling problems, and (3) distribution cost problems.(Emory & Niland, 1968) also use linear programming for related problems. In addition to these problems, (Hillier & Lieberman, 2001)claim that resource allocation is a very limited use of linear programming, and there are various other important applications as well. They state that any mathematical model that has a similar format as linear programming model is a linear programming model.

(Turban and Meredith, 1991) consider linear programming as a very important model in management science. Management science consists of three components; the decision variables, the environmental parameters, and the results. According to the above-mentioned researchers, linear programming consists of the same constituents, but with different names; the decision variables are what we want to regulate, the objective function is what we optimize and the constraints need to be satisfied. (Adeyemo & Otieno, 2009)try to extend linear programming past Management Science into areas such as Physical and Environmental sciences.(Kareem & Aderoba, 2008) try to use linear programming models as a tool for manpower planning in a cocoa processing industry. (Nedim et al, 2002) use linear programming for risk analysis, in order to maximize the efficiency of resource distribution and minimize the consequences of risk environment.

Sensitivity analysis is an extension of linear programming. Inasensitivityanalysis, we check how sensitive our linear programming model is towards changes in the values of the variables. According to(Jansen, De Jong, Roos, & Terlaky, 1997), sensitivity analysis is used in cases where parameter values might be approximations, and where theapplication of a particular solution is difficult. Sensitivity analysis acquires information about bottlenecks and degrees of freedom in a problem. It helps us to determine the behavior of the optimal value, and the optimal solution.

Based on the literature provided above, we can conclude that linear programming is a powerful decision-making tool. In this paper, this technique is used to optimize the labor cost in a chips packaging industry.

3. Methodology

The acquired data is some basic information from the packaging department of the company and is interpreted according to the requirement; for example, the determination of allowable non-value added time for each packaging line using the allowance specified by the company. After this, the constraint is analyzed and applied accordingly. Eight different constraints are generated by analyzing the problem. There are constraints for value added time, non-value added time, space, daily wage & some are based on the production rate which in turn depends on market demand. The simulation software LINDO™ is used for linear programming of the problem, because of the number of constraints. LINDO™ uses pre-formed constraints and objective function to perform optimization according to the user needs. It can also be used to obtain a sensitivity analysis, which is also performed in this research.

4. Mathematical Model

Maximize

$\sum_i^n CiXi$ (i=1, 2, 3, 4……n) …… (a)

Subjected to the constraints:

$\sum_i^n AiXi \leq d$ (i=1, 2, 3, 4……n) …… (b)

3.1. Nomenclature:

X1 = no. of workers for 14g lays

X2 = no. of workers for 29g lays

X3= no. of workers for 45g lays

X4 = no. of workers for 78g lays

Per hour wages of workers for 14g = 62.5 Rupees

Per hour wages of workers for 29g, 45, 78g = 50 Rupees

Total space = 120 ft. squares

Space occupied by one worker = 12 sq. ft.

Total budget available per hour = 500 rupees.

Minimum total value added time/hour=400 min

Maximum allowable total non-value added time= 56 min

3.2. Explanation of constraints:

a. Non-Value-added time per worker for each type of worker is also obtained from industry. Non-Value added time for 14, 29, 45 and 78 grams' workers is 4, 6, 8, 5 minutes per hour respectively as in constraint 1.

b. Value-added time per worker for each type of worker is given to the data obtained from industry. Value added time for 14, 29, 45 and 78 grams' workers is 56, 54, 52, 55 minutes per hour respectively as in constraint 2.

c. Constraint 3 is introduced due to the space scarcity. We have calculated total space and used average space used by each worker.

d. Constraint 4 is due to the cost; we have introduced an upper limit on cost that should not be crossed.

e. Constraints 5, 6, 7, 8 are due to the demand of chips of 14g, 29g, 45g, 78g. The demand of 14g lays is high so production will be high and minimum 2 workers will be required for packaging. Similarly, aminimum of one worker is required for each of 29g, 45g, and 78g.

3.3. Objective Function:

$$Cost = 62.5\,X1 + 50\,X2 + 50\,X3 + 50\,X4 \quad (1)$$

This is the labor cost per hour of packaging.

3.4. Constraints:

$4X1+6X2+8X3+5X4 \leq 56$ (Non-value added time) (2)

$56X1+54X2+52X3+55X4 \geq 400$ (value added time) (3)

$X1+X2+X3+X4 \leq 10$ (space constraint) (4)

$62.5X1+50X2+50X3+50X4 \leq 500$ (budget constraint) (5)

$X1 \geq 2$ (constraint due to demand) (6)

$X2 \geq 1$ (constraint due to demand) (7)

$X3 \geq 1$ (constraint due to demand) (8)

$X4 \geq 1$ (constraint due to demand) (9)

4. Results

4.1. Comparison between number of Workers

Following are the optimized results obtained from LINDO™:

VARIABLE	VALUE
X1	2.00
X2	1.00
X3	1.00
X4	3.31

Table 1. LINDO™ results

After analyzing the data, it is observed that 12 workers are working to make a pallet of 4 kinds of chips. So, we select linear programming for optimization. After constructing the objective function and the constraints, Lindo is used to solve the problem and simplex method is also applied (for confirmation, both tableau and simplex are applied). The results from both the methods are comparable. After optimization,it is observed that 8 workers are required to perform the task. Previously 3 workers were assigned for packing each type of chips but after optimization, we decided to lay off 4 workers. As you can see the number of workers for 78g chips, according to Lindo is 3.31 **(Table 1)**, which physically not possible. We can either have 4 or 3 workers, but having 3 workers violates the 2nd constraint, so we have to keep 4 workers on the 78g chips. A comparison of results with the previous values is shown in **figure 1.**

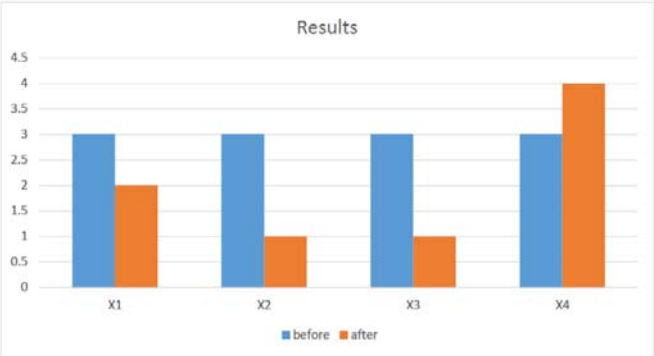

Figure 1. Comparison between number of workers

4.2. Slack Variables:

There are total eight slack variables in this research, and four of which are zero which means these are binding ones while the other four can be changed within their limits. Results are tabulated in **Table 2:**

Constraint	Slack/Surplus
Non-Value Added time	17.45454
Value Added time	0.00
Space	2.690909
Daily wage	109.545456
Due to demand	0.00
Due to demand	0.00
Due to demand	0.00
Due to demand	2.309091

Table 2 Slack/Surplus on constraints

The interpretation of results from table 2 is as follow.

a. For constraint 1 there is a slack variable of 17, which is about non-valued time, it means that optimal number workers can use 17minutes more non-valued minutes for their own use.

b. For constraint 2, which is the value added time the slack time is zero, which means value time is a binding constraint. So workers can't cut back on their 50 minutes of value added constraint per hour.

c. Each worker has to work atleast 50 minutes per hour.

d. For the 3rd constraint which is space constraint, the calculated value is 2.69, which means when the complete workforce is an active i.e. number of workers for the optimal solution there is still space for 2.69 more workers to work.

e. For 4th constraint which is cost constraint, the value of slack variable represents the extra money per hour after employing the optimal number of workers. This means that with the optimum number of workers active there is a surplus amount of money left.

f. The zero slack in the next three constraints shows that these are our binding constraints, and we can't change their value without affecting the optimal solution.

g. The last constraint which is no of workers on 78 grams lays chips, there is a surplus of 2.309.

5. Sensitivity Analysis:

Sensitivity analysis has two parts

a. Changing RHS of constraints

b. Changing LHS of constraints

5.1. **Changing RHS of constraints:**

For this results are shown in **Table 3**

Constraint No	Current RHS value	Allowable increase	Allowable decrease
1	56	Infinity	17.454546
2	400	120.5	127.000000
3	10	Infinity	2.690909
4	500	Infinity	109.545456
5	2	2.67857	2
6	1	2.351852	1
7	1	2.442308	2
8	1	2.309091	INFINITY

Table 3 Changing RHS of constraints

This table (table 3) shows an allowable increase or decrease on the right-hand side for each constraint, such that the shadow price of that constraint is not changed. Furthermore, these allowable changes are applicable when RHS of one constraint is changed at a time.

5.1.1. **Findings**

From **Table 3**, some important results are as:

a. If total non-value added time is increased by infinity or decreased by 17.454546minutes ≈ 17 minutes, then the shadow price or change in the value of objective function per unit change in RHS of this constraint will not change. Range of feasibility of RHS = 56-17 to 56+infinity = 39 minutes to infinity.

b. If total value-added time is increased by 120.5 minutes or decreased by 127 minutes, the shadow price of this constraint will remain same.

c. Range of feasibility of RHS = 400 -127 to 400+120.5= 273 minutes to 520.5 minutes.

d. Similarly range of feasibility of space= 10-2.69 square feet to 10 + infinity= 7.31 square feet to infinity Total space/12ft^2

e. Range of feasibility of total budget= 500-109.5 to 500 +infinity

=390.5 rupees hr-1 to infinity

f. Range of feasibility of total = 2-2 to 2+2 = 0 to 4 Workers on 14 g lays

g. Range of feasibility of total = 1-1 to 1+2 = 0 to 3 Workers on 29 g lays

h. Range of feasibility of total = 1-1 to 1+2 = 0 to 3 Workers on 45 g lays

i. Range of feasibility of total = 1-infinity to 1+2

= -infinity to 3= 0 to 3 Workers on 78 g lays

If RHS of more than two constraints or all the constraints is to be changed then first find (increase or decrease/corresponding allowable increase or decrease) for RHS of all the constraints, sum all these fractions and the result should not exceed 1.

5.1.2. Significance:

In any industry, the valuable time has to be saved. Normally, analysis or optimization is done once and we want to check the applicability of the analysis if something is changes in future.
As far as the changes in R.H.S. of constraints are concerned, we do sensitivity analysis to find a range of feasibility where the value of objective function per unit changes in R.H.S of constraint which will not change and we will not have to do the analysis again. Like if total space, total non-value added time, total value-added time, total budget per hour, minimum number of workers for each type of chips are changed in future then sensitivity analysis will tell us that what the range of such changes should be such that the change in total cost (objective function) per unit change in these R.H.S is not altered.

5.2. Changing the coefficients of objective function:

Original objective function is

$$Cost = 62.5\ x1+50\ x2+50\ x3\ +50\ x4 \qquad (10)$$

And the optimal solution is

X1 =2, X2 =1, X3 =1, X4 =4

Sensitivity results are given in **Table 4.**

Variable	Current coefficient	Allowable increase	Allowable decrease
X_1	62.5	Infinity	11.590909
X_2	50	Infinity	0.909091
X_3	50	Infinity	2.727273
X_4	50	0.925926	50.000004

Table 4 Changing the coefficients of objective function

5.2.1. Important findings:

From **Table 4**, some important results are as:

a. Range of optimality of x1 coefficient = 62.5-11.590909to 62.5 + infinity
= 51.91 rupees hr-1 to infinity
b. Range of optimality of x2 coefficient = 50-0.909091 to 50 + infinity
= 49.09 rupees hr-1 to infinity
c. Range of optimality of x3 coefficient = 50-2.727273 to 50 + infinity
= 47.27 rupees hr-1 to infinity
d. Range of optimality of x4 coefficient = 50-50 to 50 + 0.925926
= 0 to 50.92 rupees hr-1

These allowable increase or decreases are valid if the coefficient of only one variable changes at a time.
If more than one coefficients change then:
Find increase or decrease/allowable corresponding increase or decrease in each coefficient and then sum all these fractions. The result should not exceed 1.

5.2.2. Significance:

The range of optimality of the coefficients of decision variables in the objective function is also calculated such that the current optimal solution is not changed. Sensitivity analysis explains the allowable range of wages per hour of different workers (coefficients of variables in objective function) given that the current optimal solution which is x1=2, x2=1, x3=1, x4=4 is not changed.

6. Cost Benefit

The wage of one worker is 500 rupees per shift for 14 g but 400 rupees for others per shift. Previously all workers were paid: 400 * 9 + 500 * 3 = 5100 (11)

This is the wage per shift before optimization. After optimization the wages are reduced to:

400 * 6 + 500 * 2 = 3400 (12)

Thus, we have to pay 1700 rupees less per shift to the workers to do the same amount of work.

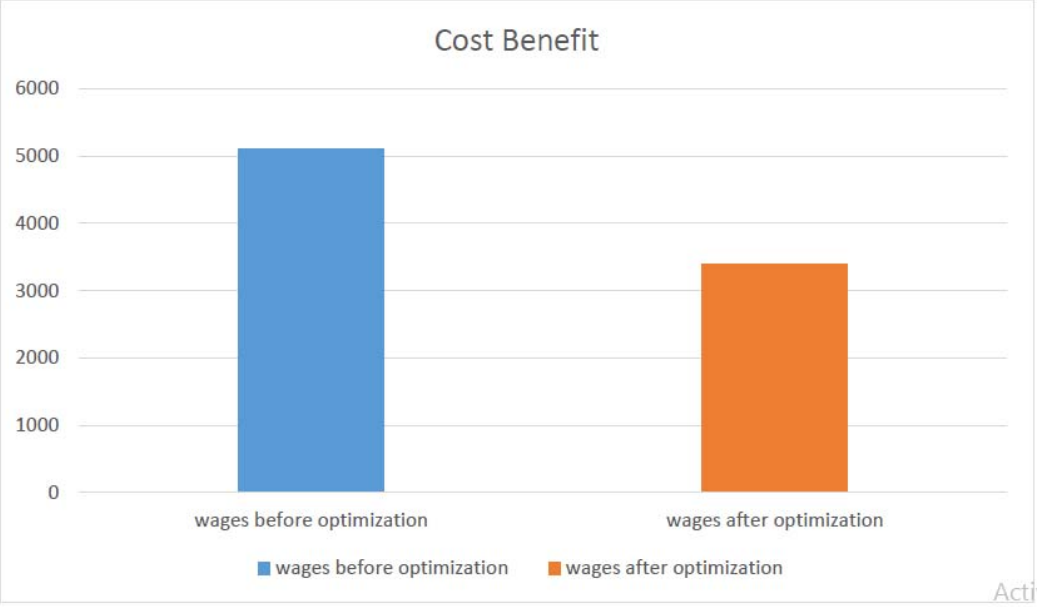

Figure 2 Cost comparison

7. Suggestion

To further improve the efficiency of the packaging process following measures should be taken:

a. Automation should be done on the line because robots are much more efficient in repeating one task again and again.
b. If automation can't be done due to monetary constraints, then space of the workers should be increased and new technology should be installed to increase the rate of production of boxes.
c. A comprehensive time motion study should be done in the packaging department in order to decrease the wastage of time in various departments of the company.

8. Conclusion

This research paper summarizes our working on labor optimization for the packaging department of Frito-lays. In this research paper, we have used different techniques to reduce the number of workers from 12 to 8 and get an optimized cost effective solution. Moreover, we have saved almost 1700 rupees per shift which will give company annual savings of 1.86 million rupees. Also reducing the number of workers will give more space to existing workers so that they can work more efficiently.

9. Future Research

The company is planning to add some new flavors and sizes in their product, so due to this variation, production analysis lead towards the complexity. Allocation of resources and managing cost will be the highest priority of the management before launching the new flavor. This research can be beneficial for the analysis, the addition of new variable in the objective function and constraints equation can be represented as the new size or the flavor, depending upon the condition. Decision analysis can also be conducted after the resource allocation, whether to carry out this activity of launching new product or not.

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HOW IPO's PERFORM AFTER LISTING ON PAKISTANI STOCK MARKET-AN EVENT STUDY APPROACH

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Abstract

This study investigates the aftermarket performance of Initial Public Offering of Karachi Stock Market of Pakistan. Performance has been analyzed in terms of Short run and long run time period by applying different event study models i.e Market adjusted abnormal return, Cumulative abnormal return, buy and hold abnormal return and wealth relative model. For IPOs performance analysis, the data has been used for the period 2001-2013. The initial performance of the IPO has been evaluated by return on first day. Moreover, long run abnormal return has been studied by investigating event time abnormal return up to three years of company after being listed. It has been found that IPOs give positive significant short run positive return for first fifteen days after listing. The long run results show that there is under pricing in Pakistan Stock Market like other markets of the world.

Keywords: IPOs, Pakistani Stock Market, Short run Performance and Long run Performance

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1. Introduction

The debate on offering of new issue has been complex since the early era of finance studies. The phenomena of first time sale of securities of companies to general public are known as Initial Public Offering (IPO). Through this mode the corporations raised the funds and meet their financial requirements. A large amount of empirical work has been done to give explanation for the short-run under pricing and long-term performance of IPO in developed economies and in emerging economies as well. The researchers tried to figure out the anomalies in IPO market. So they mainly focused on short and long-run returns, behavior of investor, role of underwriter, theories and other variables explanation of short-run and long-run Characteristics of IPO.

In all over the world financial markets have evidenced that performance of IPO is different in pattern from those of well established firms. In general, IPO outperforms in first few days after listing but over the long time span the IPO performs poorly relative to already listed companies. Consequently, investor earn high abnormal return who invest in newly listed shares of firms and for a longer period the gain for those companies may be extinguished.

Traditionally, it is evidenced that researchers used event study methodology to test the performance of initial public offering by analyzing cumulative abnormal return (CAR) and buy and hold abnormal return (BHAR).Initially, this method was used by Ball and Brown (1968) and Fama et al. (1969) in their study examined the impact of information on the performance of publicly traded stocks. Subsequently, Reilly and Hatfield (1969) tested investor experiences with new shares listed on New York stock exchange. Stoll and curly (1970) analyzed performance of small business IPO's issued during the period of 1957,1959 and 1963.They reported under performance of S& P industrial average for next nine years after listing the companies. Ibbotson (1975) evaluated performance of IPO issued between 1960 and 1969.His results showed negative performance from second to fourth year after listing of firms. He concluded that there was an initial abnormal return and rejected the previous studies' hypothesis of no abnormal return in IPO market. Miller (1977) found that investors have heterogeneous expectations about value of firms. Rock (1986) who introduced winner curse model in IPO market and examined the performance of new issues. Ritter (1991) analyzed the long-run performance of IPO of US market for 1526 firms during 1975 to 1984.The sample consisted of matching firms for 36 months after listing. Bill (1991) studied a sample of 53 Swiss IPOs for the time span of 1983 to 1989 and found significant underperformance in Swiss IPO market. Levis (1993) found that UK market underperformed for three years. Kunz and Aggarwal (1994) reported that in Swiss market was facing non-significant abnormal returns after two or three years of listing. They also examined US market data set consisting of 42 new listed companies and found significant underperformance for after the three years of offering.

The importance of stock market cannot be denied in the modern corporate world. Stock markets provide a mechanism for channelization of savings of people, pooling the individualized funds to create wealth and sharing of risk. For empirical analysis of this research, I used the data of companies which fall under KSE 100 index of KSE. Pakistan stock market is considered highly volatile capital market of the world with full of anonymity and escaped performance. The present study has investigated short-run and long-run performance of IPO in emerging market.

Performance of initial public offering whether on short-run and long-run horizon has always been of great importance for both the investors as well as for researchers? Investors have to decide whether or not to purchase the shares of newly establishing public limited companies. For this purpose, the knowledge of market price and return is very important. Many studies have been conducted in developed polished markets. However, these studies are lacking in evidence with regard to performance of IPO determination in the emerging market. In view of this the present research aims to study the performance of initial public offerings in KSE. This study would fill the gap in the literature, as only Sohail and Nasr (2007) for the first time studied the short-run and long-run performance of IPOs in Pakistan. Afterwards, Sadaqat et al. (2011) studied short-run performance. Moreover, the present study will help the investors to make wise investment decisions. This study would bridge this existing gap in the literature as it is conducted for one of the best performing emerging markets around the globe.

1.1 Objectives of the study

The purpose of this study is to achieve the following objectives:

1) To examine level of under pricing of initial public offering
2) To determine the short-run under pricing of IPO in Pakistani stock market
3) To see whether underperformance reduces or eliminates over the long run time frame

1.2 Research Question

How initial public offering performs in an emerging market i.e. Karachi stock exchange?

2. Literature Review

The literature on the performance of Initial Public Offering for emergent markets is enormous. We will present a brief review of the most relevant studies.

Omran (2005) saw the matter of initial and aftermarket underpricing of IPO for 53 Egyptian share issue privatization (ESIPs) during the time horizon of 1994-1998.Several cross-sectional models were used to examine the initial excess return and aftermarket return were determined by price earnings ratio, initial return in addition to demand multiplier and ex-ante uncertainty. He found mixed results for one period of year, providing positive abnormal return to investors. However, over three to five years abnormal returns were significantly affected by the price earnings ratio, the initial excess returns, and to a lesser extent by oversubscription variable. Thus the study revealed that investors were overoptimistic towards performance of IPO, but with the passage of time they become pessimistic.

Sohail and Nasar (2007) studied the short-run and long-run performance of IPO listed on KARACHI stock exchange during the period from 2000 to 2006. They used market adjusted return in the capital asset pricing model (CAPM) and calculated average market return, cumulative abnormal return (CAR) and buy-and-hold abnormal return (BHAR) over twelve months. Furthermore, they conducted the sector-wise and cross-sector analysis. They found that average market return; CAR and BAHR were negative and significant. They concluded that determinants of underpricing in Pakistan were ex-ante uncertainty, offer size, market capitalization and over subscription by little power of explaining the underpricing by market volatility variables, price-earnings ratio, secondary issues and percentage of shares offered..

Hamdi et al. (2013) analyzed the short-run and long-run behavior of stock returns of privatized initial public offering (PIPO). They used data of 162 PIPO during the period from 1986 to 2008 for fourteen countries of Europe by using CAR and BHAR. They found that PIPO outperformed during this period for all European countries and concluded that their result was important for both the investors and the policy makers for their investing and privatizing decision. Moreover, this study also helped understand behavioral financial performance of PIPO.

Smith (2013) empirically tested previous studies on analysis of price performance of IPO in the United States. He wanted to investigate the disagreement between researchers about the variation in opinion of prediction of stock return through different methods. Further, he analyzed the price performance of IPO and how much IPO generated an abnormal return. The researcher used event study methodology and calculated buy and hold abnormal return in order to find out the short-run and long-run performance of IPO during 1986 to 2008 for United States market. He found that IPO significantly generated abnormal return during short run, long run and when it were analyzed in the look up and quite period. He concluded that buyers should be beware before participating in IPO marketing and only small class of investors get benefit out of it. Moreover, he also provided an overview of IPO pattern to investor.

Wen and Cao (2013) examined the aftermarket performance of IPO and long-run underperformance of IPO of Taiwan Stock Market. The sample consisted of 121 IPOs from March 2005 to 2007. They used cumulative abnormal return and buy and hold return for three to five years after listing. Furthermore, they used regression model to analyze Post–IPO performance. The dependent variable for stock performance was BHAR five years stock performance and level of under pricing and expected skewness were taken as independent variables. The control variables were: deal characteristics, market conditions, firm's characteristics and industrial features. The results showed that IPOs were underpriced and for 3 years to 5 years IPO faced high underperformance. On first day of trading skewness was positively related with level of underpricing. They concluded that IPO in its first trading year performed better but after 3 to five year IPO suffered severe underperformance. They stated that skewness was not able to explain level of underperformance of IPO in the long run.

Gounopoulos et al. (2007) examined the short-run and long-run performance of initial public offering offered during 1999-2002 in Cyprus stock exchange. The data set comprised of 75 new listings. They investigated IPO offer price and their equilibrium market price at first day of trading, and after 6, 12, 24 and 36 months. They employed market adjusted initial return and cumulative abnormal return to calculate short-run and long-run performance of IPOs. Furthermore, they estimated underpricing by using regression. The variables were size, age, hot and cold period between offer price and first day price and percentage share retained by pre IPO shareholder. The results matched with the results of previous studies i.e. IPO had high initial return on first day. For long run the results were much lower and negative. Moreover, the regression results were also similar to other researches i.e. positive initial return among all the variables. It was noticed that during middle of the period Cyprus market had extraordinary conditions and had high returns after that bubble the return went negative.

Lee et al. (1996) analyzed the initial underpricing and post listing return for Australian IPO. The data set comprised of 266 IPOs during January 1976 to December 1989.They used cumulative abnormal return for one day to three years after initial public offering. The results showed that Australian IPO significantly underperformed after the listing for three subsequent years. Furthermore, they rejected the explanation of post listing return leading to speculative bubble. However, evidence suggested that there was a curvilinear relationship between underpricing and subsequent one and two year returns.

Aggarwal et al. (1993) empirically tested the after-market performance of initial public offering in Latin America. The sample included 62 Brazilian offering during 1980-1990, 44 Mexican IPO from 1987-1990 and 36 Chilean IPOs during the period of 1982-1990. They calculated abnormal return for first day, one month, second month, third month and one year to third year. They used market adjusted abnormal return and wealth relative to examine performance of IPO. The short-run results for initial first day return were 78.5%, 2.8% and 16.7% for Brazil, Mexico and Chile, respectively and long-run return showed negative trend in all of three Latin America market. They concluded that IPO underperformed in long run compared to nearly all markets except UK and USA.

2.1 Aftermarket theoretical Reasons

Basically there are theories proposed to explain the behavior of aftermarket underpricing of Initial Public Offerings. Many researchers have conducted research to dig these anomalies. The first who found the long run underperformance is Ritter (1991).The divergence of opinion hypothesis explains the underperformance of initial public offering of long run performance and has been given by Miller (1977). He proposed that there is heterogeneous opinion among the investor about IPO pricing which causes short-run outperformance. Miller also explained that price of new shares in its initial trading is set by marginal investors. As time passes the flow of information increases and new information about the firm becomes available and because of this, variance of opinion among the initial public offering investor occurs. Brav and Gomper (2002) also support this argument. Ljungqvist et al. (2001) investigated Miller.

The impresario hypothesis is basically based on initial investor sentiment. In real life investor expects high return for the future at present time investment in IPO. Investor sells the shares if he experiences poor underperformance in long run. This theory was first time explained by Ritter (1991) and then Rajan and Servaes (1997) confirmed Ritter findings by

explaining investors' sentiment for long-run underperformance as "propensity to overpay for the stocks of certain industries at times."

It is another theory which is also based on initial investor sentiment due to underperformance of IPO in long run performance. In this hypothesis two market issues are taken into consideration, one is hot issue and the second is cold issue. According to window of opportunity hypothesis, investors are optimistic about those companies which are recognized as potential after going to be public in the IPO market. This is generally in case of high volume period, where IPO is considered having an average overvalued in short run and poorly perform in long run. It is also noticed when book-to-market ratio is high the placement of stock is easier, the risk of initial listing is reduced and initial underpricing cost has a cushion.

Loughran and Ritter (1995) reported first time evidence that leads manager and issuer to be able to take advantage of "Windows of Opportunity". De-George and Zeckhousw (1993) provided evidence of increasing reputation of company going to be public by giving high incentives to their managers.

3. Hypotheses

H_{10}: The short-run return of IPO is equal to zero.
H_{11}: The short-run return of IPO is different from zero
H_{20}: The Long-run return of IPO by using CAR &BHAR is equal to zero.
H_{21}: The Long-run return of IPO by using CAR & BHAR is not equal to zero

4. Data Sample for Short run and Long run Analysis

Since the sample size of IPO that have been used for short term performance analysis contains companies which are listed on emerging market i.e. Karachi Stock Exchange during past thirteen years which covers time span from 1 January to 31 December. The total firms listed during the period are 77 and out of this total number of 59 firms are taken for this study and the rest 18 are excluded due to non-availability of data. This sample comprise of only unseasoned Initial Public Offering. Seasoned offering and mutual funds IPO are excluded from the data. For Long-run performance study, the IPOs are excluded which floated less than thirty six months, due to lack of information.. The research has analyzed short-term performance of average return of IPO and also long-run performance in order to know at what extent IPO underpriced is eliminated or not with the passage of time by using Event study. "An event study attempts to measure the valuation effects of a corporate event, such as, a merger or earnings announcement, by examining the response of the stock price around the announcement of the event."

4.1 Data Sources

The following data sources have been used to extract the required data.

1. Karachi Stock Exchange data base used to obtain daily opening, closing, high and low prices of stocks and index.
2. Market data got from www.scstrade.com
3. Public offering information taken from www.businessrecorder.com andwww.kristocks.com
4. The new listing companies were cross checked by getting data from Securities

4.2 Short-run Performance of IPOs by MAAR and AMAAR

This study has examined short-run and long-run performance of IPO in Pakistan. The short-run performance is measured through market adjusted average return (MAAR) daily return and Average Market Adjusted Abnormal return (AMAAR) on 1st day to 15th day after listing on KSE The short-run performance can be computed by three steps which are empirically tested by Aggarwal et al. (1993), Sohail and Nasr (2007), Vong and Trigueiros (2010), Sadaqat et al. (2011) and Kaya T. (2012). Performance of IPO is measured by the following formula:

$$R_{i,1} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}} \qquad (4.1)$$

Where $R_{i,1}$ is total first day raw return for stock "i" at the close of first day. $P_{i,1}$is the price of i_{th} stock at the end of first day,$P_{i,0}$ is the offer price of stock. The return on market index is used as a bench mark and calculated during the period as follows:

$$R_{m,1} = \frac{I_{i,1} - I_{i,0}}{I_{i,0}} \qquad (4.2)$$

Where $R_{m,1}$ is total first day market return,$I_{i,1}$ is the market index at the end of first day. $I_{i,0}$is market index at the offer day. The market adjusted return is calculated as:

MAAR = { [(1 + *Ri*,1) / (1 + *Rm*,1)] - 1 }*100 (4.3)

After computing MAAR, Average Market Adjusted Abnormal Return (AMAAR) is calculated as MAAR divided by n firms in Sample, to know whether IPO firms have average positive return on first day.

$$AMAAR = \frac{\sum_{i=1}^{n} MAAR}{n} \quad (4.4)$$

4.3 Long-run Performance

The long-run performance is measured by taking cumulative abnormal return and buy-and-hold abnormal return for the period of 12 months, 24 months and 36 months. CAR and BHAR are calculated by event study method. This method was firstly used by Fama et al. (1969) for stock splits and then by Brown and Warner (1980, 1985). Short-term performance studies were done by Loughran et al. (1994). Long-term performance studies include Barber and Lyon (1997) and Lyon, Barber and Tsai (1999). Potential problems with the existing long-term performance studies are found in Ahern (2008).

Cumulated Abnormal Returns (CARs) are calculated as below:

$$ar_{i,t} = r_{i,t} - r_{m,t} \quad (4.7)$$

$$AR_t = \frac{1}{n}\sum_{i=1}^{n} ar_{i,t} \quad (4.8)$$

$$= \sum_{=1} \quad (4.9)$$

For calculation of cumulative abnormal return for sample IPO the first step is to calculate abnormal return for each initial public offering monthly as in equation (4.6). Second step is to find out average monthly as return as in equation (4.7) and last compute CAR as shown in equation (4.8).
Buy and hold abnormal returns are calculated as below:

$$BHR_T = \frac{1}{n}\sum_{i=1}^{n}[\prod_{t=1}^{T}(1 + r_{i,t}) \quad (4.10)$$

Long-run buy and hold returns are obtained by compounding monthly return for an IPOs included in sample, $r_{i,t}$is the monthly return (for each i IPO firm in each t month) are compounded for T months after the listing, as shown in equation (4.9).

$$BHAR_T = \frac{1}{n}\sum_{i=1}^{N}[\prod_{t=1}^{T}(1 + r_{i,t}) - \sum_{i=1}^{N}[\prod_{t=1}^{T}(1 + r_{m,t})] \quad (4.11)$$

Secondly computed $r_{m,t}$ and compounded (for each m firm in each t month), then summed and divided by the total number of firms included in sample. Lastly, Obtained wealth relative model by using the components of buy and hold abnormal returns. WRt measures the performance of BHAR with respect to its mean market bench mark return.

4.5 Test statistics for event time abnormal returns

Basically test statistic is used to test the null hypothesis which means that cumulative abnormal return and buy and hold abnormal returns are equal to zero for a sample size. The employed test statistic is calculated as follows:

$$t_{CAR} = \frac{\overline{CAR_{i,t}}}{\sigma(CAR_{i,t})/N} \quad (4.12)$$

Where$\overline{CAR_{i,t}}$is the mean of all firms included in the sample and $\sigma$is the cross-sectional standard deviation of abnormal return for all the firms in sample. Mostly the t statistic for return of CAR and BHAR are non-normal:

$$t_{BHAR} = \frac{\overline{BHAR_{i,t}}}{\frac{\delta(BHAR_{i,t})}{N}}$$

Data Analysis and Discussion

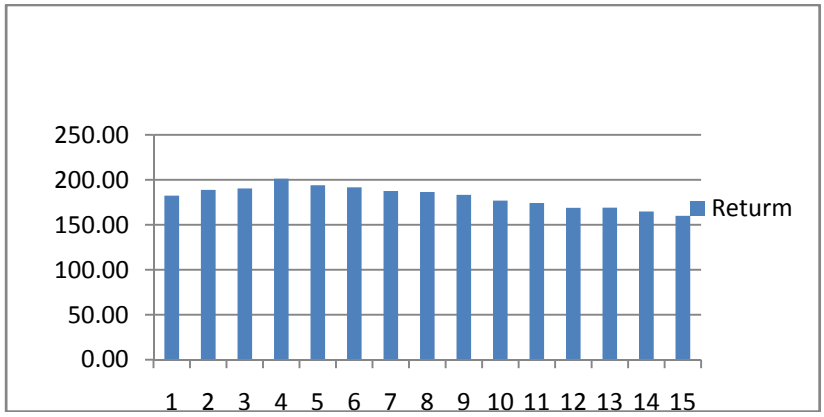
4.5 Short-Run Price Performance

For short-run analysis market adjusted abnormal return (MAAR) and wealth relative model (WR) are used.

Table 5.1 shows results of first consecutive fifteen days for each year of IPOs after listing during the period of January 2001 to December 2013. The finding shows market adjusted abnormal return for first fifteen day each year and in total average adjusted abnormal return for first fifteen days. The AMAAR for first day is 182.34% and it fluctuated from -27.47% to 635.53%. the results reveals that AMMAR increase for 1st day to 4th day which are 182.34%, 188.80%, 190.45% and 201.28 % respectively and then it shifted downward decreases to 159.70% in 15th day.

According to year wise analysis 2001 MAAR ranges from 1st day 25.5% to 31 % at the end of 15th day. In 2002, MAAR decreases and then 2003 to 2007 market adjusted abnormal return for first consecutive fifteen days. In 2007 era in boom period of Pakistani market. it was at its peak and give investor the highest profit on first day which is 635.53% even its give 591.72% at the close of 15th day .In 2008 market crashes due to which return drop down until 2011. After 2011 its start giving positive returns to investor again up till 2013.-

Figure I: Yearly Analysis of Short Run Performance



Source: Author own plot by using KSE data base

Table-I: Short-run Performance by MAAR and AMAAR Methods

2013	16.26	19.21	12.28	7.19	8.72	2.38	-3.35	-2.90	-2.25	-6.32	-6.15	-6.51	-2.24	-0.75	-0.63
2012	19.83	22.99	18.91	19.30	18.56	14.90	11.58	8.77	5.27	0.28	3.95	4.49	3.25	3.50	0.50
2011	-9.35	-14.61	-22.47	-20.41	-20.20	-24.27	-27.25	-27.42	-26.58	-35.65	-37.89	-42.69	-33.77	-40.31	-33.57
2010	4.65	-6.16	-14.03	-10.34	-15.62	-23.21	-34.09	-22.41	-6.69	-3.94	-4.80	-5.20	-22.33	-31.59	-42.63
2009	24.64	27.06	51.27	59.72	64.54	70.33	81.75	86.28	85.65	102.52	100.69	111.76	121.59	134.76	130.61
2008	254.85	270.14	287.72	313.06	338.86	329.81	302.78	287.32	265.19	253.71	241.28	215.93	173.76	150.89	120.53
2007	635.53	627.62	604.29	602.28	566.48	573.29	585.64	596.96	584.16	585.56	590.46	594.63	609.07	583.76	591.72
2006	241.43	248.80	231.77	225.93	233.92	231.11	226.56	229.83	224.43	164.87	159.87	148.51	143.80	142.23	72.49
2005	584.77	581.37	572.56	653.95	582.04	572.38	561.67	533.04	517.96	485.59	479.57	456.53	468.58	456.96	488.66
2004	392.16	418.90	435.18	448.64	442.53	433.24	448.99	462.45	470.21	476.34	473.30	470.17	474.25	470.17	465.53
2003	207.16	244.33	262.32	266.96	255.55	267.44	235.21	235.21	228.10	223.43	234.23	222.09	213.78	217.63	220.83
2002	-27.47	-7.23	10.71	26.26	15.22	16.78	21.13	14.53	13.03	10.88	12.31	8.30	12.77	21.94	31.01
2001	25.91	21.99	25.28	24.11	30.27	27.69	27.56	29.27	29.51	31.51	30.86	30.55	30.65	30.54	31.01
MAAR	2370.4	2454.4	2475.8	2616.7	2520.87	2491.9	2438.2	2430.9	2388.0	2288.8	2277.7	2203.55	2193.16	2139.72	2076.1
AMAAR	182.34	188.80	190.45	201.28	193.91	191.68	187.55	186.99	183.69	176.06	175.21	169.50	168.70	164.59	159.70

Source: Calculated by the author using data from KSE and SCS trade website.

4.6 Long-run Performance by Using AR and CAR

In table 5.9 the result has shown for average abnormal return and cumulative abnormal return for 1st month to 36th months for 51 IPOs firms during January 2001 to December 2010. In this period no de listing happened. The findings shows that AR is 17.67% in 1 month after listing and cumulative abnormal return is 35% after listing with statistical significant t test 64.77% and 1.25% respectively. From month 1 to 31st month IPOs market is giving positive average abnormal return and cumulative abnormal return. However, after 31st month the company is giving negative market return up to 36 month. In 32 month the average abnormal return is -1.66% and cumulative abnormal return is -3% and in 36 month -10.8% and -21%. So, Karachi stock exchange gives positive return to investor up to 31st month and afterwards it poorly perform as evidence in previous studies. The fig 5.3 shows average abnormal return, cumulative abnormal return and by and hold abnormal returns trends which clearly reveals under performers of IPOs firms in long runs time horizon.

Table II: AR and CAR on Long-run basis

Months	offers	AR	Sdev	t-test	CAR	Sdev	t-test
1	51	17.67	1.95	64.77	0.35	1.95	1.27
2	51	15.85	2.30	49.17	0.31	2.30	0.96
3	51	18.84	2.70	49.88	0.37	2.70	0.98
4	51	21.78	2.82	55.13	0.43	2.82	1.08
5	51	22.42	3.39	47.25	0.44	3.39	0.93
6	51	21.67	3.64	42.52	0.42	3.64	0.83
7	51	19.86	3.80	37.29	0.39	3.80	0.73
8	51	18.32	3.76	34.78	0.36	3.76	0.68
9	51	20.53	4.19	34.99	0.40	4.19	0.69
10	51	22.07	4.66	33.79	0.43	4.66	0.66
11	51	18.72	4.06	32.90	0.37	4.06	0.65
12	51	16.02	3.02	37.88	0.31	3.02	0.74
13	51	18.65	3.54	37.62	0.37	3.54	0.74
14	51	14.36	3.47	29.58	0.28	3.47	0.58
15	51	11.64	3.28	25.34	0.23	3.28	0.50
16	51	8.46	3.16	19.09	0.17	3.16	0.37
17	51	10.03	3.37	21.27	0.20	3.37	0.42
18	51	9.06	3.29	19.68	0.18	3.29	0.39
19	51	10.27	3.48	21.06	0.20	3.48	0.41
20	51	8.30	3.02	19.63	0.16	3.02	0.38
21	51	7.66	2.84	19.28	0.15	2.84	0.38
22	51	6.47	2.73	16.93	0.13	2.73	0.33
23	51	3.13	2.77	8.07	0.06	2.77	0.16
24	51	2.61	2.50	7.46	0.05	2.50	0.15
25	51	2.16	2.75	5.62	0.04	2.75	0.11
26	51	5.54	3.38	11.70	0.11	3.38	0.23
27	51	5.43	3.32	11.70	0.11	3.32	0.23
28	51	6.85	4.06	12.07	0.13	4.06	0.24
29	51	9.93	5.48	12.95	0.19	5.48	0.25
30	51	5.66	4.34	9.32	0.11	4.34	0.18
31	51	1.27	4.07	2.23	0.02	4.07	0.04
32	51	-1.66	3.69	-3.21	-0.03	3.69	-0.06
33	51	-1.10	3.69	-2.12	-0.02	3.69	-0.04
34	51	-8.96	3.61	-17.71	-0.18	3.61	-0.35
35	51	-7.78	3.31	-16.81	-0.15	3.31	-0.33
36	51	-10.80	2.57	-29.98	-0.21	2.57	-0.59

Source: Calculated by the author using data from KSE and SCS trade website

4.7 Long-run Performance by Using BHAR and WR

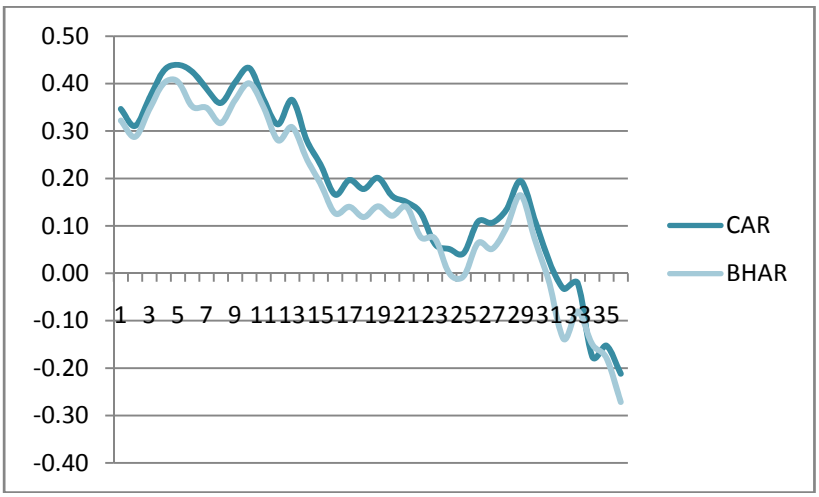
The result of buy and hold returns and well relative model is shown in table 5.10. In this table initial return is excluded and return are taken from 1st month to 36th month after listing the finding shows that Karachi stock exchange has a positive return of 32.2% at first month of trading after listing, with standard deviation 1.48 And t statistics is 1.18% and it is remain positive up till 23rd month where BHAR is 7.3% with standard deviation is 2.76% and t statistics is .18%. In 23rd month the wealth relative which is greater than 1 .In 24th month companies began to underperforming in terms of buy and hold return which is .1% and wealth relative less than 1 that is .98% . the BHAR at 36st month is 27.2% with the in significant t statistics -.75% and wealth relative .74 this reveals that Pakistani IPOs market gives positive returns up to 23rd month and afterwards it is under performing up to 36th month which is considerably lesser than the underperformance of IPOs in Germany by Ljungqvist (1997) Stehle et al. (2000) and in U.S by Ritter (1991) and Welch (2002).

Table III: BHAR and WR on long-run Basis

Months	offers	BAHR	Sd	t-test	WR
1	51	0.322	1.948	1.181	1.31
2	51	0.288	2.302	0.893	1.30
3	51	0.346	2.698	0.916	1.33
4	51	0.401	2.822	1.014	1.35
5	51	0.404	3.389	0.851	1.34
6	51	0.352	3.640	0.690	1.32
7	51	0.349	3.803	0.655	1.31
8	51	0.317	3.762	0.601	1.27
9	51	0.365	4.191	0.623	1.28
10	51	0.401	4.664	0.613	1.33
11	51	0.350	4.063	0.615	1.30
12	51	0.280	3.020	0.663	1.23
13	51	0.308	3.540	0.621	1.25
14	51	0.242	3.467	0.499	1.17
15	51	0.187	3.280	0.408	1.13
16	51	0.126	3.165	0.285	1.03
17	51	0.140	3.369	0.297	1.08
18	51	0.118	3.288	0.257	1.12
19	51	0.141	3.481	0.290	1.12
20	51	0.121	3.018	0.287	1.08
21	51	0.140	2.838	0.353	1.10
22	51	0.076	2.731	0.199	1.04
23	51	0.073	2.767	0.189	1.02
24	51	-0.001	2.502	-0.002	0.98
25	51	-0.006	2.749	-0.016	0.97
26	51	0.064	3.382	0.134	0.99
27	51	0.051	3.316	0.110	0.95
28	51	0.096	4.057	0.170	0.97
29	51	0.164	5.477	0.214	1.01
30	51	0.069	4.337	0.114	0.95
31	51	-0.021	4.067	-0.037	0.88
32	51	-0.139	3.686	-0.269	0.86
33	51	-0.081	3.691	-0.156	0.84
34	51	-0.150	3.612	-0.296	0.82
35	51	-0.179	3.307	-0.386	0.80
36	51	-0.272	2.572	-0.754	.74

Source: Calculated on excel by the author using data from KSE and SCS trade website.

Figure II: Long-run Performance of IPOs Using CAR and BHAR



Source: Author's own plot by using KSE data base

Figure 5.3: Cumulative abnormal returns and buy and hold return by years for consecutive thirty six months for SECP- registered IPOs in the KSE during 2001-13.

5. Conclusion

The results are similar to the results of previous studies which were found in the developed market and underpricing also noticed in IPO market of Pakistan. The year wise analysis for consecutive 1st to 15th day reveals that the market adjusted return on first days positive and then increase up to 4th day than decrease, but total return remains positive up to 15th day for every investigated year from 2001-2013. The rate of return ranges from 635.53% to -42.69.

There have been observed underperformance for long time horizon, when event study i.e. cumulative abnormal return and buy and hold return applied to test abnormal return. The results shows that IPO market of Pakistan provides positive return for first two year and in third year there is negative return. So, the investor who holds the new listed companies share upto three years they will achieve negative abnormal return and then investment in newly listed shares underperformance. It means the Pakistani IPO market not perform well and disappointing for those investors who wishes to hold share for long time period

This research study has not only made it possible to fill the gap in existing literature with reference to IPO performance analysis. It has provided valuable practical insight with respect to IPO short-run and long-run performance in Karachi stock exchange. The individual investors can use the finding of this study to make their own investment decision both in short run and long run regarding holding of stocks to maximize their return on investment in IPOs.

This study is the first attempt to investigate the short-run and long-run performance of IPO during the 2001-2013 period of Karachi Stock Exchange which represents an emerging stock market. However, previously two studies on IPO performance in Pakistan have been conducted. The first is by Sohail and Nasr (2007) who studied performance of IPO during the 2000-2007 periods and discussed the performance of IPO up to only one year whereas I have discussed up to three years.

More studies should be conducted for emerging markets with regard to performance of IPO and to see whether the factors influencing the performance and pricing of IPO in one economy are the same as for the polished developed economies.

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APLICATION OF ZERO BASE BUDGETING IN SRI LANKAN PUBLIC SECTOR

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Abstract

Zero-Base Budgeting (ZBB) implemented in Sri Lanka in 2016 pose a question as to whether it is a reality that aligned with national priorities or a merely rhetoric. Preliminary investigations reveal that many parties engage in the process without internalizing the purpose of ZBB but simply follow the circular and guidelines issued by policy makers. The objective of this study is to investigate what is really happening in the application of ZBB at operational levels in public sector organizations. Both qualitative and quantitative methods are used in the study. The sample comprises of provincial level accountants, directors of budget/accounts and payments, directors planning/ development, and other support staff who engage in budget preparation.

The study finds that almost of all parties symbolically engage in ZBB by disregarding its challenges. Understanding of ZBB embodies with myths that it starts with zero and ends with zero. ZBB is becoming an institutionalized practice of making estimates in the same traditional way but filling them in reporting formats introduced as per national budget guidelines for ZBB. Integration of budget with planning, review, output and outcome are not well communicated but poorly perceived by concerned parties as an alienated concept without management approach. Confusion is seen as to who decides budget priorities and how ZBB would create value. Operational context is also found to be not conducive for successful implementation in Sri Lanka as factors such as technological changes, required training and guidance are not taken into account prior to implementation. Some are in the opinion that ZBB is a tool to cut the budget in terms of allocations instead of bringing about efficiency and effectiveness. Application of ZBB in Sri Lanka should have focused on long term strategic management perspective instead of being hurried to implement before the ground is ready for takeoff.

Keywords: Zero Base Budgeting, Planning, Prioritizing, Output and Outcome

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1. Introduction

Georgia county is considered to be the first to introduced Zero Base Budgeting (ZBB) during the administration of Governor Jimmy Carter in the 1970s, with a view to allocate recourses in a more efficient and effective way to achieve national priorities on a rational base (Pyhrr, 1977). Though its popularity declined subsequently, ZBB was reintroduced in Georgia in 2012 by incorporating performance based budget procedures (Lauth, 2014). With the regained popularity of ZBB public sector organizations are trying to implement it. Sri Lanka stated its objective of introducing ZBB as to introduce performance measurement framework based on national priorities integrated with national planning, review, outputs and outcomes. To achieve this objective, a medium term framework covering the period from 2016 to 2018 was introduced by issuing the national budget circular of 3/2015 on 29th July 2015 highlighting that the present budgeting practices are imprudent (Samaratunga, 2015a). Therefore, budget estimates were required to be made on realistic base to achieve accelerating economic growth of the country by utilizing limited public resources efficiently and effectively (Senewiratne, 2015).

Further, the government expected to identify duplications, wastes and non-value adding resource allocations through ZBB with a view to eliminate them (Samaratunga, 2015b) thus pushing the GDP of the country to achieve desired economic growth. The budget circular 3/2015 consists of objectives, instructions to prepare and standards formats and three hierarchies namely spending agency, spending unit and division are identified with the responsibilities for budget preparation.

Spending agency is the unit that has the highest responsibility whereas the division is the lowest unit. A line ministry is a spending agency and any cost unit identified at operational level is a division. Structure in which information is gathered for budget preparation comprises of 194, 203 and 987 spending agencies, spending units and divisions respectively (Treasury, 2015). The Treasury consolidates the national budget once data is collected from all. The government had taken measures to carry out training programs, seminars and workshops to educate those who involve in budgeting process despite the fact that whether they were effective. Preliminary investigations and discussion revealed that ZBB budgeting has been perceived differently and not understood well. It is highly uncertain whether the objectives of ZBB would be achieved as planned. Therefore, it is worthwhile to assess the process of ZBB implementation and how objectives of budgeting are met. The objective of this research study is to examine the process, of ZBB implementation within the given medium term framework and how it is perceived by major stakeholders.

2. Literature Review

Traditional incremental budgeting normally considers previous year's budget as a base and makes adjustments by adding certain percentages mainly on arbitrary basis to maintain the current level of operations. In a way, traditional budgeting does not take into account any initiatives to move towards delivering outcomes aligned with development goals (Samaratunga, 2015a). It further assumes that socio economic and political environment would not significantly change specially in developing countries and therefore, current programs and activities would repeat at the same cost, subject to adjustments made for inflation under incremental budgeting. Public sector organizations are moving towards ZBB and the budgeting practices of United Nation agencies, International Labour Organization, UNESCO and World Health Organization are also changing due to budgetary pressures, principals and the reactions of administrative leaders (Patz & Goetz, 2016).

Traditional budgeting, theoretically does not promote capacity enhancement and therefore a need does not arise to justify activities. These assumptions and static conditions do not prevail in future as socio economic and political operations have now become global and the growth cannot be expected unless reforms in planning are brought up (Senewiratne, 2015). Growth prospects are unlikely to be achieved unless required investments and programs to expand appropriate infrastructure development in line with national priorities are made on time. On the hand, history has shown that budget allocations under incremental budgeting have never been significantly released by the treasury unless some undue political influence is made. Hence, traditional budget is used as a tool of getting approval of parliament to legitimize government activities. Therefore, it can be argued that ZBB budgeting can be a management approach and key decision making tool despite the fact that it is not new (Lalli & Pyhrr, 2015).

ZBB is claimed to be an efficient and effective tool (Pyhrr, 1977) intertwined with planning and decision-making compared to traditional incremental budgeting system. It can be implemented either by private sector or public sector organizations with regard to any types of businesses irrespective of whether it is big or small. Effectiveness and efficiency of resources used by public sector organizations have paramount important as they are supposed to uphold the public interest first place.

Literature finds that Peter Pyhrr, a manager at Texas Instruments in Dallas, developed the idea of ZBB and accordingly, he practiced or preparing budgets simply ignoring previous year's figures starting from scratch with robust justifications and relevant assumptions ("Zero-base budgeting," 2009). The popularity of ZBB has been increasing again and as a result Georgia county reintroduced ZBB again in 2012 after three decades of difficulties faced when that was first introduced in 1970s (Pyhrr, 1977). Despite the fact that its popularity had subsequently declined (Keenan, 2000), ZBB is considered to be a very good technique of effective resource allocation. ZBB has been found to be effective across industries, in companies big and small, and under both public and private ownership (Fitzpatrick & Hawke, 2015). ZBB is becoming popular again and statistics in the USA show that the number of companies introduced and practicing ZBB increased from 14 in 2013 to 90 in 2015 (Fitzpatrick & Hawke, 2015). Carly Fiorina, a US presidential candidate in her campaign for the 2016 election has also proposed ZBB as a practical solution for balancing the federal budget (Bloomberg, 2015)

However, there are some criticism against ZBB mainly on the ground that current practice is trying to cut the budget at micro level (Lauth, 2014) by covering to the back drop of prioritization. Therefore, it implies that the success depends on how best that is internalized and the commitment to practice it in line with national development objectives rather than implementing it for the name sake (Guthrie, 2002). In principle, ZBB can eliminate non value adding activities by managing costs to have desired end objective effectively.

Apart from the basic idea of improving the efficiency and effectiveness of resource allocation now it is used as a tool of building on to a culture of cost management as well (Fitzpatrick & Hawke, 2015). Evidence finds that 10 to 25 percent of cost savings resulted after implementing ZBB (Fitzpatrick & Hawke, 2015) and ZBB is the best fit for organizations that follow standard practices. Hence, ZBB can be regarded as a relevant management tool to deal with scarce resources with respect to planning in public entities. Therefore, ZBB can be a good tool to deliver national objectives while brining maximum benefits to a wide range of beneficiaries with high level of transparency in budgetary process (Andrews & Hill, 2003) as against incremental budgeting.

Compared to incremental budgeting, ZBB is a bottom up approach whereby the need for resources at grass root levels (Divisions and Spending Units) are required to be justified with quantifiable results and outcomes with corresponding detailed cost analysis. Hence, there is an opportunity for all the stakeholders at operational levels to immensely contribute for economic development under ZBB practice. This exercise is supposed to help them prioritize all programs and activities based on a rational basis by considering the relative contribution to national development objectives and priorities.

3. Methodology

Both qualitative and quantitative techniques were used to analyze and interpret data. Primary data was collected through interviews, questionnaires and direct observations made as a project coordinator at various meetings at provincial levels and the line ministry level. Respondents to interviews comprised nine provincial directors - budgets and payments, nine chief accountants of provincial ministries of educations, nine chief accountants of provincial departments of education, seven provincial directors planning in education, nine provincial directors in planning 20 provincial accountants, two chief accountants at the ministry of provincial councils and local government and two directors at the ministry of finance. Structured questionnaire was given to accountants and other operational staff at provincial level those who involve in budget preparation. 55 dully filled questionnaires were collected. Questionnaire consists of questions with scale of 1 to 5 representing least to most respectively, yes or no answers and questions to give little explanations and a space to give additional comments.

Formats specified in the budget circular 3/2015, incremental budgets prepared for the year 2015 and ZBB prepared for 2016, instructions and guidelines given for preparing budgets, news articles, speeches made by politicians and other relevant literature were used as secondary sources of data. Direct citations and interpretations were used in qualitative analyses whereas descriptive statistics were used in quantitative analyses.

4. Data analysis and Discussion

Incremental budgeting was the practice of Sri Lanka until 2016 and it was announced in 2015 that national budget preparation should be done based on zero base starting from 2016. The announcement was made by the Ministry of Finance subsequent to a power change in the presidential election held in 2015. The introduction of ZBB was sudden and the decision was announced unilaterally by the Ministry of Finance without having much consultation with other stakeholders of budgeting process at provincial level. The only option available for preparers of budgets to simply comply with the requirements and follow the instructions and guidelines provided. No room had been left for them to make any suggestions to improve the efficiency of budget preparation. A sectoral approach has been suggested and accordingly budget ceilings are decided by the Ministry of Finance after having discussion with secretaries of respective spending agencies (Line Ministries). However, it was found that authoritative power vested with the Ministry of Finance had played a key role in determining the sectoral budget ceilings and there was no significant impact of secretaries of line ministries though it was mentioned that secretaries to decide them. The views and justifications of line ministries were welcome at meetings held with officials of the Ministry of Finance to finalize ceilings but the influence of line ministries was seen to be very minimal. Arbitrary decisions were taken and views were expressed by officials of the ministry of finance subjectively as they realized the significance of operations at provincial level. No significant counter arguments are made at meetings and development goals and objectives were never referred at the meetings at which the author participated. Officials of the line ministries maintained a stance of accepting what the ministry of finance decides.

The content of discussions made was mainly on past physical and financial progress and not a single reference was made to concepts of ZBB and its outcomes to be achieved. It was observed that there is an institutionalized practice of traditional incremental budgeting and it is well embodied in most of decision makers in the budgetary process are likely to continue. Commenting on the usefulness of meetings conducted to brief on budget preparation at the implementation level, average score 2.03 resulted which is very close to "little useful' condition. The perception was obtained in a scale of 1 to 5 and the scale 1 represents 'No Use" whereas the scale of 5 represents 'very useful'. It was further revealed that those meetings were less useful pertaining to understanding and preparation of ZBB. On average, every respondent at the interviews (67) had participated more than 5 meetings on ZBB whereas other respondents who really prepares documents mentioned that they participated 3-5 meetings during the year 2015 for the purpose of budget preparations.

Guidelines on implementation of ZBB specify that the estimates should be made in two steps after identifying ceilings. Estimates for expenditures are identified as recurrent and capital. Step 1 is to detemine recurrent expenditure based on discussions with operational staff at ministerial level (Spending Agency) and the department of national budget. Step 2 requires to ascertain capital expenditure where ministry-wise ceilings are estimated on discussion chaired by the secretary to the treasury. On average, more than 70 % of the government budget in Sri Lanka goes to recurrent expendure that mainly comprises of personal emonuments.

As per the guidelines given by the Ministry of Finance, budget preparation process should first assess the relevance of proposed activities by reviewing missions, objectives and functions with a view to identify non value adding activities. Hence, it was found that preparers had not taken that serious of identifying and relating outcomes objectively. The main reason for this was the less capacity that they have. The respondents had found hard to relate programs and activities to corresponding outcomes. Sometimes they had perceived that outcomes may result due to many reasons and not specifically because of programs and activities that they carry out. Around 90% of respondents were confused about program output and process outcomes. As a result, outputs and outcomes included in the formats are highly subjective and nominal. Inclusion of output indicators and outcome measures has been a compliance requirement in the given formats as they were not reviewed and related. What matters at the final phase of budget preparation, was the provision of estimated figures to prepare the consolidated budget within macro ceilings which are known to the Finance Ministry. No evidence was found as to how estimates were related to national development objectives for the year 2016. Financial progress on the other hand revealed that less than 40% of capital budgets had been released at the end of September 2016 thus showing an unlikely situation to release the balance before end of December 2016. Therefore, no room was left for the government to have an objective review and evaluation of outcomes of programs and activities spelled out in ZBB for the year 2016 so far and make necessary revisions. More questions will follow as the ZBB estimates for 2016 have an extensions to the year 2017and 2018.

Among other formalities, the government had three aims of ZBB (Treasury, 2015). They are namely;

1. to make budgetary requirements be comprehensive, justified and complete
2. To question the previously-set assumptions, assessing them and judging their relevance.
3. To help as a tool for systematic analysis, review and resource allocation to any area that needs attention

However, it was found that there was no mechanism to evaluate whether above aims were achieved, the aims of achieving comprehensiveness and justifications are vague and simply left along rhetoric when budget estimates were submitted. There had not been proper discussions on assumptions to judge the relevance of programs and activities. In fact no such assumptions had been made at all. Systematic analysis and review had also not been made as any such areas that need attention had not been identified. On the other hand, it is hard to make judgments on whether specified aims are achieved or not.

4.1 Implementation of ZBB

Budget circular 3/2015 requires each line ministry to appoint a team to review vision, mission, obejctives and key functions to assess government prorities under the current context. This team is supposed to further identify relevant activities by eliminating dulpications and wastes and reorganize the operations to reduce the cost. The study finds that the Ministry of provincial councils and local governemnt has taken prompt measures to appoint a committee as per the guidelines and several workshops and capacity building works had also been carried out to align vision, mission, obejctive

and key functions of the Ministry in line with national priorities. However, the identification of relevant programs and activities and elimination of duplicates had become a big issue mainly due to lack of capacity of budget units and complexities prevailed within the oragniztational structure of the Mininstry and allocation of duties and responsibilities among operational units. Hence, the buget for 2016 may have included duplicates and non value adding activities as there was not appropritate way of detecitn and removing them.

The second biggest problem was the identification of cost units despite the fact that they are defined as a project and or sub project. Simillar kind of projects are carried out by many spending units and divisiona for example waste management is handled by foreign funded projects and by many other operational units as well thus happening duplication is inevitable. This issue was more severe when provincial level spending units are to be identified within provincial administraion. Study finds that no serious process had been in place to identify value additing activitis and duplications. Prioritization budget allocation had not taken place at procvincial level as it was not well taken and impracticality.

4.2 Prioritization of Program and Activities

Prioritization of programs and activities in line with the national development priorities is one of the key aspects of ZBB. No proper guidelines were given how priorities are determined and assessed. All the respondents to the questionnaire mentioned that they were unaware of such priorities. Further they had stated that budget estimates were given as in the manner they were decided in the previous year. Preparers of budgets were confused over the priorities as whether ZBB talks about national priorities of the priorities of spending units or divisions. Further, none of the respondents knew how their priorities are linked to national priorities if they exist. No actions were found have been taken by the government to communicate national priorities to spendind agencies, units and division.

Despite the fact that budgeting unit is mentioned to have the freedom to decide its budget requirements in line with natinal priorities, the guidelines leave much freedom for the government treasury to rearrnage allocations on the ground that the requested budget amounts are not aligned with national development priorities. The power to do so has been given as per the national budget circular 3/2015 itself. Hence, politicization and excersise of subjective influence of beauracrats are likely to have happened. Evidence find that, final ceilings on budget allocations had been made based on the wishes of political authories at national level and spending agency level. Such deciosns are standalone programs and budget allocations have deviated from the aim of producing a comprehensive allocations to achieve obejctives in a three year time frame. One example is that huge fund allocation to the Ministry of Education under the program of " Nearest School is the Best School". This is a deviation from basic principles of ZBB.

As per guidelines given, all proposed programs and activities need to be aligned with given sectoral targets and costs should be estimated reliably. However, respondents of interviews had some general understating of national priorities. Accordingly, reduction of interregional disparities was regarded as the first priority by the most of the respondents followed by reduction of poverty as the second priority. In fact no such practical evaluation has been carried out at the time of consolidating the overall budget for the country. Discussion revealed that national priorities and goals are seen to be highly influenced by political agendas and subject to bargaining powers of political power centers.

4.3 Decision Packages and Levels of Operations

ZBB basically comprises of three decisions packages starting from the zero-base level which is meant to include program and activities to assure that minimum essential things are carried out. The second decision package is the current funding level to maintain status quo; that is the level what the budgeting unit has been carrying out in the past (Pyhrr, 1977). The third package is enhanced service level that comprises programs to enhance the present levels to clearly set strategic targets. Therefore, ZBB should continue without referring to past expenditure but it should be future and development oriented.

All three decision packages are subject to budget ceiling depending on availability of resources, strategies implemented alignment of vision, mission and objectives. Spending unit has to determine what level to be implemented in estimating budgets. It is generally a combination of all three levels aligned with national development objectives and priorities. Selection of decision packages or budget level is the core of ZBB and that has to be agreed upon with general consensus national policies.

Even though the budget preparation guidelines mentions about decision packages it does not describe what they are and how they are linked to budget estimates. None of the respondents was aware of these budgetary levels and determinants of them. ZBB has been understood as a mechanism that requires all the cost units have to make their cash balances to be zero at the end of the fiscal year. More than 75% of respondents did not identify any difference between incremental budgeting and ZBB budgeting expect the idea that cash balances to be made Zero at the yearend. The myth that ZBB budgeting starts and ends with zero balances is dominant at all decision making levels from national level to provincial divisional level of cost units. It was witnessed at many meetings where the author participated heads of ministries and other decision making units stressed the meaning of ZBB as a practice of starting with zero and ending with zero and not allowing for carrying forward. Hence, it is very clear that even top rank employees had not well taken the concept of ZBB.

Most have tended to plan for what can be fully spent and never thought that it shuold be aligned to national priorities with clear objectives in line with the mission statement.This ideology is pretty much seen at all levels that involve in budget preparation. The study found that no arrangements had been made to assess different decision packages mainly due the fact that such a requirement had not been communicated to spending agencies, spending units and divisions. Therefore, no need had arisen to choose from different decision packages as only a single budget estimates had been given. However, the guidelines say that the responsibility of estimating figures for ZBB is vested with management and the team.

Another basic requirement of zero-base budgeting is that budget estimates are made by keeping the cost of running the operations at the lowest possible level. Hence it is required to calculate costs and benefits of activities that would lead to an incremental increase of value. Breaking the budget down into different decision packages in this way makes it easier for top managers to make choices on allocating scarce resources.

4.4 Budget Cycle

Budget cycle is required to be reviewed at the end of each year as it operates for three year from 2016 -2018. Outputs and outcomes of intended programs and activities are required to assess and linked to the following year budget to reach the next level of national goals. Study did not find any evident as to whether such arrangements have been made to carry out an assessment accordingly. There were no programs at the Ministry of Finance to do so. Instead, only physical and financial progresses are reported at progress review meetings and instructions and guidance are given on how to expedite the work to spend the balance amount of allocation for the current year.

4.5 Linkages of Vision, Mission and Objectives to ZBB

Understanding of respondents on vission, mission, and objectives was very poor. Majority is not well convinced what their mission statement and the national mission statement mean. Inclusion of vission and mission statements in strategic plans has become symbolical practices to simply comply with guideilnes issued by the authorities. Vissiona and mission were found to be not internalised in orgnizational practices at cost units.

4.6 Beneficiaries

Number and nature of beneficiaries exposed to is considered as one major criterion to prioritize expenditure estimates. Accordingly, the budgeting unit has to reconcile how the number of benificiries has increased or decreasedduring the curren year. The expenditure estimates should be made based on actual numbers of beneficiaries identified. Further, procurement of goods are required to be linked to well prepared procurement plans that are intergral parts of ZBB.

Prioritation of capital budgeting expenditure are requierd to budget for completion of continuation works funded by either domestic or foreign sources. Then resource allocations can be be considered for rehabilitation and improvement of capital assets. Finally, new constructions are considered within ceilings if funds are available.

Though this order maintains a kind of rational it contradicts the objectives of ZBB where expenditure items should be proposed with justifications to achieved intended outcomes irrespective of the fact that whether it is new construction, continuation of old construction or simply a maintenance or rehabilitation of existing building. None of the respondents had understood the duplicity of instructions given in relation to the objectives of ZBB. Accordingly to the both questions as to whether guidelines on prioritization of capital expenditure were followed and whether construction works and maintenance

were included in the budget based on proper justifications aligned with intended outcomes, positive answers were given. It implies that respondents are unaware that answers to both questions contradict each other in achieving the objectives of ZBB. Therefore, the requests for capital expendtures are seen to have been made on arbitraty bases. It was the general practice to request for new constrcutions when allocations are likely to be given and no serious exercise was taken to determine outcomes. Respondents could not related how capital expenses relate to specify outcome. It was found that outocmes in relations to capital expenditures have been sepecified arbitrarily. intended number of the direct beneficiaties of capital expenditure were said to have been included in buddget formats as that number was a required information as per the guidelines. How beneficiaries are getting the benefits when programs and activities are carried out were mentioned and respondends mentioned that that was not a serious considerations in detemining the budget estimates.

It was suggested in the guideines to budget for storied buildings to increase the efficiency and economise land use in ralation to new works. Howeverm it was revealed as per records of budget estimates for the year 2016 that there were considerable requests for contractions works without specifying proper justifications and links to outcomes and intended benefits. When line items of selected budget estimates are examined, it was revealed that expenditure items are not connected to programs or projects with specific objectives, output and outcomes. They are seen to be mere expenditure items that fit to the given ZBB formats and adhere to guidelines.

4.7 Development of KPIs , Monitoring and Evaluation of Performance

It was instructed spending agencies to develop KPIs for each and evevy program and activity under ZBB. Accordingly, guidelines were stressing the need of developing KPIs in a systematic process of gathering, manging, analysis, distributing and reporting performance information on time. The following process explained figure 1 was given as an example to be followed by spending agnecy with an example of education given in the circular 3/2015.

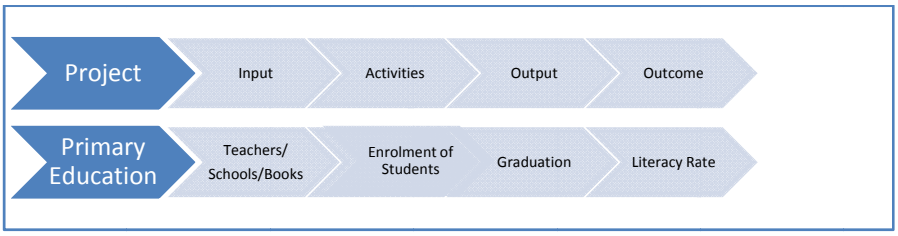

Figure I: Process of developing KPIs

At least two Key Performance Indicators (KPIs) are required to be specified along with each program or activity under which furnds are requested. Further, it is mentioned that unless speficied two KPIs are achieved, the budget for the following year will pruned accordingly. However, it was not seen that such an arrangement in place to assess this and already budget estimates for the year 2017 have been made and about to be presented to the parliament.

Therefore, end users of ZBB process realised that there are no consequences on the next year budget as they are simply intructions for the given year only. Nowhere in the guidelines has specified about how these achievement of KPIs are objecively measured and taken into consideration when the following year budgt figuers are determined. If it is true, continuos budget review should have been done either on monthly basis or quartery basis thus incorating revised figures into the budget. Except,the practice of reporting quarterly progesses, no comprehensive revisions had taken place and no resources had been allocated for this purpose. So that buget estaimates included for the year 2017 when the budget for 2016 was finalised were not seriously reconciled in the process of preparing budget estimates for the year 2017. It was revealed that estimates for the year 2018 and 2019 as per medium term framework have been included without referring to justifications or relavence to specified outcomes. Why numbers for the year 2017 included in 2016 budget are significantly different from that of included in the budget for 2017 was not reviewed. Even the figures for 2018 included in the budget 2016 had been slighly modified and included in the budget for 2017 under the column for 2018. It appears that still the incremental budgeting take plance in new formats with a backdrop of ZBB.

Study reveals that the spending agency, spending units and divisions had developed respective KPIs and included the same in the ZBB as per the guidelines given. However measurement and review of them as to whether and to what extent KPIs have been achived were simply ignored. The main task for the spending agency that is the line ministry was to implement ZBB and not to measure outcome. Therefore, no official is interested in taking measures to carry out a comprehensive assessment on the results achieved from ZBB. Spending agencies are busy with preparation of budgte for 2017.

It was found that, linkages cannot be properly made in subsequent budgets as the key players are least bothered about reviewing resuls. Further, it appears that the government is woried only on preparation of the budget for esource allocation purposes and not for the rest speficied in ZBB. On the hand, ZBB, it can be used as a tool of manipulating the budget allocations as it has to set priority ceilings with limited revenue. Adhoc measures taken and the govermnet inteference to real implementation of ZBB have also created big threats to achieive the objectives.

Lots of flaws were seen in the process of data collection for monitoring and reviewing purpose. Treasury from time to time collect data on standalone basis and the same information is looked from divisions and spending units by different authorities. It was further revealed that the data collected on the progress of projects and programs carried out are not reconciled to assess the overall progress. Information collected at a time is simply stored. They are used only to discuss about the physical progress and financial progress only. No formal analysis or study is carried out to assess output and outcomes to determine next course of actions to be taken. This practice is well known among employees and has become an embedded symbolical institutional practice.

Time taken for meetings for ZBB apart from other general meetings to make employees aware about the budget preparation, implementation and review process was considerably high. More than 30% of employee time had been utilized for this purpose. Respondents revealed that it is hardly taken follow up actions based on matters arising from such meeting. Researcher too evidenced by participating at many meeting being a constituent to an education project. The productivity of the time spent is this regards has to be separately measured and is another research issue.

Awareness of end users of budget preparations about output, outcome and KPIs is stayed at very low level with a 1.4 score out of maximum score of scale 5. More than 90% of respondents perceived that information collected on cadre category, approved cadre and actual cadre will be used by higher authorities for political agendas instead of using them for prioritizing national development goals. Accordingly, 72% stated that information on cadre was collected with an objective of filling vacancies with political appointments rather than rearranging the cadre to support ZBB. Comments given by respondents mentioned that most of the vacancies filled so far even under the new government are political appointments. Information on existing vehicles at each budget unit is requested along with ZBB. Accordingly, details information on cadre and motor vehicles were requested for. No attempts had been taken to figure out how actual cadre and vehicles are linked with programs and activities carried out each unit under ZBB.

4.8 ITMIS and Use of IT

Guidelines mention that an Integrated Treasury Management Information System (ITMIS) will be implemented by the Treasury to obtain required budgetary information for spending agencies through an online system. Answering to the question on the freuency of use ofIntegrated Treasury Management Information System (ITMIS), 86% of respondents replied that they did not use ITMIS instead, printed versions of formats obtained from the respective ministries were used for preparing budgets. Those who have mentioned that ITMIS was used, it was revealed that the use of ITMIS was to download the budget formats.

There is no arrangements to obtaine and submit online information for budgetary purposes and All the respondents stated that, budget estimates were not supplied online. In fact there is no onlince system inder ITMIS of MOF to support ZBB. ITMIS makes available some downloadeable files namely Contact Information (it provides details of point of contacts at budgeting units) , Employee Information (A format to provide carder infromation), Individual Responsibilities and Institutions List, Instruction for End User Survey and ITMIS User Survey Document. Instruction file explians how to fill up formats only. Since more than 70% of the total allocation it was not a difficual task for budget preparers to rearrange estimates in the new formats.

Proper implementation of ZBB requires well establishe IT enironment to delvier the resuls as expected. The process involves a great deal of aggrigagetion of numbers from divisional figures, continuous review and revisions, linking figures to outcomes and justifications. The completeness and efficiency cannot be assured without an appropriate IT facilities and systems in place. This aspect was seeen to have been largely ignored. Required investiment for establishin a sound IT environement and comprehensive traing was not made. The use of IT at prpvincial level was minimal. Futher, use of IT was percieved as using computers to carry out some works only. It was found that some people engage in budget preperation process use computers to compite data sometime and take printouts of them and either fax or send it by post to higher authorities instead of sending them by using emails though the facility is available. It has become a practice of doing so. There was no proper influence or presure from top to transform in to IT environemnt. Top people too used to accepting and prefer to have hard copies of documents with mannual authorization to aviod risk involved in pubic fanance use.

Bugeting units did not have a proper understing about cost drivers despite the fact that they are key elements in determining budget estimates (Fitzpatrick & Hawke, 2015). This situation too may have deviated from achieving the objectives of ZBB at its initial level. This understanding and knowledge help them to manage expenditure at provincial level.

Lots of limitations were seen at provincial level on autonomy of deciding budgetary needs. Hence, no room had been there to carry out p proper planning and monitoring process in relation to ZBB. Budgeting from zero is only a part of the planning process. The connection between bottom up approach with top-down budget ceiling in line with national priorities is essential to achieve ZBB objectives.

It was further seen that there are not incentives to employees aligned with performance of ZBB so that the motivation of end users to engage in budget preparation process is hard to find in SL context of ZBB. National Budget Circular of 3/2015 issued on 29 July 2015, requires to implement ZBB for the year 2016. It was a hurried move and the real motive of this hurriness is yet to be unknown. It needs a considereable amount of preparations to form a conducive environment to smoothly launch ZBB. However, preparations within a time period of less than three months to implement ZBB in Sri Lanka were made. This hurriness in implementing ZBB has posed a question as to whther the envioronment was ready to embrace the new concept of ZBB in Sri Lanka. UAE had also taken measures to implement ZBB within a short period of time in 2010 (Samaratunga, 2015a) but, it had a strong support as its IT systems were very sound and supportive. Further the IT literacy of endusers there had been at an acceptable level.

4.9 Other Aspects

The government faced another problem of not meeting revenue targets as planned. For exmaple, imposition of Value Added Tax (VAT) increase from 11% to 15% made a real blunder to revenue collection. It was not possible to enact VAT increase bill untill Novermebr 2016 so that the increase is effective with effect from 1st November 2016. Adhoc government policies may have deviated from the objectives of ZBB. For example, the project intoroduced for education called " Nearest School is the Best School" with a huge budget allocation of Sri Lankan Rupeers (LKR) 1500 million per province in the budget for 2016 as a priority goal. However, only around LKR 300 million per province had been releasesd at the end of September 2016 and it is unlikely that the balance amount will be released during the year. This allocation would be again included in the budget 2017 as well irrespective of the fact that upto what level it would achive thus leaving budget review and meaureing perfomance of ZBB unattended. Therefore it could be concluded that implementaion of ZBB is Sri Lanka is at a very primitive level and is unlikely to achieve its theoritical objecitives of streamlining national priorities and elimination of wasts and duplicate allocation to bring about value creation with the view to enhavne GDP and growth of country.

With respect to capital expenditure, no analysis was found to have been done as to how they relate to intended outputs, outcomes and national developmetn priorities despite the fact that capital expediture is a key for generating value and increasing GDP. Instead, budgeting units tended to estimate for common caiptal expenditure items such as constrution of new buildings, repairs of builidngs, procurement of computers, motor vehicles and other office equipment on arbitraty bases. Costs of ZBB implementation were seen not to have been taken into account thus leaving ZBB to be mere Rhetoric at this stage. It is a fact that ZBB cannot be implemented by issuing circulars and guidelines only. It requires significant amount of costs to create a supportive and workable environment to carry out ZBB. Among them, investments for appropriate IT environment and continuous training for staff take top priorities.

5 Conclusion

Motives of implementing ZBB in a hurried manner in a context where incremental traditional budgeting had been practicing over a long period of time are unclear as to whether that was politically agitated or it is a genuine attempt to incorporate with development goals and planning and performance measures. Hurriedness of implementing ZBB has created a half baked cake situation where end users of budget preparation s had not clearly understood the concept of ZBB and its objectives.

The need for well spread and required IT facilities to smoothly implement and operationalize ZBB had been simple ignored. Further, there were no comprehensive training given for budget preparers , instead ad hoc standalone guidelines were passed on to them at various workshop, seminars and meeting without having a clear focus and understanding. Evidence was found that some implementers also did not understand the objectives of ZBB. This has created confused views of ZBB among public employees. On the other hand, there were no plans to motivate preparers of budgets. ZBB had been perceived as another routing practice just to comply with legal requirements and to follow instructions and guidelines given. Hence, it is being institutionalized as a symbolic practice.

Implementation of ZBB had not integrated with resource allocations, planning and development goals as mentioned in the national budget circular. Rational and appropriate justifications which are the key underpinning of ZBB were not given at all thus leaving its importance to be trivial. Non- focused meetings, briefings and other arrangements to educate budget preparers had wasted lots of valuable time of public employees. Discussions on ZBB implementation carried out at various levels were seen to have been unproductive to larger extent. Whether intended objectives of ZBB could be achieved in this process is highly uncertain and it appears like having not created any value in terms of consolidating planning with budgeting.

No any serious intervention by the implementation of ZBB to integrate Planning, budgeting and review processes as mentioned in budget circular 3/2015. Implementation of ZBB has paid very little attention on reviewing public expenditure in line with national prioritization and development goals. How the sectoral ceilings of expenditure to achieve efficient and effective use of public finance were used had not been reviewed by the authorities and they are likely to be buzz words. Secretaries to the ministries are requested to monitor final output/ outcome achievement of key functions of ZBB and it turns to be another burden for them without having any substance. A practice of cascading the responsibilities towards the downstream of the hierarchical administrative structure was seen rather than trying to achieve common goals. Hence, it is recommended to have a dedicated unit to deal with ZBB application and evaluation.

Alternative and efficient ways of utilizing limited resources had not been identified instead all the key players engaged in budgeting process were busy with tasks to meet deadlines and finalize the estimates as per instructions and guidelines thus ending up with filling up new formats. Political agenda embedded in budget estimates were also seen and furtherance to that, attempt of politicians to link budgeting objectives for 2017 to Sustainable Development Goals (SDGs) (ColomboPage, 2016) is seen as a new move without a having a proper review of 2016 budget and a substance.

One of the areas that could bring about the objectives of ZBB is the alignment of macro-economic targets with national development priorities subject to the levels of investment ceiling and that is yet to be considered in future. It is paramount important that the Ministry of Finance should have a clear understanding of budget requests made by spending agencies, spending units and divisions and to maintain healthy relations with them in order to achieve strategic, operational and financial objectives of the country.

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The Efficiency of Power Regulatory Agencies in Costing and Tariff Setting: A Comparative Study of SAARC Countries

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Abstract

The purpose of this study is to identify the regulations of energy sector in developing the pricing and tariffs standards in SAARC countries. The findings revealed a positive role that Regulatory authorities played in energy sectors in SAARC member countries. This study will help to evaluate the transparency and accountability of costing and tariff standards prevailing in the SAARC region. The findings will help investors in designing strategies and making trading decisions to get maximum results in public serving also provide a good source in analyzing the effective costing methods that alter the end result and change the whole scenario in the energy sector.

Keywords: Regulatory Authority, Pricing, Tariff

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1. Introduction

Electricity is recognized as a basic human need and an essential constituent of infrastructure on which depends the socio-economic development of any country. In fact, electricity can be termed as one of the key drivers for rapid economic growth, poverty alleviation and peoples' welfare. In any typical economy, electricity is produced from six main sources viz. coal, oil, gas, hydro, nuclear and renewable energy sources e.g. wind, solar, biomass, geothermal etc.

Electricity supply industry is a 'natural monopoly' and a regulated sector in most of the countries in view of its three distinct features which requires policy makers, regulators, producers and consumers to treat it in a different way. Firstly, there is a continuous network requirement as all three activities viz. generation, transmission and distribution are connected with each other. Secondly, electricity is a non-storable output and it is not possible to store it at large scale. The suppliers are required to match supply with demand at every point of time. Thirdly, the demand for electricity keeps changing on a continuous basis which requires adjustments on supply side to match with the varying demand. All these factors provide a strong basis to treat the electricity supply industry as a natural monopoly.

Being a regulated sector, the price of electricity is subject to regulation by a public authority as opposed to price determination of a product by market demand and supply mechanism. The regulated price can take different forms such as setting of prices, price caps or combination of both. Electricity pricing, which is sometimes referred to as 'electricity tariff' varies from country to country and even city to city within a country. This is due mainly to the fact that cost of electricity generation depends much on type of fuel used (thermal, hydro etc.) and market price of fuel, subsidies by government etc.

1.1 Background of Study

Electricity pricing or tariff setting is a key regulatory instrument which determines the volume and nature of demand and supply. There are costs involved in supply of electricity which need to be recovered from the consumers in order to sustain the supply in future. Tariff determination refers to the process of determining price of electricity to the consumers. Tariff is, therefore, a schedule of prices for various consumer categories and signifies the amount of money paid by consumers in lieu of making electricity available at their homes.

The tariff decision is a complex issue and the regulator must keep a balance among various interests. For instance, the end-users want a 'lower tariff' and if the regulator sets high tariff it would cause loss of consumer welfare. Similarly, if the electricity tariff is unreasonably lower, it would bring loss to the supplier and result in inefficient service. The electricity

regulatory authorities have; therefore, to keep in consideration some principles while determining tariff for end-users such as 'principle of economic efficiency' which means that cost of supply should be minimum given the level of technology. The 'principle of adequacy' means that the approved tariff should be adequate to recover all reasonable cost of production. The 'principle of economy' indicates that electricity should be utilized efficiently and higher tariff should be set for higher amount of consumption of electricity. Lastly, the 'principle of affordability' should be considered which means tariff should not be a barrier to fulfilling human need.

Besides considering above principles, the regulators must also ensure that the process of determining electricity prices or tariff should be transparent, accountable and participatory to serve public interest. As electricity tariffs affect different sections of society e.g. residential consumers, businesses and industries, the tariff determination process should have a clear mechanism of participation, allowing written complaints, public hearings, etc. to redress grievances against the regulators.

Methodology of Electricity Pricing / Tariff Determination

In a regulated market, various methods are being used to regulate electricity prices, depending upon the socio-economic factors such as scale of electricity sector; use of technology, degree of competition, market responsiveness etc. These methods have their own advantages and disadvantages.

a) **Cost Plus approach**– It balances the costs incurred by the utility with future estimated revenues

b) **Performance-based approach**–It is an extension of cost-plus approach that provides incentives for improving efficiency and reducing costs.

c) **Price Cap approach** – A ceiling price fixed by the regulator on basis of historical cost and future efficiency gains and taking account of general inflation in the economy.

The electricity pricing process should specifically identify the method used for tariff determination and the reasons for its selection so as to enable stakeholders to assess the appropriateness of this method. For instance, the selection of performance-based approach may provide more flexibility to the electricity utilities to improve their performance.

Cost Components of Electricity Tariff / Pricing

The cost calculation of electricity generation, supply and distribution is an important exercise that helps in assessing the financial performance of utilities. The regulatory authority determines the electricity price or tariff on the basis of total cost of supply or annual revenue requirement, calculated after examining the various cost components. Other socio-economic factors such as paying capacity of end-users are also considered by the regulatory authority.

The cost elements in generating, transmitting and distributing electricity are normally classified as **'fixed cost'** and **'variable cost'.** The 'fixed cost' do not change with the amount of electricity used, whereas 'variable cost' changes in proportion to the amount produced and consumed. These costs are recovered from the consumers through tariff.

Table-4 shows the fixed costs and variable costs of an electricity generation plant, whereas **Table-5** shows major cost components of electricity generation, transmission and distribution companies.

Table 5: Major Cost Components of Electricity Generation, Transmission and Distribution Companies

Type of Electricity Utility	Major Cost Components
Generation Company	Fuel Cost; Transportation cost; Employee cost; Repairs & maintenance cost; Depreciation; pollution control expenses; taxes; Return on capital etc.
Transmission company	Employee cost; Repairs & maintenance cost; depreciation; metering etc.
Distribution company	Power Purchase cost; Transmission cost or Wheeling charges; Employee cost, Repairs & maintenance cost; Depreciation; Energy losses; Taxes; Return on Capital

- ***Fuel cost' is a major cost item in thermal and nuclear power plants, whereas in hydro power plants it is almost negligible***
- ***'Transmission losses' means electricity lost during transmission process***
- ***'Power Purchase Cost' means cost on purchase of electricity from all sources viz. thermal, hydel, nuclear or imported***
- ***For a distribution company, generation cost and transmission cost become 'power purchase cost'***
- ***'Energy losses' means losses due to electricity theft, under-estimation of consumption, technical losses etc.***
- ***'Wheeling charges' are the distribution commission paid to the Transmission company***

In calculating the electricity cost, some indexation factors are also used to nullify the effect of inflation and exchange rate variation (USD/Rupee). It may be mentioned here that the fixed or capital cost of hydel or wind plants is much higher than their variable cost in view of less production in a year.

Table 4: Fixed and Variable Cost Components of a Electricity Generation Plant

Fixed Cost (Capacity Cost)	Variable Cost (Fuel/Energy Cost)
1. **Fixed Operations & Maintenance cost (O&M)**	Fuel cost **(major cost)**
2. **Return on Equity (ROE)**	Variable Operations & Maintenance cost (O&M)
3. **Return on Equity during Construction (ROEDC)**	
4. **Insurance**	
5. **Cost of Working Capital**	
6. **Withholding tax**	
7. **Debt Repayment**	

- ***Fixed O&M covers cost of maintenance, financial cost, employee cost, rents and cost of other utilities***
- ***ROEDC is the amount incurred during construction & testing time and finalized after commissioning of plant***
- ***Debt repayment includes principal amount plus interest***

Electricity Tariff Structure and Subsidies

The electricity tariff structure or rate design signifies a set of rules and procedures that determines the different categories charged to the consumers of electricity. The tariff structure should be simple and must ensure accountability for use of electricity, in addition to improving performance and efficiency of the utilities. The most common tariff structure used is a 'two-part tariff; in which the consumers of electricity are required to pay some fix charges (i.e. minimum consumption charge, load charge or connection fee) per billing period and additional charges based on actual consumption. The other tariff structure include single-part tariffs, block tariffs and Time-of-Day tariffs (TOD, peak load) and seasonal tariffs. In single-part tariff, a single price per unit of electricity is charged for the entire amount of electricity consumed. In blocked-tariff, the tariff are either increased or decreased with the corresponding increase or decrease in electricity consumption.

Many governments provide subsidies for energy, either explicitly or implicitly, to producers and consumers. Through electricity tariff subsidies, the government reduces electricity prices by making 'unrequited value transfers' to the consumers or utilities. The financing of subsidies can be done in innumerable ways such as **'explicit subsidies'** that are voluntary transfers by government to consumers and are reflected in the national budget; '**implicit subsidies'** are where there is no immediate transfer from the government whereas **'cross-subsidies'** are policies that reduces costs to particular types of customers or regions by increasing charges to other customers or regions. In this context, it may be mentioned that energy subsidies normally have a direct impact over the national exchequer as it leads to a worsened fiscal balance due to larger government expenditures, smaller revenues, or net current transfers. Subsidies also affect the long-term growth potential of any economy.

1.2 Research Objectives

1. Examine the transparency of costing standards in energy sector in SAARC region.
2. Determine the effectiveness of Regulatory Authority in power sector.
3. To see the effect of tariffs methods in electricity pricing.

1.3 Research Questions

1. What are the costing and pricing standards of electricity in the SAARC region?
2. What is the role of Regulatory Agency in developing electricity prices and tariffs?

1.4 Hypothesis

H_{10}: Regulatory Agencies are less effective in developing costing and pricing standards.
H_{11}: Regulatory Agencies plays a positive role in developing costing and pricing standards.

2. Data analysis and Discussion

Pakistan

The **National Electric Power Regulatory Authority (NEPRA)** which was established in 1997 under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, is empowered to determine, specify or approve tariffs for power generation, transmission and distribution companies. NEPRA is authorized to issue licenses to power companies and approve investment and power acquisition programs of utility companies. Under the law, NEPRA is mandated to safeguard the interests of investors and consumers by taking judicious decisions based on transparent commercial principles and provide competitive environment for operation of power sector. The NEPRA (Tariff Standards and Procedure) Rules, 1998 provides for tariff setting process and broad parameters of tariff setting.

Tariff determination for electric power services is one of the primary responsibilities of NEPRA. NEPRA fixes electricity tariffs based on principles of economic efficiency and service of quality and keeping in consideration prescribed Tariff Standards and Procedure Rules, 1998. The tariff of power generation and transmission companies is determined on **cost plus basis**, whereas distribution companies are given a **multi-year performance tariff**. Though NEPRA determines the tariff for all the generation, transmission and distribution companies; yet the sum of costs of all the three kinds of tariffs is recovered from the consumers through the retail tariffs of distribution companies. The bills generated by distribution companies include not only its distribution margin but also the generation cost and wheeling charges.

NEPRA chooses a base year to determine the revenue requirement of a distribution company under multi-year tariff regime or annual electricity end-user tariff regime. The tariff so provided provides an opportunity to the distribution company to fully recover NEPRA approved revenue requirement. NEPRA determines the consumer-end-tariff of a Distribution Licensee by assessing the following components of its Revenue Requirement and also inviting comments from the public, prior to tariff determination to ensure transparency and accountability:

a) Power Purchase Price (PPP)
b) Distribution Margin (DM)
c) Prior Year Adjustment (PYA)

Formula for determining 'Revenue Requirement'

'**Revenue Requirement'** refers to the 'minimum amount of revenue required by a distribution company to run its operations smoothly' and comprises interalia, of cost of power purchase; cost of transmitting power and the distribution margin. The formula used by NEPRA for determining the Revenue Requirement (RR) of the distribution company is as under:

$$\mathbf{RR_D = PPP_D + DM_D \pm PYA_D}$$

In the above Formula:

RR_D = Revenue Requirement of Distribution company
PPP_D= Power Purchase Price (cost) of Distribution company
DM_D = Distribution Margin of Distribution company
PYA_D= Prior Year Adjustment of Distribution company

Let's analyze the two main cost components of the Revenue Requirement (RR) viz. Power Purchase Price (PPP) and Distribution Margin (DM).

a) Power Purchase Price (PPP)

PPP refers to 'generation cost' and 'transmission cost' allocated to distribution companies from the pool of Centre Power Purchasing Agency (CPPA) and National Transmission and Distribution Company (NTDC) in accordance with NEPRA-approved transfer price mechanism plus power purchase by distribution companies through NEPRA-approved bilateral contracts.

The Power Purchase Price (PPP) consists of following three cost components:

(1) **Energy Charges (EC**) – It consists of fuel cost and Variable Operations & Maintenance cost (O&M)

(2) **Capacity charges(CC)–** It consists of Fixed O&M cost; working capital cost; insurance cost; ROE; ROE during construction; debt servicing; agency fee etc.

(3) **Transmission charges (TC)** – It refers to charges related to transmission of electricity

The following formula is used to determine PPP:

$$PPP = PP_{(EC)} * Q_{(p)} + PP_{(CC)} + TC$$

In the above Formula:

PPP = Power Purchase Price (cost)
$PP_{(EC)}$ = Energy Charge part of PPP
$Q_{(P)}$ = Quantity or power purchased
$PP_{(CC)}$ = Capacity Charge part of PPP
TC = Transmission Charges

b) Distribution Margin (DM)

The major cost components in 'Distribution Margin' of a Distributing company comprises of operations &maintenance cost; return on rate base; depreciation; repairs and maintenance; salary and wages; taxes, travels and vehicles; other regulatory costs including other income determined or approved by NEPRA for running the distribution business.

The following formula is used to determine the Distribution Margin (DM):

$$DM_D = RB_D * RORB_D + D_D + E_D + t_D \pm ORC_D$$

In the above Formula:

$DM_{(D)}$ = Distribution Margin of Distribution company
$RB_{(D)}$ = Rate Base of Distribution company
$RORB_{(D)}$ = Return on Rate Base (capital cost) of Distribution company
D_D = Depreciation expense of Distribution company
E_D = Employee cost of Distribution company
tD = Taxes pass through by Distribution company
ORC_D = Other Regulatory Costs of Distribution company

India

The **Central Electricity Regulatory Commission (CERC)** which was established in 1998 under the former Electricity Regulatory Commissions Act, 1998 (now Electricity Act, 2003) is mandated to regulate the tariff of generating companies owned or controlled by the Central Government as well as those companies which are engaged in sale of electricity in more than one State. The Commission is also responsible to regulate and determine tariff of inter-State electricity transmission as well as issue licenses to persons to function as transmission licensee and electricity trader.

CERC, under the Electricity Act, 2003, has issued the Power Market Regulations, 2010which govern transactions related to ''Energy trading'' by companies like Indian Energy Exchange (IEX), Power Exchange India (PXI), National Power Exchange (NPX) in various contracts related to electricity. These regulations are aimed at taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and enhancing supply of electricity.

Before 1992, India had a 'single-part tariff system' in which both fixed cost and variable cost was calculated at a certain generation level. However, in 1992, a two-part tariff formula was adopted for all electricity generation plants under the National Thermal Power Corporation Ltd. (NTPC) – a Central public sector undertaking, founded in 1975 and functioning under the Ministry of Power of India. Presently, 17 coal-based and 7 gas-based stations are operating throughout India under NTPC.

Availability-based Tariff (ABT) system

Since January 2000, an **"Availability-based Tariff (ABT) system** has been adopted for all regional grids in India for improving grid discipline by frequent dependent pricing. Presently, it is limited to short-term energy transactions between the beneficiary states and Central generating stations without the need for negotiations on price or quantum in real time. In the Indian context, 'Availability Tariff refers to a 'rational tariff structure for power supply from generating stations on a contracted basis.

The electricity generation plants have two kinds of costs viz. fixed costs and variable costs. The **fixed cost** covers the interest on loan, return on equity (ROE), depreciation, cost of secondary fuel cost (for coal-based & lignite fired generating stations) O&M expenses, insurance, taxes and interest on working capital, whereas **variable cost** comprises of the fuel cost, i.e., coal and oil in case of thermal plants and nuclear fuel for nuclear plants. In ABT system, fixed cost and variable cost components are treated separately. The fixed or capacity charge is for recovery of annual fixed cost, whereas the variable or energy charge is for recovery of primary fuel cost, wherever applicable.

There are following three main components of Availability-based Tariff (ABT):

a) Fixed or Capacity Charge

The fixed cost payment to generating company is linked to the availability of plant which denotes its capability to deliver MWs on day-by-day basis. The total amount payable to generating company over a year towards fixed cost depends on average availability (MW delivering capability) of the plant over the year. In case the average actually achieved over the year is higher than the specified norm for plant availability, the generating company gets a higher payment. However, if average availability achieved is lower, payment is also lower.

b) Variable or Energy Charge

The energy charge comprises of the variable cost (i.e., fuel cost) of power plant for generating energy as per given schedule for the day. The energy charge (at the specified plant-specific rate) is based on scheduled generation and not on actual generation and plant output.

c) Deviation Charge

In case there are deviations from the schedule (e.g., if a power plant delivers 700 MW while it was scheduled to supply only 600 MW), the energy charge payment would still be for scheduled generation (600 MW), and the excess generation (100 MW) would get paid for at a rate dependent on the system conditions prevailing at the time. If the grid has surplus power at the time and frequency is above 50cycles, the rate would be lower. If the excess generation takes place at the time of generation shortage in the system (in which condition the frequency would be below 50.0 cycles), the payment for extra generation would be at a higher rate.

Tariff determination

The State Electricity Regulatory Commissions (SERCs)fix the electricity tariffs through tariff orders in accordance with the National Tariff Policy 2006 (Ministry of Power, Government of India, 2006) and as per the provisions of the Electricity Act, 2003. The tariff is set based on the estimated Annual Revenue Requirement (ARR) of the electricity distribution licensee(s) (DISCOM) in a financial year.

The Annual Revenue Requirement (ARR) is calculated by combining the following cost components:

a) Power Purchase Cost or cost of generation in case of licensee –owned power station
b) Cost of capital
c) Operational and Maintenance (O&M) cost
d) Depreciation
e) Interest on working capital
f) Provision for tax
g) Adjustment with preceding year's unaccounted expenses or revenue gaps

The ARR is determined ex ante for each financial year of a Control Period (over 5 years as per National Tariff Policy 2006). The initial control period is allowed to be of three years. Tariff for the financial year is fixed and based on estimated ARR (provisional) and expected electricity sales.

Since tariff is estimated ex ante, actual revenue realized may not cover annual revenue requirement. The gap is to be adjusted while estimating the ARR in the ensuing year. Only in exceptional circumstances ("*natural causes or force majeure*" situations), the SERC may carry forward the deficit with interests to be amortized in future. This revenue deficit is earmarked as regulatory asset.

Average tariff for a consumer is measured from the total tariff-related revenue from the consumer category divided by total estimated electricity sales to the category. In an ideal case, average tariff for
a consumer category should be at par with the cost of electricity supply. The consumer tariff has three main components viz. Power purchase cost (80% of total cost); O&M cost and financial cost.

Bangladesh

The **Bangladesh Energy Regulatory Commission (BERC)** which was established in March 2003 through a legislative Act of the Government of Bangladesh is empowered to determine tariff of electricity generation and transmission, marketing, supply, storage and distribution of energy. BERC is mandated to determine both the bulk and retail tariff rates of electricity, natural gas, petroleum products, coal and other mineral resources, with reference to the government's overall policies in the sector. Electricity generation in Bangladesh is overwhelmingly natural gas-based.

BERC is also mandated to issue licenses and ensure transparency and accounting in the pricing framework. For this purpose, it arranges public hearings of stakeholders, policy-makers, government officials and civil society where proposals are shared for intended retail and bulk tariff pricing. BERC then determines the tariff rate based on the discussion in the public hearings and other public issues.

The Bangladesh Power Development Board (BPDB), being the sole buyer of electricity from Independent Power producers (IPPs);Small Independent Power Producers (SIPPs); Rental power plants, corporatized generation companies and other publicly-owned power plants, based on negotiated bulk power tariff rates, sells electricity to distribution utilities based on BERC's regulated wholesale tariff rates.

The Power Grid Company of Bangladesh (PGCB) was established in 1996by the Government of Bangladesh to act as the national grid operator and is allowed to recover its costs through wheeling charges from BPDB power generating companies to distribution companies utilizing transmission network. Wheeling charges are set by the Bangladesh Electricity Regulatory Commission (BERC).

Components of Electricity Tariff

The Bangladesh Power Development Board (BPDB) fixes the bulk tariff rate for the power distribution companies, whereas retail tariff rates are imposed on final consumers of electricity by the distribution companies. There are separate retail tariff rates for five categories of consumer's viz. domestic, agriculture, small industry, non-residential and commercial.
The electricity generation cost is 'passed through' to end-user tariffs. The average end-user electricity tariff for each customer class is so fixed as to fully cover reasonable costs of supplying electricity to that customer class (including generation cost, system services, transmission, and distribution), and generate a surplus to expand coverage and supply, and improve the quality of service. The tariff is adjusted in case there is variation in the recognized costs in excess of ten percent. Differential rates are maintained for peak and off-peak consumption by consumers.

There are following price components of electricity tariff in Bangladesh:

a) Fixed or Service Charge

The fixed charge, also known as 'service charge' or 'daily supply charge' is applied for supply of electricity to consumers for each day of billing period, regardless of how much electricity is consumed. It is often shown as a 'daily rate' on the electricity bill.

b) Variable or Usage Charge

The variable charge, also known as 'usage charge' or 'consumption charge', is listed as cents per kilowatt hour (c/kWh) for electricity and cents per mega joule (c/MJ) for gas.

Tariff Calculation

Each generation unit consists of two part tariff rate. One part constitutes the "fuel cost" used in the generation of electricity, whereas the other part is intended to recover plant's revenue requirement.

The electricity bill of consumer indicates 'fuel charge' and 'service charge' for month's consumption. The customer's total charge will be the sum of these two amounts and calculated as follows:

a) **Fuel Charge** = Fuel Cost Recovery Rate x Customer's Consumption
b) **Service Rate Charge** = Service Rate x Customer's Consumption

For tariff calculation of Electric power, the following components are calculated:

1) Fuel cost/charge
a) Yearly net generation
b) Fuel required
c) Fuel cost per unit/kwh

2. Service charge
a) Operation & Maintenance cost
b) Yearly Depreciation
c) Regulatory Working Capital
d) ECA loan calculation
e) Commercial loan Calculation
f) Return on Equity Calculation

Fuel cost calculation:

At first, the yearly net generation is calculated by multiplying net capacity with plant factor and monthly operation hour as follows:.

Yearly Net Generation = capacity × plant factor x hours per year

Thereafter, the total heat required for generation is calculated by multiplying yearly net generation and heat rate as under:

Total Heat Required = Yearly Net Generation x Heat Rate

After these calculations, the total Fuel required for next generation is calculated by dividing total heat required for generation by calorific value of Fuel (oil).

Total Fuel Required = Total Heat Required / Calorific Value of Fuel

Finally, the total Fuel cost per year by multiplying Fuel Price with total fuel required.

Total Fuel cost = Total Fuel Required x Fuel Price

The Generation cost is the summation of fuel cost and non-fuel cost.

The Total **Annual Revenue Requirement (ARR),** which represents the licensee's capital and operation costs, is then calculated by adding the 'Total Costs' with the 'Return on Rate Base'.

Sri Lanka

The **Public Utilities Commission of Sri Lanka (PUCSL)** which was established in 2002 is empowered to regulate electricity tariff and other charges levied by regulated entities. It exercises licensing, regulatory and inspection functions and enforces provision of licenses, contracts and other instruments. It is also mandated to protects the interests of all consumers and promote competition.

Electricity 'tariff methodology' has been enforced by PUCSL under the Sri Lanka Electricity Act No. 20 of 2009, which classified the tariff components under following heads:

a) **Bulk Supply Tariffs–** This relates electricity generation and use of Transmission System

b) **Distribution Tariff–** This relates to use of licensee's Distribution System

c) **Retail Supply Tariff** – This related to supply of electricity

Under the PUCSL tariff methodology, the transmission customers are required to pay the bulk supply tariff, whereas other customers are required to pay a tariff comprising of all components.

Determination of Bulk Supply Tariffs

The electricity produced by PUCSL-licensed Generating companies are purchased by a single buyer and reflected in Power Purchase Agreements (PPAs). The generation cost is determined by the single buyer based on which the bulk supply tariff is also calculated.

The bulk supply tariff is composed of following three components:

a) Generation tariff
b) Transmission tariff
c) Bulk supply and Operations Business tariff

Generation tariff: The following two-part tariff pricing formula is used in Power Purchase Agreements:

a) Capacity Price/ Charge – to recover fixed costs associated with each generating unit such as debt servicing; efficient O&M fixed costs and costs of services provided by CEB Generation HQ

b) Energy Price/ Charge – to recover the fuel cost; efficient variable O&M costs and start-up costs

Transmission tariff: The Transmission System Allowed Revenue (TSAR) is that revenue that the Transmission Licensee is allowed to collect from the transmission users for use of transmission system, excluding connection charges. TSAR is the sum of following two components:

a) Transmission Base Allowed Revenue (BAR)
b) Large Infrastructure Development (LID) allowances

A multi-year tariff system is used to calculate the **'Transmission Base Allowed Revenue (TBAR)'** with a limitation (Revenue Cap) imposed by PUCSL on overall revenues (TSAR) during tariff period (5 years) regardless of the number of Transmission Users, energy transmitted, etc. Transmission System Allowed Revenue is adjusted yearly on basis of Revenue Control Formula.

The revenue related to capital expenditure (CAPEX) classified as **Large Infrastructure Development (LID) Allowances** is collected from the users of transmission system by adding an allowance to the Transmission Base Allowed Revenue (TBAR) from time to time.

Adjustment of Technical Losses in Bulk Supply Tariffs

The technical losses in Transmission System are allowed to be 'passed-through' to Bulk Supply Tariffs. The forecast transmission losses are calculated by System Operator as a part of Annual Operating Plan. The actual transmission losses are, however, measured through the metering system. In case the metering system is not available, the Commission may allow the Transmission Licensee to use forecast transmission losses for determining the Bulk Supply Tariffs.

Determination of Distribution Tariff

The Distribution and Supply Licensee is involved in distribution as well as retail supply of electricity. The Distribution Allowed Revenue (DAR) is that revenue that the D&S Licensee is allowed to collect from the users of distribution system (wire business), excluding Allowed Charges (connection, reconnection, meter testing, etc.) that are separately regulated.

A multi-year tariff system is used to calculate the **'Distribution Allowed Revenue (DAR)** with cap imposed by PUCSL on overall revenues during the tariff period. This cap is adjusted for changes in the number of distribution users and energy distributed as prescribed by the Revenue Control Formula.

Determination of Retail Supply Tariffs

The Retail supply tariff is classified into following two main components:

a) **Retail service tariff'–** This includes all costs related to commercial cycle (meter reading, invoicing, and collection), routine meter testing cost and bad debt allowance etc. The Retail service tariff is calculated on basis of a Multi-Year Tariff System in which a cap on average price is also imposed during tariff period (5 years). The cap is adjusted annually considering SLCPI.

b) **Bulk Supply "Pass-Through" Tariff–**This tariff is based on the Bulk Supply Tariffs and adapted in order to be applied to retail customers. It consists of two parts viz. capacity charge and energy charge. The energy part is further divided into three time intervals. The Bulk Supply "Pass-through" Tariffs is differentiated by voltage levels defined by the USCSL. The following formula is used to charge bulk supply pass-through tariffs to the retail consumers:

$$PTP_{p,i,v} = BST^{F}_{p}\,(E_i) \times (1 + AL_{p,v})$$
$$CP_{p,v} = BST^{F}_{p}(C) \times (1 + CAL_{p,v})$$

In the above Formula:

PTPp,i,v = Allowed energy Pass-through-tariff for a 6-month period 'p' in hourly interval 'i' at voltage 'v'
ALp,v = Allowed (energy) Loss factor (%) at voltage level 'v' for 6-month period 'p'
CP$_{p,v}$ = Allowed capacity Pass-through Tariff for 6-month period 'p'
CAL$_{p,v}$= Allowed (capacity) Loss factor (%) at voltage level 'v' for 6-month period 'p'

Nepal

The **Nepal Electricity Authority (NEA)** which was established way back in August 1985 under the Nepal Electricity Authority Act, 1984 through the merger of Department of Electricity of Ministry of Water Resources, Nepal Electricity Corporation and related Development Boards, is mandated to recommend, determine and realize tariff structure for electricity consumption. It is also responsible for generate, transmit and distribute power by planning, constructing, operating and maintaining all generation, transmission and distribution facilities in Nepal's power system, both inter-connected and isolated.

The Electricity Tariff Fixation Regulations were promulgated under provision of Electricity Act, 1992. In 1994, an Electricity Tariff Fixation Commission (ETFC) was formed in accordance with Electricity Act, 1993 to oversee the retail tariff structure. However, the generation tariff is looked after by NEA. The Commission in non-functional at present. It followed ROR method to fix tariff rates for consumers.

Determination of Tariff

As per Electricity Act, 1992, the tariff and other charges are required to be determined on the basis of rate of depreciation, reasonable profit, mode of operation of power plant, changes in consumer's price index, royalty and policy adopted by government of Nepal.. Any entity distributing electricity in isolation of national grid, is entitled to fix tariff and other charges for distribution of electricity. Further, the Act mentions that tariff may be so fixed that all investments made on electricity generation, transmission or distribution is paid back in average of 25 years by deducting the depreciation cost and a dividend of 25% on share capital earned. It is also required under the Act that the tariff should be fixed by taking into consideration the types of consumers; social liability; cross subsidies and demand potential. The following components are considered while fixing the tariff:

a) Marginal cost of electricity generation
b) Exchange rate of convertible foreign currency
c) Fuel cost
d) Loans and debt servicing

Nepal electricity generation system pre-dominantly depends on hydro resources. The hydro-power pricing in Nepal is determined on basis of hydro-power project costs, which can be classified as:

a) **Associated costs** – This includes all costs incurred during construction and operation phases such as civil works, electrical and mechanical equipment, transmission and sub-station, engineering, management, administration and operation and maintenance costs.

b) **Induced costs** – All costs that are incurred to mitigate adverse impacts produced by the project during construction phase to the society, nature and environment

c) **External costs** – The costs incurred on the infrastructure such as roads, rural electrification, transmission lines that may not be directly linked to the project are considered external costs. There are generally no external costs during the operation phase.

d) **Opportunity costs** –This cost refers to the cost assigned for the forgone opportunity for other users of water as irrigation.

In addition to above costs, there are two kinds of royalties (as defined in Hydro-power Development Policy 2001) namely capacity and energy royalty based on capacity and energy generated respectively.

Cost plus pricing approach is generally used for pricing or electricity in Nepal in which the generator fixes electricity tariff, based on its average generation cost plus a certain net profit margin. However, in cases of power purchase from IPPs by the Nepal Electricity Authority (NEA), a fixed percentage of retail tariff approach is used in which a certain percentage of retail tariffs are fixed as tariff.

The hydro-power pricing in Nepal is determined on basis of following two price components:

a) **Capacity Price** – This refers to the annuitized installation cost of hydropower project, including debt repayment, interest payment; guarantee fee during repayment; interest tax, insurance fee and capacity royalty.

b) **Energy Price** – This refers to the cost of annual operation of hydropower plant per unit (kWh) and covers the equity portion of installation cost. The cost of operating hydropower plant is related with operation and maintenance expenses, energy royalty, return on investment, corporate tax, dividend tax and export premium, if applicable.

Bhutan

The **Bhutan Electricity Authority (BEA)** which was established way back in 2001 is an autonomous regulator for the electricity sector, operating under the Department of Electricity of Ministry of Power of Bhutan. It is empowered to develop regulations for domestic tariff setting including subsidies in accordance with provisions of Electricity Act, 2001. It is also responsible for economic and technical regulation of power sector entities, including tariff setting and licensing.

The Electricity Act 2001 contains broad principles of tariff setting. Subsequently, a Tariff Determination Regulations, 2007 were enforced which became applicable on all distribution, supply, transmission, generation and system operation Licensees. **The Bhutan Power Corporation Ltd. (BPCL)** is responsible for electricity transmission, distribution and supply functions including management and operations of embedded generation units consisting of micro/mini/small hydro and diesel generating units. The BPCL provides transmission access for export of surplus power to India.

Determination of Tariff

The electricity tariff sold to industries and household in Nepal is calculated using the **cost-plus model**. Under the Bhutan Electricity Authority (BEA) Tariff Determination Regulations, 2006, the BEA is authorized to approve a 'Tariff Schedule' for each Licensee that sets the maximum prices to be charged. The Tariff Schedule is applicable for the duration of tariff period with appropriate indexing or other adjustments over the course of tariff period.

For generation Licensees, tariff determination shall provide for an allowance for auxiliary consumption at power stations as well as an allowance for station availability. For transmission, distribution and supply Licensees, the 'costs of supply', to be determined by BEA, shall provide for an allowance for technical losses, commercial losses and non-payment. The scope of costs shall include the following:

a) Operating and Maintenance (O&M) costs
b) Depreciation
c) Return on Fixed Assets, including an allowance for company taxation
d) Power purchases and Fuel costs for electricity generation
e) Costs of losses and non-payment of electricity bills
f) Cost of working capital
g) Any Regulation fees, duties or levies applicable on Licensee under the law

Formula for determining Average Cost of Supply

The formula for determining the average cost of supply for a Licensee in any year is determined as under:

TC = OM + DEP + RoA + RoWC

In the above Formula:

TC = Total Cost of supply in million Ngultrum
OM= Allowance for Operating and Maintenance costs in million Ngultrum (including regulatory fee etc.)
RoA = Return on Fixed Assets in million Ngultrum, determined as per following formula:

RoA = WACC x NA

Where

WACC = Weighted Average Cost of Capital
NA = Net Value of all Fixed Assets at start of year in million Ngultrum

RoWC = Return on Working Capital in million Ngultrum determined as per following formula:

RoWC= WACC x [REV x ARREARS /365 + INVENTORIES]

where

WACC = Weighted Average Cost of Capital
REV = O&M + Depreciation + RoA
ARREARS = Allowed days receivables
INVENTORIES = Allowance for Inventories in million Ngultrum

Formula for determining End-users Prices

The Authority (BEA) determines an 'Average Price' for each 'Customer Group' applicable for tariff period. All customers connected to a common voltage level shall comprise on customer group for the purpose of determining Average Prices. Within each customer group, the Licensee may create different tariff structures for different customer categories. For determining the Average Prices, the Power Purchase Price (PPP) shall comprise of the weighted average of purchases from domestic generators at their 'Additional Price' and purchases from imports, at the average import price.

The cost of supply for a Customer Group in a particular year is determined as per following formula:

Energy purchase cost – valued at Power Purchase Price
Add: Network costs allocated to Customer Group
Add: Cost of Working Capital allocated to Customer Group
Less: Any Non-Tariff Revenue from Customer Group
Less: Subsidies allocated to Customer Group

The Average Price for a Customer Group is determined as the ratio of the discounted costs of supply for that Customer Group to the discounted electricity sales to that Customer Group, where sales are adjusted for an allowed collection rate, and where discounting occurs over the Tariff Period at the Weighted Average Cost of Capital (WACC) applicable to the Licensee.

3. Conclusion

Electricity pricing or tariff setting is a key regulatory instrument which determines the volume and nature of demand and supply. The tariff decision is a complex issue and the regulator must keep a balance among various interests. SAARC member states are facing similar issues in energy sectors and there is need for alternative energy to offset dependence on imported and expensive fuels.

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