

**CAPITAL UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, ISLAMABAD**



**Informational Role of Stock Prices in Explaining  
Expected Earnings, Investment and Return**

by

**Tayyiba Naz**

A thesis submitted in partial fulfillment for the  
degree of Master of Science

in the

**Faculty of Management & Social Sciences  
Department of Management Sciences**

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*I would like to dedicate my Research Thesis to my Parents,  
who always supports me and serve as guidance for me, at every step of my life*



## CERTIFICATE OF APPROVAL

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## *Abstract*

This study provide insight about the Informational role of stock prices in explaining future variations in earnings, investment and stock return at different time horizons. A sample of 100 non-financial companies listed at Pakistan Stock Exchange, (PSX) is used to analyze the data from the period 2000 to 2017. The findings of the study by using panel data analysis provide that prices can predict future earnings of firms in both short term and long term. The Forecasting Efficiency of Stock Prices, (FPE), is high in short run as compare to long run. Stock prices and firm investment are significantly related, prices informativeness about investment has witnessed more increase at short term over long term horizon, Revelatory price efficiency, (RPE) is increased at short horizon of one year implied, prices influence mangers information set. The relation between stock prices and its ability to predict variations in return show decline for the years under observation and last hypotheses is to measure relation between investment and its predictability in terms of providing foresight for future earnings proved insignificant for data for the firms listed at Pakistan Stock Exchange, furthermore the best predictor for future earnings are past earnings evident from the findings, positively related current earning with future earnings of the firms, hence prices for the firms listed at Pakistan Stock exchange are efficient,(EMH), in the sense it reflect information on two most important firm performance related indicators, its future earnings and investment, as prices shows the market valuation of firms assets

**Keywords:** Informational role of Stock prices, Forecasting Price Efficiency, and Revelatory Price Efficiency.



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# Abbreviations

<b>CAPX</b>	Capital Expenditure
<b>EBIT</b>	Earnings before Interest and Taxes
<b>EMH</b>	Efficient Market Hypotheses
<b>FERC</b>	Future Earning Response Coefficient
<b>FPE</b>	Forecasting Price Efficiency
<b>FRSB</b>	Financial Accounting Standard Board
<b>GDP</b>	Gross Domestic Product
<b>ITE</b>	Insider Trading Enforcement
<b>KSE</b>	Karachi Stock Exchange
<b>MSCI</b>	Morgan Stanley Capital International
<b>NPV</b>	Net Present Value
<b>PIN</b>	Probability of Informed Trading
<b>PSX</b>	Pakistan Stock Exchange
<b>R&amp;D</b>	Research and Development
<b>RPE</b>	Revelatory Price Efficiency
<b>SBP</b>	State Bank of Pakistan
<b>SECP</b>	Securities and Exchange Commission of Pakistan
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America

# Chapter 1

## Introduction

### 1.1 Theoretical Background

Theoretical background of this study can be discussed into two blocks, information production block and aggregate efficiency block as it is the point of link between financial markets (prices informational role) and resources allocation (future earnings and investment forecasts). Fama (1965) study the behavior of stock prices and argue that, initially there were two types of theories for understanding the behavior of stock prices, technical theories (chartists) and theory of fundamental analysis (intrinsic value analysis). Technical theories are based on assumption that “successive price changes are dependent” whatever happened in past is going to reoccur in future and by identifying trends in past price changes future can be predicted, an investment strategy can be devised that will outperform the market. Fundamental analysis however have different assumption that securities have intrinsic value, dependent on company’s earnings prospects which in turn depends on factors like management quality, industry and market conditions, fundamental analyst argue that by understanding these fundamental factor intrinsic value can be estimated which is same as predicting future prices but in world of uncertainty intrinsic value cannot be estimated correctly hence there is disagreement among individuals about intrinsic value

which cause actual market price to deviate from its intrinsic value. Opposite to these approaches another approach, Random walk model negate assumption used by chartist according to random walk model of stock prices “*successive price changes are independent*” price series has no memory so it is not possible to identify pattern in past price changes to predict future changes as prices follow random walk and randomly move around its intrinsic value however if it was systematic intelligent traders can identify the ways through which it reaches to intrinsic value.

Information production and even distribution of information among participants constitutes an important pillar of financial intermediation process as Information, transaction and enforcement cost are the reasons for emergence of financial markets and financial intermediaries, (Levine, 2005). Financial development and advancements in information technology have totally changed the outlook of financial sector in recent years, information availability is increased and cost associated with information processing is decreased are the few changes of the big changes markets has witnessed in recent years. Hayek (1945) signals the importance of price system as source of information dissemination mechanism needed for optimal decision .Everyone have some advantage with respect to information and main problem in formulating economic policy is to make all knowledge available to planner, not concentrated instead scattered among all individuals. All economic activity can be defined as planning “set of interlinked decisions about allocation of resources. The main challenge is how to communicate knowledge about all decision relevant factors to planner. Prices serve such mechanism that help to aggregate information and make it available to decision maker (planner) as prices make adjustment to changing circumstances so information on changing circumstances also got reflected in prices.

Fama (1991) redefine the concept of market efficiency as the older one seems rigid because it is based on the zero transaction and trading cost. Market efficiency hence is modified as prices reflect information only to the extent when the profit to be made on acting on that information is greater than marginal cost (Jensen, 1978). The problem associated with testing market efficiency are joint hypotheses

problem as it cannot be tested in isolation as the model provide the definition of the word “properly” in the market efficiency “prices properly reflect all information” hence it is confusing if its market inefficiency or model failure, when anomalies on the behavior of return are found. Market efficiency help in understanding the return behavior both cross section and time series.

First test of market efficiency, weak form efficiency which is basically the test of predictability of past return for future return now generally known as return predictability to cover other variables important in predicting return, like dividend payout, P/E ratio, Initially return predictability for shorter time period, daily, monthly and weekly are calculated and are later measured for longer time frame and result imply predictability constitutes greater percentage of return variance for long term as compare to short term that make it ambiguous to give the answer if it the result of irrational price swing or rational changes in expected return, because it is difficult to isolate both the explanations, while in 1970 and prior test for market efficiency assumes expected return to be constant through time in an asset pricing model mean return is not predictable and the historical mean is the best forecast for future return, predictability of return make old model of constant expected return invalid but less predictability for short term (for individual securities) is in agreement with return changes (daily and weekly) constitute small part of return variance and higher predictability for long term.

Dimson and Mussavian (1998) discussed brief history of market efficiency and found that the concept of market efficiency is initially anticipated by Louis Bachelier (1900) in his dissertation for PhD in mathematics, whose work had predated efficient market hypotheses by Eugene Fama as well as Einstein’s study on Brownian motion but his work was overlooked, since then different researchers worked on market efficiency and 1960 and onwards is the turning point in this regard Fama (1965) combine existing literature and his own contributions and ruled out economists assumption who believed that “*Analyze an economic time series by extracting from it a long-term movement, or trend, for separate study and then scrutinizing the residual portion for short-term oscillatory movements and random fluctuations*” (Kendall & Hill, 1953).



Fama (1970) provide definition of efficient markets as “markets where at any point stock prices reflect all available information and this information is freely available to all participants” According to market efficiency theory stock prices reflect fundamental value of firms, provide information about its earning potential, industry and market conditions, which is against the idea that by carefully (technical analysis or fundamental analysis) devising investment strategy it is possible to earn abnormal returns. Price adjustment against three information subsets is tested to prove that prices contain all information. First test is for weak form efficiency, where information subset is historical return/prices. Second test is for semi strong efficiency, where information subset is publicly available information (earnings announcements, dividend announcements) and third information subset is private information for which one might have monopolistic access and test strong form efficiency all tests proved validity of Efficient Market Hypotheses, deviations are found but those deviation were not sufficient enough to refute its validity.

Tobin (1969) argue rate of investment, “the speed at which capital stock is increased should depend on  $q$ , define as “the ratio of market value of assets to their replacement cost” and rate of investment should be related to  $q$  (Tobin  $Q$  ratio), define as “the ratio of market valuation of assets to their replacement cost.” Managers can make investment decision on the basis of company’s  $q$  ratio “if  $q$  ratio for a company is greater than one managers should increase investment as value placed on its asset is greater than replacement cost for assets and if it is below unity it is not advisable to make investment as market value of assets is less than cost at which assets can be replaced. If markets are efficient in the sense given by market efficiency theory (Fama, 1970), then manager can rely on  $q$  ratio for their investment decision as market correctly reflect value of company and provides unbiased estimates for its future performance.  $Q$  theory (Tobin, 1969) guide managers while making investment decision. Managers can base their decisions on  $q$  ratio if  $q$  ratio is  $1 >$  it is worthwhile for managers to make investments because present value of future earnings from these assets will exceeds its cost so it appropriate to purchase or acquire assets and when this

ratio is less than one managers should not make investments and it is better to reduce operation because cost of assets exceeds value placed by market.

This empirical study aims to determine the price informativeness of firms listed at Pakistan stock market, there are many studies on market efficiency on different parts of the world, on developed, emerging and under developed markets to find the answer to the question if prices are reflective of all available information in the market, and the results show variation across different markets that can be explained in the light of differences in market structure, country and financial infrastructure, the same type of study has been conducted on the US stock market, this study in the sense make empirical contribution as it is conducted on emerging market, Pakistan, on financial data of companies listed at Pakistan stock exchange, to answer the questions on stock prices efficiency, if prices exhibit same behavior in accordance with Efficient market Hypotheses, if it prices contain all information for firms listed at Pakistan stock exchange, representing corporate sector of Pakistan.

### 1.1.1 Research Questions

- Whether stock price informativeness predicts company's future earnings?
- Whether stock price informativeness predicts company's investments?
- Can stock price informativeness predict future return?
- Can investment informativeness predict future earnings?
- Whether predicted variation of prices for future earnings is enhanced at short term or long term?
- Whether predicted variation of prices for future investment is enhanced at short term or long term?
- Whether Prices in financial market has become more informative?

### 1.1.2 Research Objectives

- The objective of this study is to measure the price informativeness for financial markets.
- To access the stock prices ability to reflect information about future Earnings.
- To measure the extent, to which prices guide investment decision.
- To determine the decline in prices ability to forecast future return over time.
- To measure the informativeness of investment, in terms of its ability to provide foresight on future earnings of firms.
- To determine if informativeness of stock prices for future earnings and investment is greater at short horizon or longer horizon,

### 1.1.3 Significance of the Study

Pakistan stock exchange established in 2016 as a result of merger of Karachi, Lahore and Islamabad stock exchanges, has attained the status of an emerging market by MSCI, which shows its attractiveness as an investment venue for both local as well as foreign investors. This research aims to provide understanding of the behavior of stock prices, that can be helpful to individual investors, institutional investors and managers because when they are able to identify the behavior of the variables like, Stock prices, its relation with earnings, investment and return, the key firm performance indicators and the nature of their relation, whether it's positive or negative they can make their investment strategies, modify it accordingly to incorporate this insight, and will efficiently make their investment decision which for businesses ensure uninterrupted funding, the most important function of financial market, channeling resources to best value use which is possible when market prices provide accurate information, to both market and managers. The Comparison between results of this research work and the results of studies conducted on other markets help to identify the

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differences in behavior of the variables under observation and the reason for discrepancies, further deepen the insight of investors and managers plus policy makers to make improvement in factor causing differences, design such policies to overcome the differences and make such attempts which standardize stock market with international markets.

Rest of the document is organize in five chapters, chapter two is literature review, the previous studies conducted on the variable included in this research while chapter three is data description, describe methodology used and equations for analysis and chapter fourth include results and their interpretations and finally chapter five consists of concluding remarks based on results and recommendations on the basis of those results.

# Chapter 2

## Literature Review

### 2.1 Financial Intermediation and Information Dissemination Mechanism

This chapter covers the literature in the domain of informational role of stock prices in forecasting earnings, investment and return. Financial sector including financial market and financial intermediaries play an important role in economic wellbeing of a country, however some prominent economists are unconvinced about the importance given to financial markets and institutions, a noble prize winner, Lucas(1988) term finance as an “*over stressed determinant of economic growth*” and the other economists, noble laureate Robinsons (1952) put forward statement “*where enterprise leads, finance follows*” and some even term financial markets as “*Casinos where people came and place bets*” (Levine, 1996), however other economist, Miller (1998), a noble prize winner and others reject these ideas and are in agreement with an idea of “financial markets promotes economic growth” market are not just sideshow, because financial sector decide “*who gets to use society’s savings*” sometimes because of the cost of collecting and processing information about investment projects some good investment cannot be pursued due to non-availability of funds as savers find it risky to invest in those projects, that is reduced with emergence of financial arrangement, financial

markets and financial intermediaries collect information on firm and market condition, increase their confidence help allocate resources to its highest value use, in return promote growth, as Levine (2005) quoted Joseph Schumpeter's view of financial development role in growth as "*Bankers is not just a middle man, he authorizes people in the name of society (to innovate)*".

Levine (2005) identify five functions of financial sector, information production about possible investment and allocate capital, monitoring and corporate governance, risk management and diversification, pooling and mobilization of savings, facilitates exchange of goods and services. However the primary role of financial markets is resource allocation in an economy, it helps in optimal allocation of funds from saving surplus unit to saving deficit unit. While selling securities in primary market result capital inflow to company and hence influence company's cash flows however buying and selling of securities in secondary markets do not results in any capital flow to company so how activities in these markets can affect company's payoffs and investment decision is the purpose of this study.

Wurgler (2000) find countries, with developed financial market increase their investment in growing industries and reduce their investment in declining industries while for countries with less developed financial market, economy less efficiently allocate its resources as it increase investment in declining industries and reduce investment in growing industries, the main objective of an economy and financial sector help economy in achieving this objective, it helps economy to take advantage of attractive investment opportunities, one such mechanism is Tobin Q ratio, countries where stock market prices reflect more firm specific information allocate resources with greater efficiency, as managers calculate Tobin Q ratio, screen out bad projects from good projects hence quality of investment decision is increased. Levine (1997) quoted Bagehot (1873) "*Political economists say that capital sets towards the most profitable trade and rapidly leaves the nonpaying trades, while this process is slow in other countries, in England, however capital runs as surely and instantly where it is most wanted and where there is most to be made of it, as water runs to find its level*".

Bagehot (1873) attributes financial innovation the reason behind industrial development in United Kingdom in mid to late nineteenth century. Hicks (1969) argue that, “*financial innovation is require for industrial revolution termed it the reason for industrial revolution in UK as product manufactured in this industrial revolution was invented much*”

Bond, Edmans and Goldstein (2012) emphasize on need for redefining price efficiency as it should not be defined in context of forecasting firm’s future cash flows. Price efficiency generally defined as “extent to which prices forecast variations in future payoffs”. Prices might be efficient in forecasting sense called forecasting price efficiency but not in revelatory sense that is basically “the extent to which it provides information that is not otherwise available to mangers and help them to take value maximizing action” termed it Revelatory Price Efficiency. Prices not only reflect firms cash flows it can also effect cash flows according to a prominent trader George Soros who termed it “*reflexivity*” and described it in these words “*In certain circumstances financial markets can affect the so called fundamental which they are supposed to reflect*”. Role of Stock prices on real decisions can be categorized into three channels. Learning channel, where Mangers learn from prices because prices incorporate outsiders information who individually may be less informed than managers but collectively more informed plus they might be at information advantage about those decision related aspect beyond firms fundamentals. Second channel is managers track stock prices movements because their compensation is tied to stock prices, shareholders in order to ovoid agency problems tied manager’s remuneration to stock prices because prices reflect firm value. Third channel is, prices act as an anchor and individuals irrationally follow prices.

Durnev, Morck, Yeung and Zarowin (2003) study the relation between price informativeness and firm specific return variation, defined as “*portion of firm specific return unexplained by market return*”, and price informativeness as “*how much information about future earnings is embedded in stock prices*”, more firm specific price variation means more informative prices because it suggest prices contain more firm specific information, find positive relation between price

volatility and price informativeness that is in accordance with Roll(1988) second possible explanation for more firm specific price variation, prices contain more firm related information encourage risk arbitrage and reject other explanation of increase noise trading as stock prices reflect information, about firm, industry and market conditions and extent to which prices show co movements depend on the relative amount of firm, industry or market information incorporated in price, more firm level return variation means more firm specific information incorporated into stock prices, reason for asynchronous price behavior.

Fama, Fisher, Jensen and Roll (1969) study the price adjustment mechanism to stock splits, argue market efficiency can be inferred by independence of successive stock price changes. Securities to be split show abnormal return prior to arrival of any information about possible split attributed to firm's positive past performance, but there is now uncertainty about future performance of firm, investor will use any information to reduce it and split can be one source of information, and reevaluate stream of earnings from share because split are accompany by dividend announcement, however managers increase dividend only when they are confident about firms capacity to earn enough profit to maintain this new high dividend and rarely will decrease dividend as people make unbiased forecast about managers assessment of firms capacity to earn enough earnings to support dividend. Prices increase when split is accompanied by dividend increase, and when no announcement is made regarding dividend increase, price show adjustment with split announcement and slight adjustment on announcement of dividend, however firm return came into its normal relation with market return at the end of split months, when no dividend is expected to be announce, prices decline however it also came in its normal relation as dividend is expected to be announced, where it was five month before split, may be the time when some reliable piece of information has starting coming in market about split, and the effect of split is wiped out at the end of split month, also lend support to the concept of an efficient market, market where prices instantly adjust to new information, it is the dividend implications of information of split not any intrinsic effect of split itself, cause prices to move



(Fama, Fisher, Jensen & Roll, 1969).

Durnev, Morck and Yeung (2001) find positive relation between quality of investment decision and firm specific return variation, more return volatility means more firm specific information is incorporated in stock prices. Firm level price variation can be attributed to two reasons, prices track firm value closely as more firm specific information is added to prices as a result of price variation, however other view is prices are away from intrinsic value, as at the time of price variation both informed and uninformed traders are active. Price is use to assess the value of firm,when investors have little information than managers about firm, they think prices are overvalued as manger issue new securities when prices are high, they bid down prices that increase cost of fund for existing shareholders and stop managers from perusing attractive investments, hence firm experience under investment (Myers & Majluf, 1984).

Price efficiency hence is important for resource allocation, and firm where prices reflect exact value of firm, are able to raise fund at lower cost and rarely experience under investment, to avoid the problem of under investment, firm can have extra cash to finance investment (Jenson, 1986), but it cause managers to neglect capital market changes, and firm run the risk of over investment, term malinvestment is used by Hayek (1941) to describe both under investment and over investment, less seen in firm in industries with more price changes made efficient investment decision as their marginal Tobin Q ratio is near one and average Tobin Q ratio is above one, which is in accordance with efficient market hypotheses,Tobin (1984) termed it functional form of effect market hypotheses as prices reflect all available information (Durnev, Morck & Yeung, 2001).

Morck, Yeung and Yu (2000) find stock prices are more synchronous in emerging markets while move independently in economies with higher per capita GDP, rich economies, and this difference in price movement is not explained by correlated firm fundamentals and other country and economy structure related variable but government respect for private property rights explain, the difference. Financial market serve an information processing mechanism that helps to allocate capital to its highest value use, with prices moving in the

direction of information, however countries with lower per capita GDP huge price swings are observed without any fundamental change, that discourage risk arbitrage, as risk arbitrageur find it less attractive to collect information about firm, less firm specific information is added in prices, as this piece of information is less likely to cause a change in market prices, as a result noise trading dominates informed trading. Piotroski and Roulstone (2004) study the relative impact of three informed market participants, corporate insiders, trade analysts and institutional investors trading activities on information environment of firms, in an attempt to answer the question why some market show more synchronous prices movements while markets display co movement of stock.

Price synchronicity positively related to analyst coverage, and inversely related to institutional ownership and insiders trading activities. All three market participants influence price formation process; their activities cause prices to incorporate, firm level and market level information, affect information dissemination and its interpretation. Firm managers are at advantage about firm related information, its opportunities and risks, their activities add firm level information in prices, institutional investor's information edge is however blurred as it depends on their investment style and ownership stake, some institutions hold significant positions in firms their trade activities convey huge firm level information while transient investor trade for portfolio rebalancing requirements and liquidity needs, rarely has some informational utility, large trade volume convey investment related information while small volume trade reflect portfolio rebalancing and liquidity need however institutional investors can have information advantage about market as well but their information is not observable as of analysts through reports and predictions about firm prospects. Trade analysts are outsiders and due to their expertise and closeness to market they have superior information about industry and market. Activities of analyst incorporate market related element of future earnings news in stock prices, insiders and institutional investors add firm related component of future earnings news in prices. To test if its firm specific information or noise trading cause prices to move independently, if it is noise trading, activities of these informed

participants will not generate different component of future earning information and will have same impact on information but all three participants contribute different component of information (Piotroski & Roulstone, 2004).

Marhfor, Ghilal and M'Zali (2015) investigate the relation between analyst coverage and price informativeness, and find negative relation between analyst coverage and price informativeness. Analysts perform two functions, it helps in even distribution of information, reduce information asymmetries, second it reduces managers incentive to manipulate firm accounting figures, as analyst evaluate firm's financial statements and ask managers about accounting figures on their interaction with them. Prices predict investment, because prices contain information that managers can use because it's new to them, it reflect information of different participants, who have no other channel for information communication to firm and this information from prices can guide managers investment decision. If analyst activity is associated with more informative prices, then enhance analyst activity will result in more sensitivity of prices to investment, but Price informativeness decrease with more analysts' activity. Financial crisis, 2007, has raised question about the information quality of analyst, their analysis because they had less information about firms, new to the managers might be the reason for capital market inefficiency that leads the world to those crisis, another reason for this negative relation analysts are reluctant to disclose bad information as they may lose commission, investment banking business the main objective for their activities, as their relation with management may turn sour upon disclosure of bad news.

Chen, Goldstein and Jiang (2007) use two measures of amount of private information in prices, Price non synchronicity and probability of informed trading (PIN) to measure investment to stock price sensitivity and find significant positive relation between private information and investment to prices sensitivity further lend supports to the idea that manager learn from stock prices as prices have some information not available to them (trader's information). When manager's information was controlled results were still significant, so it is confirmed that it is private information cause investment to price sensitivity.

Edmans, Jayaraman and Scheemeier (2016) use staggered enforcement of insider trading law as a shock to source of information that leaves total information in prices unchanged. Enforcement increase outsider's contribution in prices while it decrease manager's contributions, and result in increased investment sensitivity to  $q$ . Edmans, Jayaraman and Scheemeier (2016) conclude, it is not total information in prices that matters for real decisions but source of that information. Sensitivity of investment to  $q$  effect is more pronounced in emerging countries where information acquisition rises more after ITE (total informativeness remain same). Insider trading enforcement as a shock to source of information help to isolate the effects of RPE and FPE and result are significant positive after controlling for total information, confirm that it is not total information important for real decision efficiency.

## 2.2 Price Informativeness and Earnings

### Forecasts

Sloan (1996) study stock price predictability for future earnings, extent to which stock prices reflect information about future earnings present in accrual and cash flow component of current earnings. Financial statement analysis provides a tool for analyzing current earning of firms for the purpose of predicting future earnings. Sloan (1996) study the extent to which this information is reflected in stock prices as price show the expectation for future earnings but due to inability of investors to differentiate between accrual and cash flow components implications of current earning for future earnings as persistence for current earning depend on relative component of accrual and cash flow component of current earnings higher persistence is observed when current earning has greater magnitude of cash flow based part and less likely to persist in case of accrual based component. Due to inability of investors to differentiate implication of both components of current earnings, they fixate on current earning, they overprice the securities where current earning constitute more accrual component and underprice when it has less magnitude on the basis of naive expectations and

this mispricing is removed when future earning is announces, this mispricing does not guarantee abnormal return because of phenomena's like price pressures and cost associated with information acquisition and processing of the information.

Beaver, Lambert and Morse (1980) study the relation between earning changes and price changes because price changes reflect expectations for future earnings, previous studies focus on the relation of earnings changes as a predictor of price changes but here price changes are observed to explain or predict future earnings variability. According to random walk model expected value of future earning in relation to the past earning is different from value of future earning in relation to past earning for firms and prices when prices provide information that past earnings does not provide, as earning is thought to be the combination of two processes, one process involve events having no price effect on earning while other is the process which include events related to impact of prices on earnings and together both process effect future earnings. Bernard and Thomas (1990) study the relation between stock prices and future earnings, through information implicit in current earnings, find stock prices fail to reflect information about future earnings implied in current earnings.

Grossman and Stiglitz (1980) argue stock prices signal arbitrageurs information, but only to the extent that will not be exterminated the advantage of risk arbitrageurs because of the cost associated with information collection by informed traders, hence price serve as a mechanism for information transmission from informed participants to uninformed participants hence price informativeness is dependent on the number of informed traders in a market, as when informed traders expect future returns to rise they bid up the prices for that particular stock and when expect low future return, they bid down prices for stock. For a competitive economy it is not possible to have equilibrium, situation when there is no arbitrage profit, when informed traders and uninformed traders have same expected utility when expected utility increases for informed traders some uninformed traders will switch to informed traders that will lower expected utility for informed traders as prices are informationally

rich with increase of informed participants in market and ratio of expected utility of informed to uninformed declines.

Stallings and Thomas (2017) study how the relation between price sensitivity to earnings is influenced by financial statement comparability, financial statement comparability as define by Financial Accounting Standard Board (FASB), “Quality of information that make possible for users to identify the similarities and differences between two sets of economic phenomena’s to enhance usefulness of the information to the users” to ensure transparency and to make an easy comparison between entities and for one entity over time. Now the question answered here is how this comparability enhance price informativeness, comparability enhance usefulness of earnings information measured through variation in return earnings relation, because it enhances prices ability to efficiently incorporate and reflect information about firm present in its financial statements so prices are more informative for firms use with comparable financial statements as compare to the firms where comparability is low for financial statements, and this effect is more pronounce in small firms, firms with high volatility and with low return on assets. Firms with more informative prices enable investor to evaluate different investment options and help in making an optimal investment decision.

Choi, Myers and Ziebart (2019) study the impact of financial statement comparability on the relation between current stock prices and future earnings find comparability of financial information enhance stock prices ability to provide information on future earnings measured through the Future Earning Response Coefficient (FERC) because comparability of financial information make prices more informative, according to FASB (Financial Accounting Standard Board), when it is possible to compare information to some benchmark it increases usefulness of information, in this case ability of investor to compare their financial performance with other firms with comparable information serve as bench mark, The relation between stock return and future earning is analyzed based on the idea that prices reflect market estimates for firm future prospects, comparability lower the cost associated with collecting and processing

information cost, negative results for price synchronicity show that this is the increased firm specific information in prices attributable for improved informativeness. Trade analyst are at information advantage about market and industry trends and are at disadvantage for firm related information, but financial statement comparability make it possible for analyst to produce more firm specific information, comparability also improve the efficiency of investment, it increase investors understanding about firm related information, they will make better decision.

Kasznik and McNichols (2002) study the relation between market value and earning expectation for firm, to test if market place higher value on stock upon meeting expectations for earning and find that return are higher for firms that meet expectation for earning but not exceeding their fundamental value however firm consistently meeting the market expectation earn higher return as earnings announced for the firm provide direction for future earnings and as prices reflect the market expectation, upon earning announcements prices change as the investor reevaluates stream of cash flows for those stocks on the basis of information derived from announcement for current earnings of the firm.

$H_1$ : Stock price informativeness has significant impact on future earnings.

## 2.3 Price Informativeness and Investment

Faucault and Gehrig (2006) find positive relation between cross listing and investment, because cross listing make prices more informative, sensitivity of investment to prices is increased, managers place greater reliance on prices while making investment decision. Cross listing influence information and trading environment of firms in two ways, first it increase number of informed traders in the market and secondly, it make them trade more aggressively, when market is segmented they trade on their private information in foreign markets without immediate price changes in domestic market as a result earn profit. Cross listing is positively associated with growth opportunities because when prices reflect

more information, quality of decision is enhanced, value attached with listing at multiple exchanges as Cross listing premium, (Doidge, Karolyi & Stulz, 2004) firms listed at more than one exchange have higher, Tobin Q ratio. Cross listing is negatively associated with quality of managerial information when managers information is better, benefit associated with cross listing become less valuable, Cross listing allow firms to have higher value when ownership and trading volume for firm is evenly distributed between foreign and home markets.

Dow and Gorton (1997) argue soul of the capitalist system lies in its prices ability to reflect all necessary information for an efficient deployment of resources, supply changes cause prices to change and then affect the purchase and consumption decision hence prices play an important role in resource allocation for both commodity and capital market however behavior of prices differ in both market in two ways, first for commodity market consumer make decision quantity they want to purchase while in case of capital market shareholder although suppliers of capital do not make decision on how much capital is needed instead managers make this decision as they decide leverage structure, dividend policy and fund available or needed for investment and the second difference is flow of information in commodity market is one directional, while in capital market, market want to know about the managers decision and managers also want to know the market feedback but for a commodity market consumers don't care what information prices reflect.

Efficient market perform two important roles in resources allocation, named as perspective and retrospective roles, in perspective approach, market is more informed about some aspect of decision managers know less about it, which is included in prices, managers learn this by monitoring price movements and use it in their decision for example when prices are high, market placed high value on the firm and this encourage managers to invest and vice versa. Managers respond to stock prices and that encourage traders to produce and trade on their information about investment opportunities faced by firm, prices are economically significant and informative. The retrospective role is about information on past decision made by managers that encourage the current



managers to produce information on firm. There exist two equilibrium, one is economically efficient, when prices are and managers respond to market changes while in other case prices are not informative and managers will not invest and no motivation for traders to produce information as prices are uninformative this the case when average project is negative net present value (NPV). There is another role of the efficient market, managers has discretion on investment decision if prices reflect profitability of investment decision hence it will be fruitful to tie the compensation of decision makers to stock prices in order to stop them from pursuing their personal objectives (post decision performance).

Faucault and Fresard (2012) suggest the positive relation between cross listing and investment to price sensitivity and it is because of increase price informativeness, Cross listing affect price information in two ways, first it increase places for informed participants to exploit their information as a result of listing at multiple exchanges, second cross listing enable investor who are refrained from investing or trading because of regulation imposed by countries for foreign investors now can trade and use their expertise of assessing firm investment opportunities, thus information in prices is improved this information is not known to managers and to make an efficient decision managers are require to incorporate information related to all aspect so they use this relevant information (managers learning hypotheses), combine it with their own information to make decision. This effect of improved price informativeness is amplified if firm has such feature that encourage more private information production about firm opportunities and also when financial infrastructure is developed. Alternative explanation for increase investment to price sensitivity are improve mechanism for governance, that make managers to monitor prices in the market or improved disclosure, make investors able to better forecast future payoffs and reduced cost for capital as result of access to US stock market but all these result do not explain results as small changes in theses variable bring large changes in informativeness.

Morck, Shleifer and Vishny (1990) discuss the theories that explain the relation between stock prices and investment, every theory use different argument in its

attempt to explain the relation, to answer the question if return (Change in prices) predict investment. First view in this regard is the “*Passive Informant Hypothesis*” according to this hypotheses stock markets have no role in shaping investment decision of managers because managers are more knowledgeable about the investment opportunities of firm as compare to outsiders, stock market are side show, it does not provide valuable information to managers and even if it does it do not affect managers decision as managers information is thought to be more complete as compare to outsiders. second approach is “Active Informant Hypotheses” compliment the view “stock prices are predictor of investment “markets are source of information for managers in making their investment decision although this is not clear whether this information is the reflect firm fundamentals correctly or not is an unanswered question because of innate inability to provide correct estimate on this value and since people sentiments also contaminate prices information make it hard to isolate it from information about firm fundamentals, the third view on role of stock market in investment decision “The Financing Hypothesis” is related to cost of raising funds it help companies to finance investment, prices are not although cost of capital but it shows the value placed by market and more value means firms are able to raise required funds at lower cost.

Dow, Goldstein and Guembel (2007) argue stock markets encourage information production that will help to forecast future events, this study focus on the resource allocation function performed by prices in a relation with incentive of speculators to produce information because when speculator produce more information, this added information make prices help managers in investment decision,hence there is a relation between prices and investment as price movement are the feedback from market, investment will be cancel if market show negative reaction in the form of lower prices, following explanation can be given, First in case of attractive (ex-ante) investment which seems profitable and firms are expected to undertake these opportunities because of higher expected profit this will encourage speculators to produce information on these opportunities faced by firm, will enhance firm fundamentals and value and

efficiency of investment decision as more information is encourage to produce another explanation is based on constant information cost, when information cost is constant it is assumed uncertainty encourage more information production because it shows higher future profit however result indicate that project with favorable NPV, when faced by uncertainty discourage information production because it seem unattractive. market inefficiency like (Claessens, Third information production has different implications for whether this information is on existing assets or on new assets, information on already employed assets is termed as discovery, having some value while termed as the foreknowledge on new assets having less value by (Hrishleifer, 1971) so more encouragement for information on existing assets. Fourth explanation is increased incentive for more information production for firm or managers that over invest, as more investment attracts more information production. Wang, Wu and Yang (2009) study the stock market sensitivity to investment decision for Chinese stock market and find negative relation between stock prices and investment decision, and the reason for less informative prices is as prices reflect less information about future earnings, which is against the idea of finance growth relationship as an efficient stock market serve as device where price provide signal about value of capital in relation to its replacement cost, a guide for investment decision. Chinese economy witnessed enormous growth in last few decades, but its stock market has some drawbacks, reason for less informative prices, most of the shares of listed firms are state owned, and non-tradable so no market value for those companies, quality of listed firms is low, characterize by poor profitability and poor corporate governance mechanism. Stock markets perform three functions for firms, first it help to raise funds, when managers believe prices are overvalue, equity is issued to finance investments, second prices can be an information tool for manager and provide feedback on their investment decision and third mechanism to exert corporate governance, when managers remuneration is tied to stock performance of firm.

Goldstein and Yang (2015) argue information environment of stock market has become more complex, every participant in market has an edge with respect to

one type of information, adding diversity to information, and this study is about the impact of information diversity on stock price informativeness. Prices reflect information about firm future payoffs however there is uncertainty surrounding these payoffs due to uncertainties associated with country, market and industry conditions, price show the expected value, based on the information set of all informed traders. Financial market operations are about interaction between differently informed participants, each having an edge in their own specific information when they aggressively trade on this information cause more information production about that aspect means prices now contain more information about that aspect and according to strategic complementarity view, it encourage other participants to aggressively trade on their information and produce more information on other aspect where they are at advantage, because their risk about the first area is reduce “uncertainty reduction effect” about which they are less informed hence make prices less uncertain about future payoffs, as opposed to strategic substitutability according to which aggressive trading on one piece of information discourage others to trade and hence reduce information production as traders use price to extract information which is dominated by other participants information set that will stop them from aggressive trading make prices less informative “inference augmentation effect”, result show evidence of strategic complementarity, diversity in market related to information make markets more informative.

**H<sub>2</sub>**: Stock price informativeness has significant impact on Investment decision.

## 2.4 Price Informativeness and Equity Return

Claessens, Dasgupta and Glen (1995) study the return behavior for both cross section and time series for twenty emerging markets, evidence on different return anomalies and return predictability for these markets and find small evidence of anomalous return behavior, like size effect however general predictability for return was found, predictability for return rendered market efficiency invalid however this is rejected because of the two reasons, one is because of slight

return predictability that provide little help in investment and a small profit it generate can be treated as the compensation for the extra risk because small predictability means risk, the second reason is predictable part of the return might be the result of the factor that asset pricing model is fail to capture hence its model failure not failure of market efficiency, cross section return behavior is the test on evidence of anomalous behavior on return and time series analysis, auto correlation coefficient, provide evidence on return behavior over time period, anomalous behavior is not necessarily the market inefficiency it could be attributed to policy feature reason for deviant behavior of return from random walk or other models. An important insight in those feature help policy makers while devising policies in explaining behavior of return, understanding return behavior can be used by investors, as it helps in investment, necessary for an prospering economy, however if return behavior deviate from expectations due to information asymmetries like insider trading then outsiders will be discourages to invest, economy will be deprive of savings and new investment.

Banz (1980) study the relation between market prices and return in an attempt to explain the relation between these two variables, argue that between years 1936 to 1975 the risk adjusted return for firm with low market value had greater returns and lower return for large firms “size effect” although it is not confirmed that it is the market value (size) responsible for this difference or because of some unknown factor correlated with market value or size of the firm, however this effect is not stable in forty years show huge difference in coefficient when divided and observed in different sub periods. Small firms had higher return but although this relation between market value and return is nonlinear means it is true only for firms with very small size (market capitalization) and proposed relation does not hold between the firms having small difference in size (between large firms and average sized firms) many other research has identifies different other variables that need to be included as determining return or having relation with return, which is basically the pricing for an assets and many point out the possibility of joint hypotheses testing problem, when studying the behavior of return and deviation may termed as anomaly but it may be the model misspecification or

failure instead of market inefficiency like (Claessens, Dasgupta & Glen, 1995).

Pesaran and Timmermann (1995) study if it was historically possible for the investor to use return predictability to earn abnormal return for US market and conclude that it was possible to predict return on the basis of public information either financial or information on macroeconomic variables. Predictability depend on business cycle, as it was high when market is volatile (1970) and predictability was low for less volatile market (1960) and the factors used in predicting return changes over time and their forecasting power with respect to forecasting return also changes. However the explanation of this excess return predictability in terms of economic significance is confusing because of two reason, first is the predictable part may represent time varying expected result a view in accordance with market efficiency, return are impossible to predict, and other reason is against efficiency theory as it assumes expected return constant and predictability arises because of market inefficiency. To access economic significance of return predictability, as an investment tool can be measured through two methods, one is to evaluate the investment record of portfolio managers and their investment decision, if they are able to earn abnormal return on their portfolios, it ensures managers use historical information to earn abnormal return, but its problems are, it is not sure that information used by managers is publicly available, and it does not provide much information about factors that are important for return forecasting. Another approach, address these issues simulation, decisions of managers can be simulated in real time, through utilizing public information on financial and economic factor that are considered important in predicting return, however rules for return forecasting should be laid down in taking care of hindsight bias, analysis has been performed with three conditions in order to take into account the transaction cost involved, with no, high and low transaction cost to arrive at conclusion if investor are able to earn high return on the basis of publicly information after taking into account the transaction cost involved.

Ou and Penman (1989) study the relation between financial statement analysis and market return (prices), analysis extract information from financial statements

and give an estimate for “value” of the firm that can be compared to prices as prices are benchmark for firm fundamental value and financial statements are associated with stock prices because most of the information like earnings are contained in prices hence measure for value derived from analysis is compared to prices. However there is an opposite view which states accounting statements reflect the exact fundamental value while prices deviate from fundamental value and gradually move towards that value. Hence prices should not be used as benchmark, instead value on the basis of financial information should be used as a benchmark to identify mispricing in market, and the strategies used to earn abnormal returns can be identified. This measure for firm “value” help to forecast next period earnings, as it shows firm future prospects and investors take position on the basis of this value, and return derive from this investment strategy are under observation based on the fact that financial statement analysis reveal or contain information that is not present in prices, it reflect the value of the firm that help to predict return.

**H<sub>3</sub>:** Stock price informativeness has significant relation with expected return.

## **2.5 Investment Informativeness for Future Earnings**

Bai, Philippon and Savov (2015) study price informativeness for firms listed at US stock exchange, and their price informativeness for 60 year and find, price informativeness has increased over the time and this increase is more concentrated towards long term as compare to predicting variations in earnings at short term, Prices are efficient in revelatory sense as well, because it provide new but decision relevant information to managers, reflected in price which is attributable to increase in market based component of information, not to improved disclosure, managers combine it with their own information and make efficient investment decision hence price efficiency promotes aggregate efficiency, prices are stronger predictor of investment while investment reflect information

about future earnings as the predicted variation of investment for future payoffs is calculated.

**H<sub>4</sub>**: Investment informativeness is predictor of future earnings.



# Chapter 3

## Data Description and Methodology

This chapter covers Data, nature of data, computation of variables and methodology used to calculate the informational role of prices for variables under study, discussed under the following headings:

### 3.1 Data Description

This study consider sample period from year, 2000 to 2017. Variables used in analysis are share prices, number of shares outstanding, total assets, earnings, change in fixed assets, return. Data on accounting variables is collected from annual reports of companies and balance sheet analysis for non-financial firms provided by State Bank of Pakistan while data on stock prices is collected from Business recorder. Data for all the variables used for analysis is collected on June 30, end of the accounting year.

## 3.2 Sample Selection

Total companies listed at Pakistan stock exchange are 559 as of February 23, 2018 divided into 36 sectors. Sample consists of 100 companies listed at Pakistan stock exchange on the basis of convenient sampling. The companies selected in our sample are non-financial firms having representation of business sector of Pakistan. There was no company delisted for specified period from 2000 to 2017 for analysis however some of the companies came into existence after 2000, the starting year for the sample, so their financial data is available from the year those companies came into existence.

## 3.3 Measures

Following measures are used as proxies for the variables:

### 3.3.1 Log Ratio of Market Capitalization to Total Assets, $\ln (MC/A)$

Log ratio of Market capitalization to total assets, where market capitalization represent market value for the firm, used as a proxy for stock prices because the market capitalization is the combination of number of shares outstanding into share prices of firm, and to capture the growth in assets from one period to next in analysis the value of market capitalization is scaled by current total assets and log for this ratio help reduce skewness of the data. This ratio is calculated as {

$$\text{Market Capitalization} = \text{LN} \left\{ \frac{\text{Market Price} \times \text{Number of Shares Outstanding}}{\text{Current Total Assets}} \right\} \quad (3.1)$$

### 3.3.2 Earnings

To measure the forecasting power of market prices for future payoffs of firm, regression include other variable Earnings (EBIT), earnings before interest and

taxes, represent the firm performance and as in case of first measure figure for EBIT are also divided by total assets to account for growth or changes in assets in different years.

$$\mathbf{Earnings} = \left\{ \frac{\text{Earnings before Interest and Taxes}}{\text{Current Total Assets}} \right\} \quad (3.2)$$

### 3.3.3 Capital Expenditure

Capital expenditure, represent the investment level of the firm measured as the changes in fixed assets, used for all the years for the financial data included in analysis, and CAPX or changes in fixed assets divide by total assets to take in to account changes in assets from one year to another.

$$\mathbf{Capital Expenditure} = \left\{ \frac{\text{Changes in Fixed Assets}}{\text{Current Total Assets}} \right\} \quad (3.3)$$

### 3.3.4 Return

To test the relation between stock prices and return predictability, if the predictability of return from stock prices has witnessed a decline as an additional explanation for enhanced price informativeness, lower return forecasting make prices more strong for predicting variation in future earnings. Prices predict return but with negative sign, because of the inverse relation between these two variables Return, define as the changes in market prices, are calculated as

$$\mathbf{Return} = \text{LN} \left\{ \frac{\text{Current Prices}}{\text{Previous Prices}} \right\} \quad (3.4)$$

## 3.4 Descriptive Statistics

Summary statistics or descriptive statistics describe data in terms of its statistical properties, two main parameters upon which properties of data are described in

this regard are central tendency that provide the average value for data, can be calculated through mean, median and mode. Mean also known as arithmetic mean, is the sum of all observation divided by number of observation in data set, while median is the value when data is arranged in some order, value that appear in center is median while mode is the most repeated value in data however in this study only the means and median are calculated for the data to arrive at the average value. Second is the measure of data dispersion through standard deviation measure how data is dispersed around mean to measure the dispersion, standard deviation is calculated for all variables which is the square root of variance. Market capitalization, a measure for equity valuation, reported in millions of rupees. Total assets, Capital expenditure (CAPX), EBIT (earning) is from State Bank's Balance Sheet Analysis of non-financial firms and annual reports of firms on 30 June. Log (M/A), is the log ratio of market capitalization over total assets, CAPX/A, is capital expenditure over assets, E/A, is Earnings over assets. E (t+1)/A is earning for year (t + h), when h=1 over assets for year t. E (t+3)/A is earning for year t + h when h=3 over t year's assets and E (t+5)/A is earning for year t + h, h=5 over assets for year, t, from 2000 to 2017.

## 3.5 Econometric Model

### 3.5.1 Price Informativness and Earnings Forecasts

Forecasting price efficiency define as “extent to which prices forecast variations in future cash flows”, (Bond, Edmans & Goldstein, 2012), a measure of prices informativness. Forecasting price efficiency is measure by running cross sectional regression of future earnings on current stock price for firm, however current earning and industry sector are used as control variable to avoid providing market with obvious public information, we run equation (3.2) for each year, that is t=2000. . . . . , 2017 and for every horizon, h=1, 3, 5, equation is

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (3.5)$$

Where  $d_{t,h}^s, 1_{i,t}^s$  represent industry dummy and as Price informativeness  $V_{FPE}$ , forecasting price efficiency is predicted variation of future earnings from market value (prices) of firm, equation (3.1)

$$V_{FPE} = Var ( E [z|q] ) \quad (3.6)$$

FPE is calculated here with taking a square root; make result more meaningful (rupees of cash flow per rupee of current total assets). From regression equation (3.2), price informativeness in year t, and at each horizon, h is the forecasting coefficient  $b_{t,h}$  multiplied by  $\sigma_t \{ \log \left( \frac{M}{A} \right) \}$ , the cross sectional standard deviation of the forecasting variable  $\log M/A$  in year t:

$$\left( \sqrt{V_{FPE}} \right) = b_{t,h} \times \sigma_t \left\{ \log \left( \frac{M}{A} \right) \right\} \quad (3.7)$$

### 3.5.2 Price Informativness and Investment

Prices predict investment as manager learns from stock prices (Mangers learning hypotheses) because prices contain information other than managers information, trader's information which is aggregated in stock prices (Chen, Goldstein & Jiang (2007). When prices are more informative about future earnings, next question to answer is if this informativness extend to investment decision as this study aim to address real sectors contribution of financial markets, to test prices predictability of investment, same procedure is repeated as in case of forecasting price efficiency, with the minor change of investment on the left side of equation (3.2) measured by change in capital expenditure (fixed assets), with current fixed assets as a control variable, equation we run:

$$\frac{CAPX_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h} \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (3.8)$$

Where  $e_{t,h}^s 1_{i,t}^s$  represent industry dummy and the predicted variation of investment from prices is,  $b_{t,h} \times \sigma_t \left( \log \left( \frac{M}{A} \right) \right)$ .

### 3.5.3 Price Informativness and Equity Return

Prices become more informative about cash flows when it became less informative about return (Campbell and Shiller,1998), return predictability of prices is decreased, and to test whether prices predictability of variation in return has decline over time following equation is used, same equation use for calculating predictability of cash flows and investment from stock prices with a slight change of return on the left side of equation.

$$\log R_{i,t \rightarrow t+h} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (3.9)$$

Where  $d_{t,h}^s 1_{i,t}^s$  represent industry dummy,  $\log R_{i,t \rightarrow t+h}$  is log return for the firm  $i$ , for the year  $t$  and for horizon  $h$ . The predicted variation of return from prices in year  $t$  and horizon  $h$  is  $b_{t,h} \times \sigma_t \left( \log \left( \frac{M}{A} \right) \right)$ .

### 3.5.4 Investment Informativeness for Earnings Forecasts

Bond, Edmans and Goldstein (2012) emphasize on need for redefining price efficiency as it should not be defined in context of forecasting firm's future cash flows but efficiency should also include prices ability on "the extent to which it provides information that is not otherwise available to mangers and help them to make investment decision hence contribute in an economic perspective too" Bond, Edmans and Goldstein (2012) term it revelatory price efficiency, (RPE), calculated as

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) + d_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \sigma_t \left( b_{t,h} \log \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) \right) \quad (3.10)$$

Where  $e_{t,h}^s 1_{i,t}^s$  represent industry dummy and Investments predicted variation for future earnings calculated as, value,  $b_{t,h}$  calculated in equation, (3.6) and the standard deviation of the value calculated through equation (3.7).

# Chapter 4

## Results and Discussion

### 4.1 Descriptive Statistics

Table 4.1 show the results of descriptive statistics for all variables, first part of the table show the result for full sample period from 2000 to 2017, while second and third part show the results when sample period is divided into two halves one from 2000 to 2008 second half which starts from 2009 to 2017. First variable is Market Capitalization, the market value of firm, values show that mean value for firm listed at PSX is higher in second half (30,6761.9) as compare to first half (10,1538.8) and the result are confirmed from the values of median as, 49,101.4 > 10,461, value is higher at later part. These results imply that size of the business has increased as market capitalization represents the size of the business in an economy. Standard deviation value is also higher in second half signals increase volatility for the market value of firms listed at Pakistan stock exchange (433233.2 < 898490.2). Second variable is total Assets, results for mean and median show higher values in second half as compare to the first suggest more asset growth from 2009 to 2017, mean value is 27,734.8 from 2009 to 2017 higher than 8,595.3 from 2000 to 2008 also true for median as, 9419.4 > 2774, standard deviation is also higher from 2009 to 2017 as the value is, 58,082.8 as compare to first half where value is 18,639.2 mark higher uncertainty in total assets in later half. Next is capital

expenditure (CAPX), results show higher value of mean and median from 2009 to 2017, means higher is the level of investment in this half (mean;  $1669.4 > 745.1$ , median;  $241 > 121$ ) as compare to first half same are the result for value of standard deviation,  $10159 > 3804.7$  suggest more uncertainty surrounding investment in this timeframe, and lower dispersion form 2000 to 2008, Next variable is Earnings, where same trend is found as earnings seems to be higher in later half as compare to first half, mean and median for second half are greater than first half (mean;  $4440 > 1523$  and median;  $946 > 242$  and standard deviation also higher for second half, imply higher uncertainty.

In case of mean for Log ratio of Market Capitalization to total Assets, result show value of mean and standard deviation are on higher side for later part ( $1.5 > 1.4$  and  $1.1 < 1.3$  while value of median is higher for first half ( $1.51 > 1.48$ ). Ratio of CPX to total Assets show opposite result as value of mean and median are higher in first half ( $0.08 > 0.04$  and  $0.05 > 0.02$ ) from 2000 to 2008 and lower value from 2009 to 2017, however standard deviation of data is greater for second half ( $0.18 > 0.17$ ). For E/A, ratio of earning to assets, mean and median show nearly same values ( $0.128 < 0.131$  and  $0.11 > 0.115$ ) and standard deviation is higher in first half, ( $0.141 > 0.126$ ). For E (t+1)/A, mean, median and standard deviation are on higher side at first part, ( $0.129 > 0.120$ ,  $0.111 > 0.104$ ,  $0.141 > 0.126$ ) of sample period while less value at later half, while same result for E(t+3)/A with higher value of mean, median and standard deviation at first part and lower values at later part, ( $0.134 > 0.090$ ,  $0.117 > 0.06$ ,  $0.129 > 0.122$  and in case of E (t+5)/A, also show higher value of mean, median and standard deviation, ( $0.133 > 0.06$ ,  $0.117 > 0$ , and  $0.116 > 0.114$ ).



TABLE 4.1: Descriptive Statistics

	2000-2017			2000-2008			2009-2017		
	Mean	Median	St. Dev.	Mean	Median	St. Dev.	Mean	Median	St. Dev.
<b>Market Capitalization</b>	204150.4007	22202.4382	712563.1488	101538.83	10461.727	433233.21	306761.97	49101.439	898490.16
<b>Total Assets</b>	18165.09586	5473.457	44171.4489	8595.3285	2774.45	18639.217	27734.863	9419.418	58082.864
<b>CAPX</b>	1207.247902	176.7505	7682.784626	745.05149	121.6	3804.7067	1669.4443	241.676	10159.355
<b>Earnings</b>	2981.763577	467.45	10585.55092	1523.3635	242.35	5879.9963	4440.1637	946.5655	13616.147
<b>Log(M/A)</b>	1.462590352	1.502051575	1.247022811	1.4232094	1.5159166	1.1399491	1.5019713	1.4808687	1.345092
<b>CAPX/A</b>	0.063994636	0.035110903	0.181279455	0.0827208	0.0500295	0.1755052	0.0452685	0.0268378	0.1850861
<b>E/A</b>	0.130260728	0.113116931	0.136338533	0.1286	0.1106615	0.1458175	0.1319214	0.1157564	0.1262093
<b>E(t+1)/A</b>	0.124141193	0.106656037	0.134067868	0.1286788	0.1108325	0.1415358	0.1196036	0.1036293	0.1260745
<b>E(t+3)/A</b>	0.112184155	0.092410434	0.127927	0.1340606	0.117422	0.1295841	0.0903077	0.0619259	0.1224687
<b>E(t+5)/A</b>	0.096779718	0.072133472	0.121098109	0.1334304	0.1169764	0.1164123	0.0601291	0	0.1144747

## 4.2 Price Informativeness and Earnings Forecasts (One Year Horizon)

To calculate prices informativeness for future earnings following equations are used, for each year, from 2000 to 2017, and horizon (h=1)

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{i,t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.1)$$

Table 4.2 show the relation between market prices and future earnings forecasts for next one year. The market price has significant positive relation with future earnings for the year, 2000, 2002, 2003, 2004, 2007, 2011, 2014 and 2016, prices for these years are able to predict one year ahead earnings, because prices have become more informative and make it possible for the decision makers or investors to extract this information from prices, through observing price changes and learn about future prospect and performance of firms. Results are insignificant for years, 2001, 2005, 2006, 2008 and 2010 is because of market facing crisis, volatility in stock market and prices behavior specifically in the years 2001, 2005, 2008 and 2010 when market has shown huge decline and high market volatility. Next question is whether current earnings has information about future earning, results between this relation of current earnings and future earnings are significant for years, 2000, 2004, 2005 to 2014 and 2016, higher current earning means higher will be the earnings in subsequent years and current earning is the information from managers to market about firm performance ,Explanatory power of research model, measured through adjusted R- square, show the higher explanatory power of the model in the years, 2003, 2004 to the end year which is 2016,last year with one year horizon (h=1), however it show small values or less explanatory power in the years 2000, 2001and 2002.Value of F- statistic and p-value are in agreement as both values show significant results for 2000 and 2003 to 2017 however for 2001 and 2002 model was misspecified because of insignificant F-statistics value.

TABLE 4.2: Price Informativeness and Earnings Forecasts (One Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.116 (0.066)	0.043 (0.012)**	0.256 (0.070)***	0.456842	4.585684	0.000003
2001	(0.092) (0.173)	0.005 (0.040)	0.658 (0.417)	-0.068938	0.721666	0.783043
2002	0.048 (0.131)	0.063 (0.023)**	0.084 (0.093)	0.097983	1.480243	0.123038
2003	0.064 (0.070)	0.060 (0.014)***	0.065 (0.060)	0.443966	4.614045	0.000002
2004	0.027 (0.062)	0.039 (0.0178)**	0.544 (0.131)***	0.578953	7.513312	0
2005	0.052 (0.055)	0.014 (0.015)	1.053 (0.131)***	0.724093	14.12207	0
2006	(0.067) (0.063)	0.014 (0.017)	0.822 (0.137)***	0.638011	9.998091	0
2007	(0.046) (0.084)	0.043 (0.019)**	0.846 (0.147)***	0.595149	8.659696	0
2008	0.122 (0.068)	0.017 (0.014)	0.728 (0.103)***	0.641725	10.33285	0
2009	0.019 (0.061)	0.0003 (0.012)	0.798 (0.102)***	0.624511	9.666103	0
2010	0.023 (0.060)	0.004 (0.011)	1.022 (0.110)***	0.69253	12.73594	0
2011	0.045 (0.056)	0.023 (0.010)**	0.473 (0.093)***	0.571928	7.961548	0
2012	(0.029) (0.047)	0.002 (0.009)	1.023 (0.100)***	0.717376	14.2257	0
2013	0.007 (0.057)	0.016 (0.012)	0.846 (0.114)***	0.659045	11.07164	0
2014	(0.008) (0.058)	0.045 (0.011)***	0.740 (0.106)***	0.695405	12.89586	0
2015	(0.046) (0.103)	0.040 (0.024)	0.897 (0.200)	0.539567	7.106053	0
2016	(0.093) (0.070)	0.051 (0.015)***	0.324 (0.103)**	0.629393	9.848929	0

### 4.3 Price Informativeness and Earnings Forecasts (Three Year Horizon)

Informativeness for future earning involve analysis on following equation, for every year at horizon three (h=3) and then multiplying.

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.2)$$

Table 4.3 show the relation between stock prices and future earnings, if stock prices have become informative to forecast variations in future earnings for three year horizon, (h=3) and it is found that relation is significantly positive for years, 2000, 2002, 2003, 2004 and for the years 2011 to 2014 indicates in prices forecasting power for three year ahead earnings while results are insignificant for rest of the years because of uncertainty and downturn, market experienced in some of these years (2001, 2005, 2006, 2008 and 2010), the relation between current earnings and future earnings,if current earnings have information about three year ahead earnings for firms and results show the relation is significant for years, 2001, 2003 to 2010 and from the years 2013 to 2014, for these years significant results indicate that current earnings are informative in terms of future predictability for firm earnings performance, explanatory power for our research model is strong for years 2006, 2007, 2009, 2010, 2013 and 2014 while moderate strong for the remaining years, and F-Statistics value and probability are significant for all the years under observation.

TABLE 4.3: Price Informativeness and Earnings Forecasts (Three Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.053 (0.108)	0.047 (0.020)**	0.146 (0.115)	0.39122	3.739633	0.000043
2001	0.013 (0.103)	0.032 (0.024)	0.753 (0.248)**	0.462666	4.716069	0.000002
2002	0.153 (0.120)	0.086 (0.021)***	0.098 (0.086)	0.305058	2.940706	0.000643
2003	0.215 (0.136)	0.064 (0.028)**	0.030 (0.118)**	0.285182	2.805812	0.000994
2004	(0.025) (0.115)	0.063 (0.033)**	(0.632) (0.243)**	0.381425	3.920824	0.000013
2005	(0.018) (0.163)	0.070 (0.045)	0.832 (0.391)**	0.311067	3.257601	0.000132
2006	0.131 (0.106)	0.014 (0.029)	1.098 (0.230)***	0.529548	6.746568	0
2007	0.182 (0.108)	0.022 (0.025)	0.989 (0.189)***	0.53479	6.989855	0
2008	0.118 (0.127)	(0.023) (0.026)	(0.842) (0.192)***	0.44032	5.099306	0
2009	0.020 (0.090)	0.033 (0.018)	0.734 (0.152)***	0.529836	6.87183	0
2010	(0.017) (0.082)	0.020 (0.015)	0.949 (0.150)***	0.531033	6.900122	0
2011	0.021 (0.103)	0.054 (0.019)***	0.326 (0.171)	0.375139	4.128173	0.000004
2012	0.018 (0.119)	0.065 (0.022)***	0.486 (0.253)	0.358324	3.90966	0.000009
2013	0.005 (0.098)	0.036 (0.020)	0.855 (0.196)***	0.514753	6.527356	0
2014	(0.122) (0.078)	0.080 (0.015)***	0.512 (0.142)***	0.655457	10.91247	0

## 4.4 Price Informativeness and Earnings Forecasts (Five Year Horizon)

Five year Informative is calculated as follows for the years for the horizon (h=5),  
Forecasting value is the product of the value,

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + ?_{i,t,h} \quad (4.3)$$

Result reported in table shows positive significant relation between stock prices and future earnings for the year 2000, 2002, 2003, 2009, 2010, 2011, 2012. Next variables are current earnings for firm and its information about future earnings for five years ahead, and results show positively significant relation exist for years, 2001, 2004, 2005, 2006, 2007, 2008, 2009, and 2012 for these years current earnings are informative about future earnings at five year horizon, while result are insignificant for rest of the years, model explanatory power is strong for 2005, 2007, 2008 and 2012 and moderate strong for remaining years, value of F-statistics and P value are significant for all the years from 2000 to 2017.

TABLE 4.4: Price Informativeness and Earnings Forecasts (Five Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
<b>2000</b>	0.156 (0.166)	0.100 (0.031)***	0.122 (0.177)	0.35439	3.340143	0.000172
<b>2001</b>	0.089 (0.201)	0.058 (0.046)	1.211 (0.484)**	0.302567	2.872321	0.000884
<b>2002</b>	0.093 (0.219)	0.131 (0.039)**	0.064 (0.156)	0.248833	2.464529	0.003736
<b>2003</b>	0.125 (0.257)	0.105 (0.053)*	0.313 (0.222)	0.16421	1.889298	0.02985
<b>2004</b>	0.185 (0.188)	0.083 (0.054)	0.889 (0.397)**	0.254572	2.617683	0.001823
<b>2005</b>	0.140 (0.159)	0.069 (0.044)	1.077 (0.380)**	0.405585	4.41163	0.000002
<b>2006</b>	0.152 (0.192)	0.042 (0.052)	0.880 (0.416)**	0.373715	4.046401	0.000006
<b>2007</b>	0.152 (0.166)	0.057 (0.038)	1.220 (0.290)***	0.4824	5.856178	0
<b>2008</b>	0.075 (0.138)	0.009 (0.028)	1.147 (0.208)***	0.454768	5.346002	0
<b>2009</b>	(0.053) (0.152)	0.064 (0.030)**	0.804 (0.256)**	0.355877	3.878803	0.00001
<b>2010</b>	0.002 (0.157)	0.106 (0.029)***	0.443 (0.289)	0.355848	3.878443	0.00001
<b>2011</b>	0.030 (0.147)	0.086 (0.027)**	0.210 (0.243)	0.365528	4.00185	0.000006
<b>2012</b>	(0.110) (0.108)	0.065 (0.020)**	0.672 (0.232)**	0.536461	7.030226	0

## 4.5 Forecasting Price Efficiency

Table 4.5 show the results of “Forecasting price efficiency”, prices ability to predict future earnings variation, for one, three and five year horizon ( $h=1, 3, 5$ ) from the year 2000 to 2017. Results show that price informative has increased, but this increase is more pronounce at short term, prices are more informative for one year ahead earnings as value for prices informativeness: calculated as  $b_{t,h} \times \sigma_t\{\log(\frac{M}{A})\}$  are lower for one year forecast and higher value at three and five years, point out the more uncertainty surrounding prices predictive power for earnings at longer horizon ( $h= 3,5$ ), just opposite to the study of (Bai, Philippon & Savov, 2015), conducted on firm for US stock market, where price informativeness has shown increased for long term as compare to short term.

TABLE 4.5: Forecasting Price Efficiency

<b>Years</b>	<b>FPE (h=1)</b>	<b>FPE3 (h=3)</b>	<b>FPE5 (h=5)</b>
2000	0.043661	0.048027	0.102949
2001	0.004867	0.031017	0.056634
2002	0.068629	0.094582	0.143766
2003	0.061155	0.065565	0.106675
2004	0.037016	0.060628	0.0794
2005	0.01343	0.068057	0.066654
2006	0.014432	0.014322	0.043377
2007	0.047484	0.024542	0.063349
2008	0.019973	0.028184	0.011116
2009	0.000458	0.042118	0.081011
2010	0.005925	0.025935	0.139804
2011	0.031047	0.070956	0.113928
2012	0.003241	0.082478	0.083065
2013	0.019065	0.042355	-
2014	0.057807	0.104475	-
2015	0.051165	-	-
2016	0.065738	-	-

Figure 4.1 show the graphical representation for price informativness for one, three and five year horizon and it shows price informativness has increased for one year horizon, because of less uncertainty at short term while results are higher for three and five years, means results shows more uncertainty at longer and medium horizon.

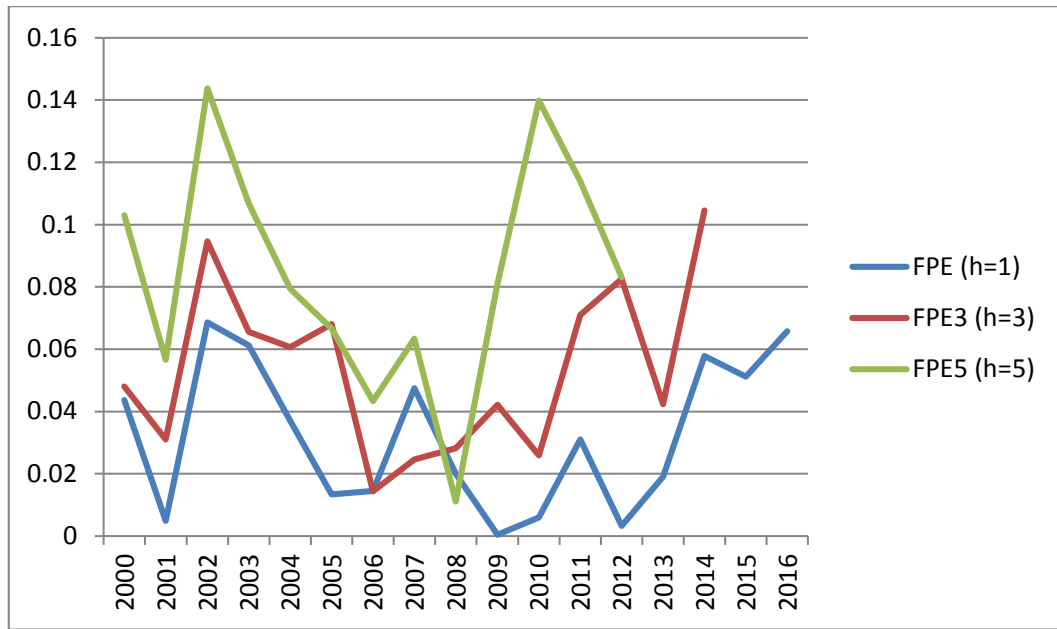


FIGURE 4.1: Forecasting Price Efficiency

## 4.6 Price Informativness and Investment (One Year Horizon)

Table 4.6 show the results of relation between stock prices and investment,

$$\frac{CAPX_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log\left(\frac{M_{i,t}}{A_{i,t}}\right) + c_{t,h} \left(\frac{E_{i,t}}{A_{i,t}}\right) + d_{t,h} \left(\frac{CAPX_{i,t}}{A_{i,t}}\right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.4)$$

If prices are able to predict future investment for one year horizon, (h=1) for every year (t) and the results is significant only for the year 2015, means only for the year 2015, prices are able to forecast future investment for the next year (h=1), and results are insignificant for rest of the years, insignificant result are indication prices for these years do not contain information on investment. When it comes to

relation between current earnings and investment, results are significantly positive for 2001 and 2015 and insignificant for remaining years. Relation between future capital expenditure and current investment level of firm is significant for the years, 2003, 2009 and 2010, and insignificant for rest of the years. Explanatory power for research model is weak for all years from 2000 to 2017 and F-statistics value are significant for 2001, 2004, 2005, 2007, 2009, 2012 and 2016 and insignificant result for remaining years show model is misspecified for those years.

TABLE 4.6: Price Informativeness and Investment (One Year Horizon)

Year	C	MC	Et	CAPX	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.058 (0.144)	0.014 (0.027)	0.151 (0.151)	(0.190) (0.238)	0.057	1.249	0.247931
2001	(0.018) (0.089)	(0.012) (0.020)	0.558 (0.215)**	0.010 (0.067)	0.341	3.174	0
2002	0.067 (0.120)	0.012 (0.021)	0.071 (0.085)	(0.081) (0.094)	0.015254	1.066609	0.403977
2003	0.052 (0.161)	0.050 (0.032)	0.184 (0.139)	(0.327) (0.165)*	0.008553	1.038819	0.431501
2004	(0.074) (0.178)	0.077 (0.050)	0.312 (0.342)	(0.113) (0.150)	0.149461	1.825907	0.032964
2005	(0.043) (0.144)	0.049 (0.039)	0.175 (0.340)	0.114 (0.139)	0.323651	3.320855	0.000079
2006	0.113 (0.179)	(0.013) (0.049)	(0.225) (0.389)	(0.164) (0.175)	0.073459	1.384522	0.156459
2007	0.502 (0.120)	(0.014) (0.027)	0.369 (0.217)	0.019 (0.133)	0.158096	1.929532	0.021141
2008	0.115 (0.146)	(0.003) (0.030)	(0.089) (0.216)	(0.125) (0.162)	0.015387	1.077355	0.389239
2009	0.076 (0.146)	0.033 (0.029)	(0.126) (0.247)	(0.651) (0.147)***	0.257821	2.719548	0.00086
2010	0.064 (0.071)	0.001 (0.013)	0.140 (0.131)	0.194 (0.073)**	0.072193	1.385163	0.155222
2011	0.077 (0.110)	(0.014) (0.020)	0.104 (0.182)	0.137 (0.199)	-0.087264	0.602713	0.899531
2012	0.051 (0.069)	(0.006) (0.013)	0.078 (0.146)	(0.091) (0.098)	0.14987	1.872638	0.026385
2013	0.098 (0.339)	0.046 (0.069)	(0.450) (0.674)	(0.201) (0.741)	-0.067915	0.6852	0.829097
2014	(0.006) (0.063)	(0.001) (0.012)	0.077 (0.116)	0.021 (0.022)	-0.013538	0.933883	0.547806
2015	0.051 (0.084)	(0.063) (0.019)***	0.433 (0.164)**	0.332 (0.196)	0.087993	1.477589	0.113505
2016	0.113 (0.099)	(0.025) (0.021)	0.052 (0.146)	(0.186) (0.136)	0.141761	1.817626	0.03262

## 4.7 Price Informativeness and Investment (Three Year Horizon)

Following equation is used to calculated value of  $b_{t,h}$ :

$$\frac{CAPX_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log\left(\frac{M_{i,t}}{A_{i,t}}\right) + c_{t,h} \left(\frac{E_{i,t}}{A_{i,t}}\right) + d_{t,h} \left(\frac{CAPX_{i,t}}{A_{i,t}}\right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.5)$$



Table 4.7 show the results of relation between stock prices and investment decision for three year horizon, (h=3) positively significant between prices and investment only for the year 2013, and insignificant for rest of the years from 2000 to 2017, means there is no predictability of investment from prices for three year horizon for remaining years, hence prices have little significance when it comes to helping investment decision. The relation between current earning and investment is significantly positive only for the year 2013. Third is the relation between current capital expenditure and its informativness for future investment decision and the results are significantly positive for years, 2000, 2012 and 2014 model explanatory power is slightly strong for 2003 and 2010, rest of the year show low value for adjusted R- square, insignificant results for F-statistics for years, 2001, 2002, 2005 to 2009 and from 2011 to 2013, show model is misspecified for these years and significant value are shown for F-statistics and P-value for the years 2000, 2003, 2004, 2010 and 2014.

TABLE 4.7: Price Informativeness and Investment (Three Year Horizon)

Year	C	MC	Et	CAPX	ADJ R <sup>2</sup>	F-stats	Probab
<b>2000</b>	0.013 (0.173)	(0.001) (0.032)	(0.105) (0.182)	0.850 (0.287)***	0.256307	2.41303	0.004324
<b>2001</b>	0.025 (0.235)	0.086 (0.052)	0.178 (0.565)	(0.021) (0.177)	-0.02242	0.907901	0.578902
<b>2002</b>	0.006 (0.267)	0.083 (0.047)	0.039 (0.190)	0.312 (0.209)	0.096452	1.459018	0.127631
<b>2003</b>	(0.010) (0.248)	0.050 (0.049)	0.352 (0.214)	0.130 (0.253)	0.402344	4.029417	0.000007
<b>2004</b>	0.040 (0.275)	0.021 (0.077)	(0.044) (0.528)	0.074 (0.231)	0.138918	1.758251	0.04246
<b>2005</b>	0.444 (0.206)	0.026 (0.056)	(0.219) (0.486)	0.133 (0.199)	0.074347	1.389542	0.153893
<b>2006</b>	0.219 (0.228)	(0.003) (0.062)	(0.527) (0.495)	0.184 (0.223)	0.107092	1.581689	0.079373
<b>2007</b>	(0.099) (0.331)	0.072 (0.075)	(0.501) (0.601)	(0.335) (0.370)	-0.02367	0.885543	0.605074
<b>2008</b>	0.085 (0.128)	(0.003) (0.026)	0.260 (0.189)	0.046 (0.143)	0.069784	1.371346	0.162458
<b>2009</b>	0.108 (0.127)	0.015 (0.025)	0.150 (0.214)	(0.067) (0.127)	-0.041216	0.804056	0.701358
<b>2010</b>	0.027 (0.102)	(0.009) (0.019)	0.325 (0.189)	(0.004) (0.105)	0.30264	3.148197	0.000148
<b>2011</b>	0.182 (0.396)	0.131 (0.072)	(1.051) (0.656)	(1.301) (0.713)	0.010055	1.050279	0.417233
<b>2012</b>	0.006 (0.077)	(0.006) (0.014)	0.178 (0.164)	(0.288) (0.110)**	0.062307	1.328915	0.18645
<b>2013</b>	(0.012) (0.144)	(0.074) (0.029)**	0.842 (0.285)***	0.508 (0.314)	-0.013252	0.93526	0.54619
<b>2014</b>	0.124 (0.119)	(0.002) (0.023)	(0.028) (0.221)	(0.112) (0.042)**	0.141748	1.817539	0.032631

## 4.8 Price Informativeness and Investment (Five Year Horizon)

Following equation is used to measure, prices forecasting variations for future investments:

$$\frac{CAPX_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log\left(\frac{M_{i,t}}{A_{i,t}}\right) + c_{t,h} \left(\frac{E_{i,t}}{A_{i,t}}\right) + d_{t,h} \left(\frac{CAPX_{i,t}}{A_{i,t}}\right) + e_{i,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.6)$$

Table 4.8 show the results of relation between stock prices and investment decision for five year horizon (h=5),if it contain information on the variation in investment decision of managers for long term (five year horizon) and the result show significant positive relation are observed for the year 2011 only, and insignificant results for remaining years from 2000 to 2017, invalidate the prices predictability for future investment decision at longer horizon because prices have little information regarding investment that possibly can guide investment decision. The results on relation between current earnings and future investment are insignificant from 2000 to 2012 except for 2011 because current earnings provide little information for future investment decision (h=5) .Current investment at year, t in its relation with, future investment decision (at year t and h=5) at fifth year is insignificant for all the years under observation (2000-2017). Adjusted R-square, the explanatory power for the model show higher values only for the year 2001 while in remaining years explanatory power is less. F-statistics value and p- value are significant for years, 2001, 2003, 2008 while insignificant for rest of the years suggest model misspecification.

TABLE 4.8: Price Informativeness and Investment (Five Year Horizon)

Year	C	MC	Et	CAPX	ADJ R <sup>2</sup>	F-stats	Probab
2000	(0.058) (0.333)	0.112 (0.062)	0.199 (0.350)	0.342 (0.552)	0.03813	1.162528	0.316061
2001	(0.079) (0.299)	0.095 (0.066)	1.001 (0.718)	(0.108) (0.225)	0.45883	4.560962	0.000002
2002	0.099 (0.356)	0.024 (0.063)	0.082 (0.254)	(0.058) (0.279)	0.130993	1.648174	0.067147
2003	0.506 (0.300)	(0.017) (0.060)	(0.074) (0.260)	(0.034) (0.307)	0.20291	2.145538	0.01019
2004	0.229 (0.393)	(0.139) (0.111)	0.279 (0.754)	0.311 (0.330)	0.097389	1.507117	0.104635
2005	(0.036) (0.408)	0.016 (0.113)	0.453 (0.976)	(0.326) (0.396)	0.058301	1.294076	0.210047
2006	0.073 (0.364)	0.042 (0.099)	0.034 (0.790)	0.035 (0.356)	0.053981	1.276748	0.220673
2007	0.107 (0.156)	0.048 (0.035)	(0.086) (0.283)	0.102 (0.174)	-0.027272	0.868587	0.625272
2008	0.031 (0.150)	0.009 (0.031)	0.085 (0.223)	0.118 (0.168)	0.203887	2.267709	0.005474
2009	0.158 (0.470)	0.068 (0.093)	(0.651) (0.795)	0.628 (0.472)	-0.107787	0.518367	0.950844
2010	(0.025) (0.094)	0.001 (0.017)	0.190 (0.173)	(0.048) (0.097)	-0.030975	0.851279	0.645858
2011	(0.051) (0.175)	0.104 (0.032)***	1.371 (0.290)***	(0.032) (0.315)	0.100987	1.556038	0.086151
2012	0.108 (0.195)	0.017 (0.036)	(0.021) (0.413)	0.156 (0.276)	-0.046381	0.78059	0.728271

## 4.9 Price Informativeness and Investment

Table 4.9 show the prices informativeness for investment decision, if prices predictability has enhanced over time, for reflecting the variations in investment of firms for one, three and five year horizon ( $h= 1,3,5$ ) for every year,  $t$ , from 2000 to 2017. Results show informativeness has increased for firm listed at Pakistan stock exchange and this increase in informativeness is more pronounce for short term, ( $h=1$ ) as compare to medium to long term ( $h=3$  and  $h= 5$ ) imply that prices at short term are more able to capture variation in one year ahead investment as values are at lower side (less uncertainty) as compare to three and five year horizon.

TABLE 4.9: Price Informativeness and Investment

Years	CAPX (h=1)	CAPX (h=3)	CAPX (h=5)
2000	0.014476	-0.00076	0.114018
2001	-0.01259	0.086664	0.095385
2002	0.012789	0.090702	0.025915
2003	0.052117	0.051427	-0.01813
2004	0.072868	0.019499	-0.13143
2005	0.048813	0.025683	0.015473
2006	-0.01347	-0.00267	0.043365
2007	-0.01526	0.079283	0.053116
2008	-0.00329	-0.00424	0.011524
2009	0.041689	0.018949	0.085737
2010	0.000957	-0.01202	0.001046
2011	-0.01847	0.172948	-0.13722
2012	0.065319	-0.00748	0.021253
2013	0.054667	-0.08742	
2014	-0.00135	-0.00333	
2015	-0.08091		
2016	-0.03251		

Figure 4.2 show the graphical representation of price informativeness for investment decision of firms, which shows that uncertainty in case of one year ahead capital expenditure decision is lower, which shows the informativeness is enhanced at one year over medium term and long term of three and five years respectively with higher uncertainty in capturing future variation in investment level through reflecting information relevant to investment decision.

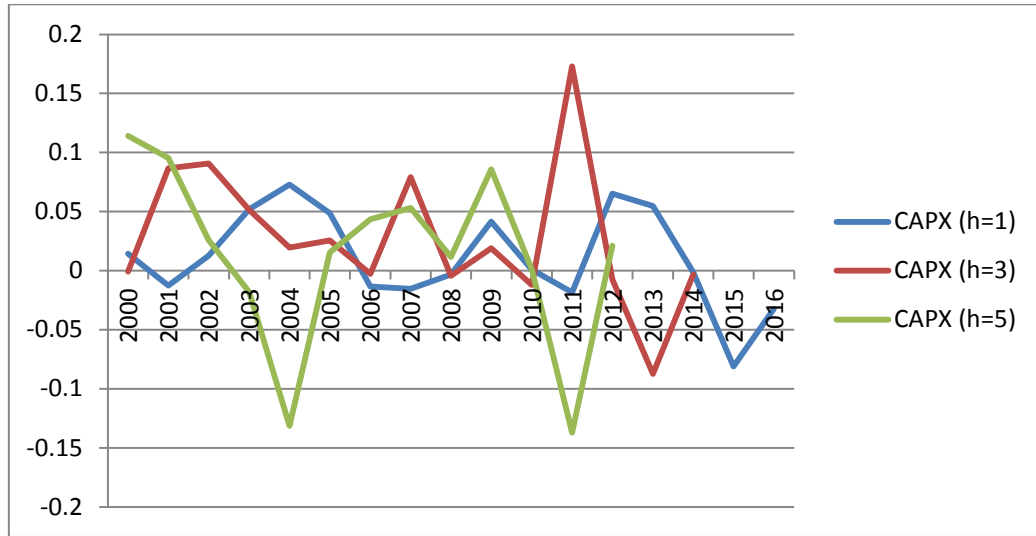


FIGURE 4.2: Price Informativeness and Investment

## 4.10 Price Informativeness and Equity Return (One Year Horizon)

Following equation is used to calculate the value of  $b_{t,h}$  , for measuring predicted variation of return from prices:

$$\log R_{i,t \rightarrow t+h} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.7)$$

Table 4.10 show the results of relation between stock prices and stock return, from 2000 to 2017, predicted variation of stock prices for future return for every year t, at horizon of one year (h=1) in an attempt to answer the question, whether improved

informativeness of prices came from increased predictability for future earnings or decreased predictability for return, (Campbell & Shiller, 1988), two components of prices, if prices become informative about one (earnings), its informative decline for the other, prices predictability decline for return, negative relation between prices and return (Fama & French, 1992), Results show relation between prices and return is significant for the years, 2000, 2002, 2003, 2010, 2014 and 2016 means for these years proposed relation holds between these two variables the significant result is an indication of price informativeness in terms of return predictability for one year time frame has declined. The relation between current earnings and stock prices is positively significant for the years, 2000, 2004, 2009, 2010 and 2014, means prices are current earning are associated. Model explanatory power is good for the years 2003 and 2014, F-statistics and p-value are significant for the years, 2002 to 2006, 2010, 2011 and 2012 and for the year 2014 and 2016, insignificant values for F-statistics shows the model misspecification.

TABLE 4.10: Price Informativeness and Equity Return (One Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.226 (0.197)	(0.083) (0.037)***	0.585 (0.210)***	0.235691	2.330863	0.006379
2001	(0.269) (0.268)	(0.064) (0.058)	0.885 (0.643)	-0.027686	0.882315	0.604718
2002	0.232 (0.263)	(0.162) (0.046)***	0.027 (0.186)	0.230996	2.359631	0.005287
2003	1.050 (0.185)	(0.16) (0.037)***	(0.156) (0.157)	0.45706	4.987594	0
2004	(0.134) (0.255)	(0.122) (0.068)	1.002 (0.456)**	0.151888	1.886022	0.027917
2005	0.699 (0.294)	(0.129) (0.081)	0.981 (0.705)	0.210787	2.335426	0.004933
2006	0.798 (0.269)	(0.125) (0.073)	0.923 (0.585)	0.18156	2.132535	0.010579
2007	(0.148) (0.296)	(0.059) (0.067)	(0.524) (0.517)	0.089779	1.513934	0.103144
2008	(0.343) (0.328)	(0.029) (0.067)	0.501 (0.495)	-0.005953	0.969166	0.504596
2009	(0.208) (0.377)	(0.087) (0.074)	1.578 (0.636)**	0.082861	1.470759	0.119432
2010	(0.105) (0.271)	(0.153) (0.050)***	2.255 (0.499)***	0.264942	2.878063	0.000526
2011	(0.198) (0.327)	(0.100) (0.060)	0.349 (0.456)	0.130094	1.779233	0.039908
2012	0.185 (0.264)***	(0.221) (0.048)	1.413 (0.564)	0.271043	2.937398	0.000414
2013	0.196 (0.305)	(0.023) (0.063)	(0.179) (0.612)	0.024373	1.130171	0.338881
2014	0.311 (0.232)	(0.094) (0.043)**	0.825 (0.421)**	0.388102	4.304827	0.000002
2015	0.428 (0.244)	0.006 (0.056)	0.575 (0.471)	-0.005359	0.972223	0.501158
2016	0.223 (0.294)	(0.147) (0.061)***	0.121 (0.432)	0.224259	2.506312	0.002341

## 4.11 Price Informativeness and Equity Return (Three Year Horizon)

Following equation is used for the calculation of value for,  $b_{t,h}$ , while the predicted variation of return from prices in year  $t$  and horizon  $h$  is  $b_{t,h} \times \sigma_t \left( \log \left( \frac{M}{A} \right) \right)$ .

$$\log R_{i,t \rightarrow t+h} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.8)$$

The relation is significant for the years, 2000, 2001, 2004 and 2010, mean for these years return predictability has declined in terms of providing insight on return behavior at third year ( $h=3$ ), while results are insignificant for rest of the years from 2000 to 2017. Relation between current earnings and return is positively significant for the years, 2004 and 2014 and insignificant relation for remaining years. Model explanatory power is good for the years, 2001, 2012 and 2014 while at lower side for the remaining years, F-statistics value and p-value are significant for 2000, 2001, 2003, 2004, 2010, 2012, and 2014.

## 4.12 Price Informativeness and Equity Return (Five Year Horizon)

The predicted variation of return from prices in year  $t$  and horizon  $h$  is  $b_{t,h} \times \sigma_t \left( \log \left( \frac{M}{A} \right) \right)$ . where the value of the,  $b_{t,h}$  is calculated by the equation, (3.5)

$$\log R_{i,t \rightarrow t+h} = a_{t,h} + b_{t,h} \log \left( \frac{M_{i,t}}{A_{i,t}} \right) + c_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + d_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.9)$$

Table 4.12 show the results of relation between stock prices and return for the horizon of five years ( $h=5$ ) for every one year in the sample period from 2000 to 2017. As results show that there exist significant relation between stock prices and

TABLE 4.11: Price Informativeness and Equity Return (Three Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.270 (0.269)	(0.139) (0.050)***	0.012 (0.286)	0.19051	2.003319	0.021133
2001	0.989 (0.202)	(0.136) (0.044)***	0.381 (0.484)	0.36014	3.488349	0.000088
2002	(0.174) (0.247)	(0.004) (0.044)	0.084 (0.175)	0.125443	1.649236	0.06938
2003	0.704 (0.279)	(0.009) (0.055)	(0.088) (0.236)	0.258395	2.650442	0.001607
2004	0.838 (0.257)	(0.166) (0.068)**	1.144 (0.459)**	0.218203	2.380829	0.004202
2005	(0.225) (0.276)	0.052 (0.076)	(0.498) (0.660)	0.075108	1.406038	0.14978
2006	(0.419) (0.332)	0.032 (0.091)	0.162 (0.722)	-0.011739	0.940765	0.537044
2007	(0.451) (0.404)	0.191 (0.092)**	0.167 (0.707)	0.094653	1.544754	0.09275
2008	(0.216) (0.300)	(0.107) (0.062)	0.433 (0.453)	0.108417	1.633601	0.067841
2009	(0.159) (0.338)	0.037 (0.066)	0.513 (0.569)	0.108323	1.632988	0.06799
2010	0.311 (0.286)	(0.120) (0.053)**	0.178 (0.527)	0.149966	1.919257	0.023565
2011	0.181 (0.304)	0.017 (0.055)	(0.352) (0.505)	0.023221	1.123871	0.344668
2012	0.319 (0.240)	(0.014) (0.044)	(0.116) (0.514)	0.349294	3.796969	0.000014
2013	0.470 (0.245)	0.068 (0.050)	(0.274) (0.491)	-0.026783	0.864086	0.626164
2014	0.115 (0.286)	0.007 (0.053)	(1.436) (0.521)**	0.229437	2.551446	0.001953

return for the years, 2005, 2008 and 2009 and insignificant for rest of the years and the relation between current earnings and stock price is significant positive only for 2009 and insignificant for remaining years from 2000 to 2017. The value of Adjusted R-square, the explanatory power for the model is good at year 2001, 2010 and 2012, F-statistics and p-value are significant for the years, 2001, 2002, 2005, 2006, 2008, 2010, and 2012.

TABLE 4.12: Price Informativeness and Equity Return (Five Year Horizon)

Year	C	MC	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	(0.173) (0.242)	(0.033) (0.045)	0.142 (0.258)	0.132561	1.659535	0.068981
2001	0.785 (0.285)	0.020 (0.062)	(0.972) (0.681)	0.284765	2.760206	0.001251
2002	0.754 (0.270)	(0.031) (0.048)	(0.208) (0.191)	0.145011	1.767688	0.045996
2003	(0.224) (0.272)	(0.082) (0.054)	0.130 (0.230)	0.09367	1.489557	0.116132
2004	(0.355) (0.314)	(0.004) (0.083)	(0.148) (0.561)	-0.056505	0.735398	0.771079
2005	(0.168) (0.367)	(0.291) (0.101)**	(0.569) (0.880)	0.12513	1.715134	0.051817
2006	0.118 (0.291)	(0.035) (0.079)	0.137 (0.631)	0.138994	1.824154	0.034269



<b>2007</b>	(0.311) (0.364)	0.064 (0.082)	(0.600) (0.637)	0.110093	1.64461	0.065222
<b>2008</b>	0.428 (0.284)	(0.173) (0.058)**	0.523 (0.428)	0.173284	2.092156	0.012093
<b>2009</b>	0.230 (0.302)	0.115 (0.059)**	(1.062) (0.509)**	0.076089	1.429116	0.137221
<b>2010</b>	0.240 (0.241)	(0.011) (0.044)	0.421 (0.443)	0.354556	3.862246	0.000011
<b>2011</b>	0.526 (0.244)	0.058 (0.445)	(0.492) (0.406)	-0.026817	0.863919	0.626359
<b>2012</b>	0.049 (0.298)	(0.084) (0.055)	(0.183) (0.637)	0.175542	2.109414	0.011305

### 4.13 Price Informativeness and Equity Return

Table 4.13 show the results for stock price informativeness for future return from 2000 to 2017, at three horizons, (h=1,3,5) to observe decline in predicted variation of prices for return as when informativeness of prices is increased it can be attributed to either increase in price ability to forecast variation in future payoff for the firm, or it signals at decline in prices ability to forecast variation in future return, the building block for stock prices, (Campbell & Shiller, 1988), results show that decline in prices ability to provide insight on return behavior in future has declined over the time period, as the result for every year and for every horizon are tabulated as the values are on lower side for one year horizon for every year mean decline is more pronounce for one year, short term as compare to long term at the horizon of three and five years as values are on higher side as predicted variation of return from prices is calculated as  $b_{t,h} \times \sigma_t \left( \log \left( \frac{M}{A} \right) \right)$ , higher the values more uncertainty surrounding predictive power of stock prices.

TABLE 4.13: Price Informativeness and Equity Return

<b>Years</b>	<b>Return (h=1)</b>	<b>Return (h=3)</b>	<b>Return (h=5)</b>
2000	-0.0847	-0.14202	-0.03363
2001	-0.06515	-0.13767	0.020371
2002	-0.17642	-0.0043	-0.03394
2003	-0.17441	-0.00929	-0.08469
2004	-0.11512	-0.15717	-0.00369
2005	-0.12394	0.050006	0.279632
2006	-0.12775	0.032577	-0.03578
2007	-0.06546	0.211334	0.071248
2008	-0.03497	-0.12966	-0.20863
2009	-0.1097	0.046198	0.14521

2010	-0.20057	-0.15762	-0.01463
2011	-0.13265	0.022211	0.076983
2012	-0.28173	-0.01751	-0.10772
2013	-0.02726	0.080841	
2014	-0.12118	0.009438	
2015	0.007918		
2016	-0.18866		

Figure, 4.3 show the graphical representation of relation between stock prices and decline in return predictability, it is shown in figure that line for decline in return forecasting is lower for one year horizon as compare to three and five years, which is the indication that price informativeness has declined for return more at shorter horizon.

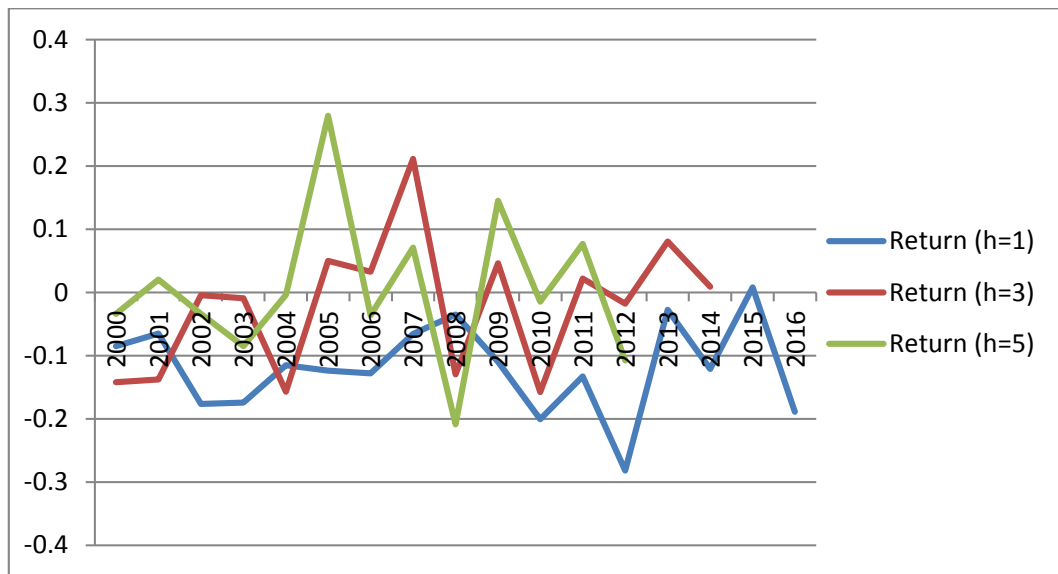


FIGURE 4.3: Price Informativeness and Equity Return

#### 4.14 Investment Informativeness for Earnings Forecasts (One Year Horizon)

Investments predicted variation for future earnings calculated as, for calculation of the value of,  $b_{t,h}$  :

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log\left(\frac{CAPX_{i,t}}{A_{i,t}}\right) + d_{t,h} \left(\frac{E_{i,t}}{A_{i,t}}\right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.10)$$

Table 4.14 show the result of regression on relation between investment and its predictability for future earnings for one year horizon, (h=1) as investment are supposed to provide information about firm future payoffs the results show that relation does not hold between investment and future earnings predictability for stocks listed at Pakistan stock exchange as all the values are insignificant, for all the years from 2000 to 2017, for the relation between current earnings, the value is positively significant for the years 2000, 2002, 2003, 2004 means in these years relation between current earning and future one year ahead earnings is positive while for rest of the years the relation was insignificant, The explanatory power for research model is weak values in 2001 to 2003, then 2014, while rest of the values for adjusted R-square are higher, F-statistics and p-value are significant throughout the time period which is 2000 to 2017 except for the years, 2001 the insignificant value of F-statistic means model was misspecified for this year.

TABLE 4.14: Investment Informativeness for Earnings Forecasts (One Year Horizon)

Year	C	CAPX	Et	ADJ R <sup>2</sup>	F-stats	Probab
<b>2000</b>	0.127 (0.066)	(0.001) (0.008)	0.292 (0.065)***	0.305579	2.945474	0.000632
<b>2001</b>	(0.115) (0.191)	(0.006) (0.024)	0.657 (0.352)	-0.066268	0.716875	0.781513
<b>2002</b>	0.226 (0.142)	0.034 (0.018)	1.105 (0.244)***	0.213437	2.190944	0.012085
<b>2003</b>	0.124 (0.117)	(0.003) (0.010)	0.306 (0.107)***	0.189681	2.053369	0.01892
<b>2004</b>	0.077 (0.064)	0.009 (0.007)	0.761 (0.096)***	0.628667	8.752164	0
<b>2005</b>	0.081 (0.064)	0.006 (0.007)	1.123 (0.105)	0.727203	13.90774	0
<b>2006</b>	(0.070) (0.071)	(0.002) (0.007)	0.892 (0.112)	0.621015	9.020633	0
<b>2007</b>	0.042 (0.086)	(0.000) (0.011)	0.962 (0.144)	0.487699	5.559472	0
<b>2008</b>	0.170 (0.060)	0.007 (0.007)	0.660 (0.131)	0.669588	8.786133	0
<b>2009</b>	(0.017) (0.066)	(0.009) (0.007)	0.865 (0.129)	0.57414	6.179887	0
<b>2010</b>	0.046 (0.089)	0.004 (0.007)	0.988 (0.104)	0.648143	9.43471	0
<b>2011</b>	0.071 (0.055)	0.007 (0.006)	0.599 (0.074)	0.666624	10.15616	0
<b>2012</b>	(0.015) (0.050)	0.002 (0.005)	0.970 (0.087)	0.705943	12.11901	0
<b>2013</b>	0.008 (0.042)	0.001 (0.005)	1.021 (0.070)	0.804742	20.73942	0
<b>2014</b>	0.049 (0.069)	0.009 (0.008)	0.939 (0.108)	0.087931	9.294731	0
<b>2015</b>	(0.217) (0.134)	(0.033) (0.013)	1.131 (0.158)	0.493628	5.309789	0
<b>2016</b>	(0.065) (0.069)	0.001 (0.007)	0.820 (0.073)	0.728494	13.99213	0

## 4.15 Investment Informativeness for Earnings Forecasts (Three Year Horizon)

Following equation, is used to calculate the value of,  $b_{t,h}$ , for the predicted variation of future earnings from investment.

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) + d_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.11)$$

Table 4.15 show the results of relation between investment of the firm and its predictability for future earnings for three year horizon, (h=3) for every year from 2000 to 2017, results show that relation exist between investment and future earnings for 2010 means only for this year imply that investment is informative in providing foresight for one year ahead earnings for firm, predictability of future earnings and the answer is insignificant for rest of the years, and the relation between current earnings and future earnings show significantly positive results for all the years from 2000 to 2017, future earnings are associated with current performance of firm, has some significant information. Explanatory power for research model is weak for the years, 2001, 2004, and good for the remaining years, F-statistics and p-value are significant for all the years expect for 2004, suggest model was misspecified for 2004.

TABLE 4.15: Investment Informativeness for Earnings Forecasts (Three Year Horizon)

Year	C	CAPX	Et	ADJ R <sup>2</sup>	F-stats	Probab
2000	0.094 (0.122)	0.010 (0.014)	0.175 (0.121)	0.211993	2.189369	0.010303
2001	(0.096) (0.123)	(0.026) (0.015)	0.956 (0.226)	0.389846	3.910683	0.000027
2002	0.247 (0.123)	0.007 (0.015)	1.384 (0.213)***	0.430023	4.311224	0.000009
2003	0.072 (0.209)	0.017 (0.019)	0.392 (0.192)**	0.137024	1.676909	0.065581
2004	0.047 (0.123)	0.011 (0.014)	0.998 (0.185)***	0.407551	4.149893	0.000007
2005	0.098 (0.161)	0.024 (0.017)	1.249 (0.266)***	0.336473	3.455425	0.000069
2006	0.119 (0.116)	(0.005) (0.011)	1.153 (0.184)***	0.538607	6.713875	0
2007	0.249 (0.104)	0.008 (0.013)	1.064 (0.174)***	0.487359	5.553264	0
2008	0.173 (0.118)	(0.000) (0.014)	0.554 (0.258)***	0.26064	2.35442	0.007247
2009	(0.060) (0.097)	0.014 (0.011)	0.897 (0.190)***	0.474315	4.466648	0.000007
2010	0.047 (0.110)	0.024 (0.008)***	0.979 (0.128)***	0.549945	6.59525	0
2011	0.063 (0.118)	0.007 (0.013)	0.535 (0.157)***	0.318569	3.140655	0.000275
2012	(0.000) (0.134)	(0.003) (0.012)	0.911 (0.232)***	0.305064	3.033176	0.000397
2013	(0.034) (0.111)	(0.017) (0.013)	1.091 (0.184)***	0.475279	5.338186	0
2014	(0.075) (0.094)	(0.000) (0.011)	0.092 (0.148)***	0.595323	7.813557	0

## 4.16 Investment Informativeness for Earnings Forecasts (Five Year Horizon)

For five year horizon, value of  $b_{t,h}$  is calculated as:

$$\frac{E_{i,t+h}}{A_{i,t}} = a_{t,h} + b_{t,h} \log \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) + d_{t,h} \left( \frac{E_{i,t}}{A_{i,t}} \right) + e_{t,h}^s 1_{i,t}^s + \epsilon_{i,t,h} \quad (4.12)$$

Table 4.16 show the results of relation between investment and future earnings for next five years, if capital expenditure predict future performance of firm, and the from the table it is shown the results are insignificant for all the years, investment is not able to predict to future earnings for the horizon of five years, investment has little informationa about firm, however results are significant for all the years for current earnings, confirming current earning has significant positive value for this relation for whole sample period except for first years 2000, explanatory power for model is strong for years, 2008 and 2012 as value for Adjusted R-square are high for these years and less value are observed for rest of the years. F-statistics and p-value are significant for all the years except 2003 suggesting model misspecification.

TABLE 4.16: Investment Informativeness for Earnings Forecasts (Five Year Horizon)

Year	C	CAPX	Et	ADJ R <sup>2</sup>	F-stats	Probab
<b>2000</b>	0.245 (0.184)	0.021 (0.022)	0.196 ( 0.182)	0.219537	2.243602	0.008444
<b>2001</b>	(0.007) (0.222)	(0.021) (0.028)	1.502 (0.408)***	0.308549	3.032847	0.000569
<b>2002</b>	0.127 (0.247)	(0.018) (0.031)	1.993 (0.426)***	0.281691	2.721139	0.001884
<b>2003</b>	0.098 (0.394)	0.013 (0.035)	0.721 (0.361)**	0.103023	1.516851	0.114067
<b>2004</b>	0.257 (0.198)	0.008 (0.023)	1.361 (0.298)***	0.256739	3.308801	0.000147
<b>2005</b>	0.283 (0.182)	0.028 (0.020)	1.405 (0.300)***	0.397842	4.199149	0.000004
<b>2006</b>	0.133 (0.218)	(0.010) (0.021)	1.087 (0.343)***	0.345026	3.57844	0.000041
<b>2007</b>	0.308 (0.164)	0.015 (0.021)	1.451 (0.275)***	0.388336	4.040758	0.000008
<b>2008</b>	0.141 (0.140)	0.015 (0.017)	0.956 (0.306)***	0.412853	3.701585	0.000008
<b>2009</b>	0.022 (0.172)	0.024 (0.019)	(1.104) (0.336)***	0.346121	3.033764	0.00072
<b>2010</b>	0.076 (0.249)	0.021 (0.019)	0.958 (0.291)***	0.209984	2.217068	0.008843
<b>2011</b>	0.142 (0.172)	0.030 (0.019)	0.677 (0.230)***	0.281204	2.791356	0.001019
<b>2012</b>	(0.095) (0.127)	0.004 (0.012)	1.013 (0.220)***	0.468861	5.088513	0

## 4.17 Investment Informativeness for Earnings Forecasts

Table 4.17 show the results for informativeness of investment for forecasting variations in future earning from 2000 to 2017, for Pakistan stock exchange at one, three and five years horizon (h=1, 3, 5), results show informativness of investment in terms of forecasting future earnings has enhanced for one year horizon, (h=1) as compare to three and five year horizon (h=3,5) as the result show lower value for one year horizon and higher value for three and five year. Predicted variation of earnings from investment is calculated as  $\sigma_t \left( c_{t,h} \log \left( \frac{CAPX_{i,t}}{A_{i,t}} \right) \right)$  show that lowers the value less is uncertainty surrounding predictability and higher values more uncertain in the forecasting power to explain future changes.

TABLE 4.17: Investment Informativeness for Earnings Forecasts

Years	Agg.Efficiency (h=1)	Agg.Efficiency (h=3)	Agg.Efficiency (h=5)
2000	0.000855	0.014334	0.031445
2001	0.009081	0.035916	0.029066
2002	0.048024	0.010224	0.025944
2003	0.004354	0.024314	0.018852
2004	0.012624	0.016177	0.011753
2005	0.00931	0.036895	0.043509
2006	0.003923	0.007822	0.015468
2007	7.67E-05	0.010171	0.019986
2008	0.011408	0.00043	0.023737
2009	0.013817	0.021254	0.036741
2010	0.007025	0.042952	0.037195
2011	0.009726	0.010001	0.042836
2012	0.002995	0.004917	0.007576
2013	0.001783	0.023506	
2014	0.012191	0.000371	
2015	0.048809		
2016	0.001082		

Figure 4.4 is the graphical representation for investment informativness about future earnings of firms three lines has been plotted representing, one, three and five year ahead predictability,

lines show the less uncertainty in short term results while for medium to long term, values are on higher side, hence less informativeness for three and five years.

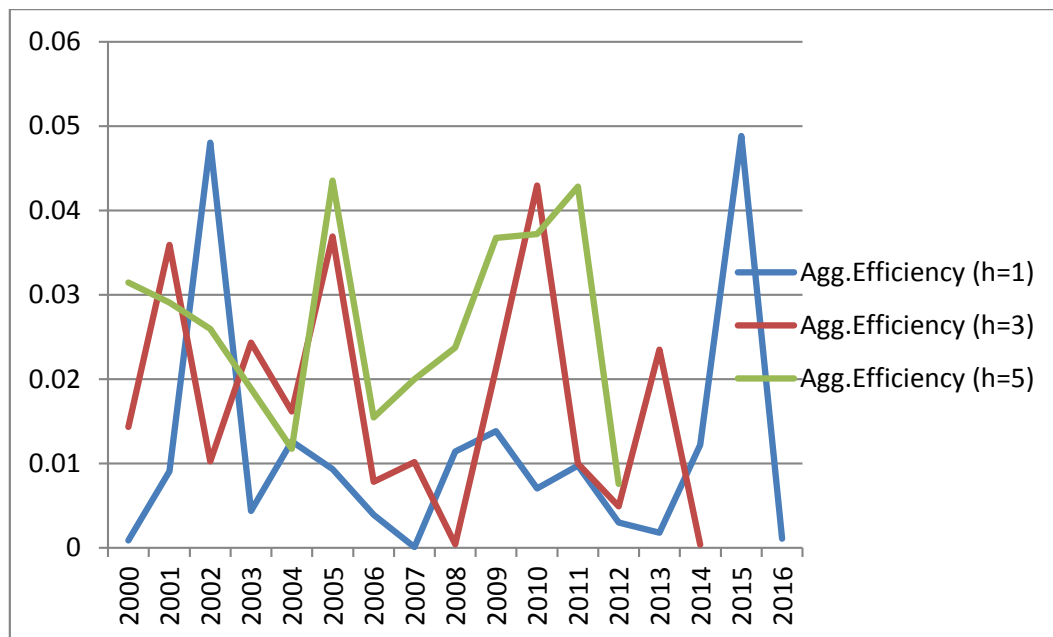


FIGURE 4.4: Investment Informativeness for Earnings Forecasts

This chapter include the results of the analysis run and the interpretations based on these results, four hypotheses has been tested through this analysis, first proposed relation is of stock prices and future earnings, if prices can predict future earnings and the results show that the relation is significant for some years, prices have information about future earnings while insignificant for few years, for those years prices are not informative about future earnings, second proposed relation is between prices and its ability to forecast future changes in investment of firms and same results are observed for this relation as results are significant for some years. Third proposed relation is between prices and its predictability for return and results show that predictability witnessed decline. The fourth hypothesized relation is between investment and its utility in terms of providing foreknowledge on future earnings, insignificant results for all the years in sample period. Overall the objective of accessing the informational role that stock prices serve at different horizon, short plus long term show prices have become more informative at shorter horizon as compare to longer horizon.

# Chapter 5

## Conclusion and Recommendations

Chapter five covers the concluding remarks on the basis of results reported in chapter fourth and recommendations, direction for future research and limitation for the study.

### 5.1 Conclusion

This research study aims to access the informational role of stock prices, in financial markets how prices help to forecast variations in future earnings, investment and return for firms because price informativeness for decision relevant variables is at core of well- functioning financial markets, it helps in the most important function of the financial sector, channel resources to most productive uses, as the literature emphasized that financial innovation bring business revolutions in an economy.

Evidence on the relation between stock prices and future earnings predictability, show that prices have become more informative about future earnings for firms listed at Pakistan stock exchange from 2000 to 2017, however the increase is more pronounced at short term, prices are more informative about predicting short



term future earnings, one year ahead while prices predictability for long term earnings is lower, result are opposite to the study by Bai, Philippon and Savov, (2015) conducted on the firms listed at US stock market, where prices are more informative for long term, as current earning serve as a good estimate for future short term earning, hence if prices are informative for long term it increases the utility of prices informativeness even further, the disagreement between the results can be explained by the status of both market, one is developed market while Pakistan stock exchange is less develop and classified as an emerging market, having some obstacles in way of its efficient operations.

Another informational role prices play in a market and has its implications for economy, it helps in investment decision, confirmed by literature however prices predict investment as it provides managers new information, make their information complete, as market prices aggregates information scattered in market, Tobin(1969), market provide signal for investment decision to managers, which is based on market valuation of company assets and help when prices are informative, reflect all information (Fama,1970) when it comes to predictability of investment from prices for firms at Pakistan stock exchange, results are significant for few years while relation is insignificant for other years and informativeness has shown greater increase at short term over long term as the results for future earnings is showing the same trend, for future earning, but as investment plans involve some time after which it start producing earnings for firms predictability at long term can be more awarding from economic point of view, as in the study by Bai, Philippon and Savov (2015), result are higher for long term, and difference in result can be attributed to again not so developed and efficient market of Pakistan and continuous political unrest, weak legal and judicial systems.

Relation between prices and return is not very much central as it has performed to answer if increase informativeness of prices came from,more informativeness about future payoffs and the second possible explanation, it provide less information on return (Campbell & Shiller, 1988) two prices constituents, hence it is to identify the source of informativeness for prices of firms listed at Pakistan stock exchange,

if this decline has materialized means its prices inability to forecast return, this relation is found to exist for few years while the trend is same, decline is more pronounce at short term over long term of three and five years, fourth relation in the study is, can investment predict future payoffs for the firm or investment has information, about future earnings, as by Bai, Philippon and Savov (2015), however the relation is proved to be significant for very few years means this relation is not prevalent for firm listed at Pakistan stock exchange and it reject the hypotheses that investment reflect the earnings of the firms as firms.

Prices are able to forecast future variations in earnings, investment and return, because prices contain information, information of firm and market, and the extent prices reflect this information determine the efficiency of market, while less informativeness and deviant price behavior for proposed relation can be attributed to the differences in market, developed and emerging markets, and the political risk, weak judicial and legal system can be further explored.

## **5.2 Recommendations**

One overall recommendation on the basis of results derived from analysis for all these variables and their proposed relation is, since this is study is concerned about informational role of stock prices, in relation with future earnings, investment and return, it's for regulatory bodies of stock market, Securities and Exchange Commission of Pakistan (SECP), to bring the changes in markets and financial infrastructure that improve the informational role of prices that standardize the financial market to same level as developed markets, will improve the informational role of prices, should stimulate the information relevant for firm specific and market specific relevant aspects improve information content of prices plus such initiatives should be taken that enhance prices adjustment and reflection of all relevant information.

When it comes to earnings information reflected through stock prices, short term informativeness is greater however as current earnings are good predictor for short term future earnings, hence make this improvement less attractive, if the

informativeness is enhanced for long term, then it would have been more beneficial for investors because according to (Bai, Philippon & Savov, 2015) current earnings are good predictor for one year ahead earnings (short term) and investors can accordingly base their decision hence if prices become efficient, the way developed market prices are, then it will be possible for prices to exhibit that behavior.

When prices are efficient to provide insight on the profitability or attractiveness of investment, it contribute to the economy as whole as it help managers make efficient allocation of resources as investment involves time, one to two years, to generate earnings hence if prices are more informative at long term then it can better give a clear picture of investment opportunities present in market by providing insight on the profitability and desirability for these investment

When financial markets are efficient (Fama, 1970), when prices are informative, can perform its main function with efficiency, help investment decisions, however the market and business condition are subject to huge volatility in Pakistan because of political uncertainty, economic fluctuations bring irrational prices swing and make prices to move less with information on firm specific dynamics, weak legal system and instable law and order situation, less developed financial infrastructure also worsen the situation as it ensure protection of right either minority investors or shareholders having big share in business, are the things where policy makers should pay attention and devise such policies to improve all these factors to fully exploit the informational role of prices and financial markets.

### **5.3 Future Research Direction**

This study answer the question if price informativeness is enhanced, and if it is what is the reason, increase information about the future earnings, and if this increase came from increase disclosure increase traders information as for investment point of view market based or traders information is more important because it affects the information set of managers, there is another question to be answer is that what information matter for aggregate efficiency that can be

measured in the light of changes financial sector or markets has witnessed in recent years like the big changes occurred in recent time, dominant trend of increase institutional ownership, increased market liquidity, that will provide the more comprehensive answer to the informational significance of stock prices for an economy.

# Bibliography

- Bachelier, L. (1900). Théorie de la spéculation. In *Annales scientifiques de l'École normale supérieure*, Vol. 17, pp. 21-86.
- Bagehot, W. (1873). *Lombard Street: A description of the money market*. London: HS King.
- Bai, J., Philippon, T., & Savov, A. (2016). Have financial markets become more informative?. *Journal of Financial Economics*, 122(3), 625-654.
- Banz, R. W. (1980). The relative efficiency of various portfolios: some further evidence: discussion. *The Journal of Finance*, 35(2), 281-283.
- Banz, R. W. (1981). The relationship between return and market value of common stocks. *Journal of financial economics*, 9(1), 3-18.
- Beaver, W., Lambert, R., & Morse, D. (1980). The information content of security prices. *journal of Accounting and Economics*, 2(1), 3-28.
- Bernard, V. L., & Thomas, J. K. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics*, 13(4), 305-340.
- Bernard, V. L., & Thomas, J. K. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics*, 13(4), 305-340.
- Bond, P., Edmans, A., & Goldstein, I. (2012). The real effects of financial markets. *Annu. Rev. Financ. Econ.*, 4(1), 339-360.

- Campbell, J. Y., & Shiller, R. J. (1988). The dividend-price ratio and expectations of future dividends and discount factors. *The Review of Financial Studies*, 1(3), 195-228.
- Choi, J. H., Choi, S., Myers, L. A., & Ziebart, D. (2019). Financial statement comparability and the informativeness of stock prices about future earnings. *Contemporary Accounting Research*, 36(1), 389-417.
- Claessens, S., Dasgupta, S., & Glen, J. (1995). Return behavior in emerging stock markets. *The World Bank Economic Review*, 9(1), 131-151.
- Demirgüç-Kunt, A., & Levine, R. (1996). Stock markets, corporate finance, and economic growth: an overview. *The World Bank Economic Review*, 10(2), 223-239.
- Dimson, E., & Mussavian, M. (1998). A brief history of market efficiency. *European financial management*, 4(1), 91-103.
- Doidge, C., Karolyi, G. A., & Stulz, R. M. (2004). Why are foreign firms listed in the US worth more?. *Journal of financial economics*, 71(2), 205-238.
- Dow, J., & Gorton, G. (1997). Stock market efficiency and economic efficiency: is there a connection?. *The Journal of Finance*, 52(3), 1087-1129.
- Durnev, A., Morck, R., & Yeung, B. (2001). *Does firm-specific information in stock prices guide capital allocation?* (No. w8093). National Bureau of Economic Research.
- Durnev, A., Morck, R., Yeung, B., & Zarowin, P. (2003). Does greater firm-specific return variation mean more or less informed stock pricing?. *Journal of Accounting Research*, 41(5), 797-836.
- Edmans, A., Jayaraman, S., & Schneemeier, J. (2016). The source of information in prices and Fama, E. F. (1965). The behavior of stock-market prices. *The journal of Business*, 38(1), 34-105.
- Fama, E. F. (1991). Efficient capital markets: II. *The journal of finance*, 46(5), 1575-1617.

- Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *the Journal of Finance*, 47(2), 427-465.
- Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International economic review*, 10(1), 1-21.
- Foucault, T., & Frésard, L. (2012). Cross-listing, investment sensitivity to stock price, and the learning hypothesis. *The Review of Financial Studies*, 25(11), 3305-3350.
- Foucault, T., & Gehrig, T. (2008). Stock price informativeness, cross-listings, and investment decisions. *Journal of Financial Economics*, 88(1), 146-168.
- Goldstein, I., & Yang, L. (2015). Information diversity and complementarities in trading and information acquisition. *The Journal of Finance*, 70(4), 1723-1765.
- Goldstein, I., & Yang, L. (2015). Information diversity and complementarities in trading and information acquisition. *The Journal of Finance*, 70(4), 1723-1765.
- Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *The American economic review*, 70(3), 393-408.
- Hayek, F. A. (1941). *The pure theory of capital*. University of Chicago Press..
- Hayek, F. A. (1945). The use of knowledge in society. *The American economic review*, 35(4), 519-530.
- Hicks, J. (1969). *A theory of economic history* (Vol. 9). Oxford: Oxford University Press.
- Jensen, M. C. (1978). Some anomalous evidence regarding market efficiency. *Journal of financial economics*, 6(2/3), 95-101.
- Jensen, M. C. (1978). Some anomalous evidence regarding market efficiency. *Journal of financial economics*, 6(2/3), 95-101.
- Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), 323-329.

- Kaszniak, R., & McNichols, M. F. (2002). Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting research*, 40(3), 727-759.
- Kendall, M. G., & Hill, A. B. (1953). The analysis of economic time-series-part i: Prices. *Journal of the Royal Statistical Society. Series A (General)*, 116(1), 11-34.
- Levine, R. (1996). Stock markets: a spur to economic growth. *Finance and Development-English Edition*, 33(1), 7-10.
- Levine, R. (2005). Finance and growth: theory and evidence. *Handbook of economic growth*, 1, 865-934.
- Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22(1), 3-42.
- Malkiel, B. G., & Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, 25(2), 383-417.
- Marhfor, A., Ghilal, R., & M'Zali, B. (2015). Investment Sensitivity to Stock Prices and Analyst Coverage. *American Journal of Industrial and Business Management*, 5(03), 90.
- Miller, M. H. (1998). Financial markets and economic growth. *Journal of Applied Corporate Finance*, 11(3), 8-15.
- Morck, R., Shleifer, A., Vishny, R. W., Shapiro, M., & Poterba, J. M. (1990). The stock market and investment: is the market a sideshow?. *Brookings papers on economic Activity*, 1990(2), 157-215.
- Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movements?. *Journal of financial economics*, 58(1-2), 215-260.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.



- Ou, J. A., & Penman, S. H. (1989). Financial statement analysis and the prediction of stock returns. *Journal of accounting and economics*, 11(4), 295-329.
- Pesaran, M. H., & Timmermann, A. (1995). Predictability of stock returns: Robustness and economic significance. *The Journal of Finance*, 50(4), 1201-1228.
- Piotroski, J. D., & Roulstone, D. T. (2004). The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and firm-specific information into stock prices. *The Accounting Review*, 79(4), 1119-1151.
- Robinson, J. (1952). The Generalization of the General Theory, in: The Rate of Interest and Other Essays MacMillan, London.
- Robinson, J. (1979). The rate of interest. In *The Generalisation of the General Theory and other Essays* (pp. 135-164). Palgrave Macmillan, London.
- Roll, R. (1988). Presidential address: R2. *Journal of Finance*, 43(2), 51-566.
- Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings?. *Accounting review*, 289-315.
- Stallings, M. A. (2017). Financial Statement Comparability and Investor Responsiveness to Earnings News. *Journal of Accounting & Finance (2158-3625)*, 17(4).
- Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of money, credit and banking*, 1(1), 15-29.
- Tobin, J. (1984). On the efficiency of the financial-system. *Lloyds Bank Annual Review*, (153), 1-15.
- Wang, Y., Wu, L., & Yang, Y. (2009). Does the stock market affect firm investment in China? A price informativeness perspective. *Journal of Banking & Finance*, 33(1), 53-62.
- Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of financial economics*, 58(1-2), 187-214.