

# **Determinants of Stock Price Synchronicity in Pakistan**

By

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**MASTER OF SCIENCE IN MANAGEMENT SCIENCES  
(FINANCE)**



**DEPARTMENT OF MANAGEMENT SCIENCES  
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*This is to certify that **Miss Ayesha Zia** bearing **Registration No. MMS1530** has incorporated all observations, suggestions and comments made by the external evaluators as well as the internal examiners and thesis supervisor **Dr. Arshad Hassan** at Capital University of Science and Technology, Islamabad. The title of her Thesis is: “**Determinants of Stock Price Synchronicity in Pakistan**”.*

*Forwarded for necessary action*

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## ***STATEMENT BY CANDIDATE***

*This thesis includes no material which has been already accepted for the award of any other degree or diploma in any university and confirms that to the best of my knowledge the thesis includes no material previously published or written by another person, except where due reference is made in the text of the thesis.*

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## ***DEDICATION***

***I dedicate my work to my Parents and Sister (Ummara Zia Gillani) who had been an inspiration for throughout my life.***

## ***Acknowledgement***

In the name of Almighty Allah, most gracious, the most merciful,

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# List of Abbreviations

GAAP	Generally Accepted Accounting Principles
IFRS	International Financial Reporting Standards
GLS	Generalized Least Square
KSE	Karachi Stock Exchange
ISE	Islamabad Stock Exchange
LSE	Lahore Stock Exchange
SEO	Search Engine Optimization
NASDAQ	National Association of Securities Dealers Automated Quotations
AMEX	American Express
NYSE	New York Stock Exchange
AIMR	Association for Investment Management Research
ADR	American Depository Receipt
IAAS	International Auditing and Assurance Standard
SNGP	Sui Northern Gas Pipeline Limited
ASRL	Associated Services Limited
HERF	Herfindahl Index
NIND	Number of Firms in an Industry
CAPM	Capital Asset Pricing Model

## Abstract

*Stock price reflect all available information, it includes both firm specific and well as market specific information. It is generally argued that higher the firm specific information reduces the synchronicity of stock prices with the market. The purpose of this study is to explore the company specific factors of stock price synchronization of Pakistani equity market by using the sample consisting 12 years from July 2003 to June 2015. The study employs panel data analysis to explore the relationship. The fixed effect model is selected on the basis of likelihood ratio. The results indicate that increase in market capitalization increases the synchronization of stock prices, whereas increase in market concentration and volatility (STDROA) tend to decrease the synchronization. Dummy analysis of crises period 2008 signifies that the stock synchronicity during crises period is observed not to be different from other periods. Moreover, in order to understand the synchronization of stock prices across different industries, results indicate that there are only two sectors i.e. Cement and Textile whose stock synchronicity is lower than other sectors, which is result of illiquidity of stocks as firms in these industries are usually family owned. Investor in Pakistani stock market should be vigilant regarding market dynamics as well as monitor macroeconomic factors that can affect their investment decision.*

**Key words:** Stock Price Synchronicity, Firm Specific Information, R-Square

# **CHAPTER 1: INTRODUCTION**

# **INTRODUCTION**

## **1.1 Background**

Stock return represents new firm level as well as market level information. The degree to which stock returns co move is therefore, determined by the relative amount of firm level and market level information. Other things remain same, economies that work in institutionally strong environment as well as with proper protection of investor and high quality accounting transparency create more firm specific information which lead to asynchronous of stock prices. While on the other hand, economies that are working in institutionally poor environment with weak investor protection and accounting opacity reduces the level of firm specific information and produce more market and industry level information lead to higher stocks co-movement. There is no solid consensus on the dynamics of stock price synchronicity. The reason behind is that stock price synchronicity is a new concept that it has attracted the attention of researchers in last decade little work has been done in this regard. Some mixed argument related to this aspect are offered.

Results demonstrate which argue, that insider transaction increase the better flow of firm specific information in to stock price, while the other argue that analyst activities result in higher price synchronicity. Some evidences suggest that analyst activates speed up industry specific as well as firm specific news into prices. Institutional and insider trading increase the absorption of firm specific news into stock prices. Firm specific information reduces the level of synchronicity while incorporation of industry level and market level information result in higher level of synchronicity (Piotroski, & Roulstone, 2004).

Moreover, Skaife, Gassen, & LaFond, (2006) argue that R<sup>2</sup> reflect the amount of information incorporated in stock prices. The finding of this study document that in international market variation in synchronicity of stock prices in firms are the results of the level of firm specific information. According to this study zero return metric is better way to capture the differences in environment in which firms are surrounding

as compared to the synchronicity measure. However there is no clarity of whether this zero return metric is proxy for information or liquidity or both.

Another study in developed emerging economies argues that Stock price synchronicity for emerging economies is higher than the developed economies. The study of Morck, Yeung, & Yu, (2000), suggests that main reason for this difference is that, Countries (emerging economies) that provide less/poor property rights, are linked with higher variation in stock price, which ultimately lead to more synchronization in stock prices. These variations are not correlated with fundamentals but due to poor property rights protection. In contrast with developed economies, stronger protection against corporate insider lead to lower synchronicity as better property rights protection may reduce firm specific risk arbitrage attractive in the stock market of such countries. Stock markets of the emerging economies might be less effective in processing economic information as compared to developed economies. Stock market synchronicity in emerging markets may be result of noise trading or political driven changes in property rights. Numb invisible pointers in stock market can poorly allocate capital which ultimate lead to hinder economic growth.

Another study related to emerging economies, by of Chan & Hameed, (2006) reveals that cost related to firm specific information would increase if there is disclosure of poor information and absence of corporate transparency, which lead security analysts to earn from forecast, based on macroeconomic information.

Similarly according to Haggard, Martin, & Pereira, (2008) stock price synchronicity as well as frequency of stock prices crashes effectively reduce in case of voluntary disclosure. Research suggest that for the efficiency of firm capital investment and corporate governance mechanisms, informed stock prices are the essential. Moreover, results demonstrate that investors' access to firm specific information and stock prices become better in disclosure which lead to improved corporate governance and firm investment.

A study conducted by Jin, & Myers, (2006) argue that higher stock price synchronicity (R square) is associated with more crash frequency. In investigating



country average R square and crash frequencies, because they differ across countries and over time, there might be differences in opacity within countries. Some firms have more opaqueness naturally. Larger firms may be more transparent than small. Growth companies which require capital need to be more transparent in order to satisfy investor while conglomerates may be more opaque relatively.

Another important factor that can affect the stock price synchronicity is IFRS or GAAP adoption. A study conducted by Christensen, (2012) states that Voluntary IFRS adoption is linked with reduction in price synchronicity but frequency of IFRS voluntary adoption at global level is lower. Possible explanation can be that advantages of IFRS adoption might be lower than what academics have estimated. According to Christensen, (2012) endogeneity bias likely describes some capital market changes around IFRS adoption. But important task is to estimate the causal effect of accounting standard and its results as well as interpretation must be questioned. Similarly, there is no clarity about the costs of IFRS adoption.

Prior to 2005 in Australia, results indicate that there is less synchronicity of stock prices. But after some time, results show substantial increase in stock price synchronicity and it is observed at highest level at the end of 2008. Possible first explanation of that, increased synchronicity is the result of higher relevance of new accounting regime, as comparability among firms is raised due to confidence in financial reports and market gradually re-evaluated the weight which is placed on firm related information. Another probable explanation is that subjective and firm specific IFRS financial reports lower the comparability and reliability which compels investors to focus on macro-economic factors to evaluate value instead of accounting reports (Bissessur, & Hodgson, 2012).

Talking about stock return synchronicity, the study provides that stock return synchronicity reduces in the year of mandatory IFRS (international financial reporting standards) adoption, while increase in years of post-adoption which is even higher than the pre adoption years. Because IFRS adoption first increase the information flow into formation of stock prices process and after that when future information releases in the market, it resultantly leads to decrease in surprising effect. In addition,

after mandatory adoption of IFRS, analysts' activities lead to higher stock return synchronicity (Beuselinck, Joos, Khurana, & Meulen, 2009).

Another interesting study that investigate the effects of reporting and accounting standards on information element of stock prices and uses synchronicity as informativeness proxy, suggests that at univariate level, relationship between stock price synchronicity and IFRS or GAAP is negative. While at multivariate level, this negative relationship does not exist, especially when they include measures of reporting at investor protection level which demonstrate that IFRS and GAAP adoption is not effective to improve informativeness of stock prices. Moreover high quality accounting standards appear help those countries that have proper reporting incentives. This relationship is negative in case of common law countries (Wang, & Yu, 2009). So these results argue that the information element of stock prices depends on the financial reporting quality, although IFRS or GAAP are seemed as high quality standard but only useful for countries that are concerned about improving the efficiency of their capital market and institutional infrastructure and also strengthen legal environment.

Moreover, China has done enough work to secure strong property rights, better law enforcement and political institutions' liberalization across 31 provinces and provides a unique prospect to investigate the effects of institutions within national territory. Research by Hasan, Song, & Wachtel, (2014) in china to investigate the association between stock synchronicity and province level institutional characteristics suggest that strong property rights and law enforcement along with better political pluralism are linked with higher stock informativeness. Furthermore, for the firms that have more Govt. ownership, better institutions result in higher stock informativeness. The analysis on province level shows unique and convincingly important evidences that stock prices not only incorporate high firm specific information which lead to better and improved capital allocation but political openness also improves institutions that result in significant decrease in stock price synchronicity in emerging economies.

Studies also argue that ownership structure also influences stock prices synchronization as well as firms' information environment. A study is conducted on a

sample of 654 French firms to analyse the effect of controlling shareholders on the synchronicity of stock prices, it provides that control and cash flow rights are negatively associated with the volume of market and industry level information adjusted in stock prices. Because controlling shareholder have the advantage to limit the flow of information (firm specific) to the market to save from external opportunistic behaviour. But at the same time results suggest that controlling ownership lead to more chances of crashes as they hide information to a certain level (threshold point) that may disclose abruptly. Synchronicity and crash of stock prices likely to reduce when controlling ownership have cash flow rights. So concentrated ownership improves that information environment of firm and lead to spreading of firm specific information (Boubaker, Mansali, & Rjiba, 2014).

Similarly, studying the impact of concentrated ownership on firm specific information, Brockman, & Yan, (2009), argue the same that concentrated ownership leads to raise the level of firm specific information incorporated in the stock prices. Inside as well as outside blockholders enjoy the benefit of information against uninformed stockholders. By using three firm specific information proxies, findings provide evidence that the concentrated ownership have substantial effect on firm specific stock returns. Furthermore presence of blockholding leads to informed trading as well as idiosyncratic volatility, so synchronicity is negatively associated with block ownership.

Findings of An, & Zhang, (2013), that analyse the impact of institutional investor on stock prices synchronicity and crash risk, argue that the institutional dedicated/temporary ownership is negatively/positively associated to stock price synchronicity and crash risk of firms. Managers usually hide bad news during hard times of firms, but when bad news hit the market, it leads to stock price crashes. This positive/negative association with dedicated/temporary ownership is consistent with the fact that the level of monitoring by institutional investors diminishes/exacerbated bad news hoarding which lead to crashes when hoarded bad news comes out in the market. Moreover Evidence suggested that the stock price synchronicity effect on liquidity is lower for S&P 500 stock which is higher for non S&P 500 stocks, which

means the degree of information asymmetry is more for non S&P 500 stocks (Kang, Chan, & Hameed, 2008).

According to Xing, & Anderson, (2011), the amount of firm specific information which is impounded into the stock is not only due to publicly available information but also due to private information, because both public as well as private information are reflected in stock prices. According to this research, U-shaped inverse relationship is found between the publicly available firm specific information in market and stock prices synchronicity. Distinguishing the private and public information incorporated into stock prices has importance as it demonstrates demonstrate that the less synchronicity can be more or less public specific information in information environment.

Although literature suggests that better firm's environment is the basis of stock prices to show more firm specific information but an interesting study argues that stock prices react to information which is not predicted by market already. Improved firm's information environment results in availability of more firm specific information, so market participants predictions get improve about future firm specific event and resultantly on the occurrence upon actual event, there is lower surprise elements about stock returns which means higher return synchronicity (Dasgupta, Gan, & Gao, 2010).

### **1.1.1 Pakistan stock exchange:**

The three main stock exchanges exist in Pakistan named as Karachi stock exchange KSE, Lahore stock exchange LSE, and Islamabad stock exchange ISE. KSE is leading stock exchange in Pakistan. It is placed in Karachi and incorporated in 1949. LSE is established in 1970 and ISE established in 1989. After integration of these three markets, it has 559 listed companies presently. Its market capitalization is \$ 75.1 billion till 2015. The indices as KSE-all share index, KSE-100, KSI-30 index, KSE-30 index.

## **1.2 Problem statement:**

The issue of stock price synchronization has attracted the academicians and practitioners during current decade. Some work has been done and published related to various parts of the world. But in Pakistan, little work has been conducted in Pakistani stock market which a completely emerging market. This intent of local and foreign investors in this market requires that this area of research be further explored specially in the context of factors that influence stock price synchronization.

## **1.3 Research question:**

1. What are the determinants of stock prices synchronicity in Pakistan?
2. Whether increase in firm-specific information lead to lower stock prices synchronicity.
3. What is the association between stock price synchronicity and price informativeness?
4. What are the effects of firm and market specific information on the synchronicity of stock prices?
5. Whether stock synchronicity are industry specific?
6. Is the behaviour of stock price synchronization is different during the crises period?

## **1.4 Research Objective:**

1. To provide the insight about the determinants of stock price synchronicity in Pakistan.
2. To explore the difference in stock price synchronicity across industries.
3. To investigate the behaviour of stock price synchronization during crises period.

## **1.5 Significance of study:**

Literature suggests that the co-movement of stock prices are due to market and industry level information, while firm specific information improves the situation. R-Square can be higher for some stocks while can be low for other stocks at same time. Pakistan is an emerging economy and with the passage of time people are more

interested in these emerging markets. In past, Pakistan was the part of global emerging market index and recently Pakistan has become part of this emerging market index again, which reflects the foreign investor' interest in this market. Pakistani stock market has experienced big changes in last decade, there is movement in the stock market as it has been increased from 4000 to 15000 points. Movements of stocks can be due to market factors or due to movement of some stocks in the market. So, foreign as well local investors/practitioners may be interested in more information related to Pakistani emerging market. This study provides additional insight and information in the domain and bridge the gap in context of stock price synchronicity.

Moreover, studies that has been conducted in different markets reveal that each market or industry has its own local dynamics, some elements (market dynamics) may be relevant in one market/industry while may not have much relevance in another market/industry. Academicians are concerned that at one point of time, in a specific market and in a specific industry, market explains one company but does not explain other. This theoretical context is important and requires to analyse the reasons that why this happens.

Similarly, practitioners are interested in efficient resource allocation. As, this aspect of synchronicity of stock prices is getting importance day by day. This information may be helpful for investor in allocating resources in financial markets.

## **CHAPTER 2: LITERATURE REVIEW**

## **LITERATURE REVIEW**

Stock return synchronicity represents the degree to which the firm returns are described by industry or market level returns. Research of Piotroski & Roulstone (2004) explains that how informed participant in the market, institutional investor, financial analysts and insider effect stock (return) synchronicity. Results depict that if all these market participants contribute to the incorporate the industry and market level information to the prices, it will lead to higher stock return synchronicity. On the other hand if all these contestants contribute to firm specific information as well as do not support transfer of intra industry information then results would show less synchronization in stock return. In relation to insider transaction, it is evident that the flow of firm specific information is improved by the insider transaction, while analyst action will lead to higher stock return synchronicity. The research do not indicate the reliable relation between institutional activities and stock return synchronization. Reason behind this positive relation between analyst activities and stock return synchronicity is the transfer of intra-industry information because analyst collect information at industry as well as firm level which lead to influence the prices of all firms in the industry. Evidence also suggests that institutional and insider contribution to incorporate the firm specific information into the prices, which obviously does not influence the overall industry prices, which is the reason for less stock return synchronization. R square technique is used to calculate synchronicity as proposed by Durnev, Morck, Yeung and Zarowin (2003).

Research carried out by Chan, & Hameed, (2006) on the sample of firms taken from 25 countries for the period starting from 1993 to 1999 examines the association between analyst activity and stock return synchronicity in emerging economies. Contradicting to the straight perception that analysts largely involve in producing market wide information. By using R square as the measure of stock price synchronicity of stock movements, stock prices synchronicity is increased with increase analysts' coverage. Study indicates that aggregate variations in earning estimated of higher analyst following portfolio influence the aggregate earnings of all stocks including the stocks with lower analyst following. In comparison, the aggregate variation in the return forecasts of a lower analyst following portfolio have



a slightly projective attribute for the earnings of any portfolio. When the prediction is highly scattered then the influence of analyst coverage is decreased on stock price synchronicity. Results of this research have some implication for analyst activities in developed economies.

Stock analysts do not have any benefit in producing firm specific information as compared to the institutional investors and insiders. Analysis based on emerging economies indicates that bad disclosure of information and high level of opaqueness lead to the higher cost of gathering firm specific information. Security analyst generate their returns prediction of stock on the basis of macroeconomic information.

Moreover, as analyst forecasts provides market wide information, it may have advantage for the analysts to learn from analysts forecasts which are covering different stocks. Amendments in earning prediction in one stock have predictive capability for returns of many other stocks as well.

Another study conducted for the period starting 1984 to 2007 which consists of 2087 SEO's issued by 3574 firms. Research provides the evidence that return synchronicity represent in terms of stock price informativeness by investigating its influence on the prices of seasoned equity offering. As earlier studies indicate that there exists negative association between price informativeness and stock return synchronicity. It means greater stock return synchronicity is the result of less firm specific information incorporated into stock prices. Some other studies argue that this relationship between stock return synchronicity and price informativeness can be positive as well if there is immediate and quick incorporation of stock information decreases idiosyncratic volatility.

Analysis of this research over the period of 24 years indicates that SEO discounts are associated negatively to stock return synchronicity. Results of this study are robust to whether return synchronicity is determined by market factors, both the industry and market factors or by the increasing impact of industry level components. This study suggests that higher stock return synchronicity is the result of greater price informativeness. The inverse association between stock return synchronicity and SEO

discounts is strongest for the companies which have no analyst coverage, and this association is weaker for firm when there exists greater analysts' coverage. So the evidence indicates that information asymmetry is mitigated by analyst coverage. When there is slight analyst coverage, market participants are vulnerable to risk of adverse information in relation with a firm and require higher SEO discounts for the issuers with lower stock return synchronicity. When a firm has strong analyst coverage then problem of information asymmetry is mitigated and SEO stocks can be issued at less discount. Overall, this study contributes to literature with the evidence of positive impact of stock return synchronicity on the stock price informativeness. Moreover, it also provides empirical evidence that greater stock return synchronicity signifies a improved information environment and aids to mitigate the amount of information asymmetry between outside investors and firm's insiders (Chan, & Chan, 2014).

Research carried out by Kelly (2014) try to understand the nature of environment which is surrounding stocks and its association with R square of market model, study needed 52 weeks return of each year. So, for each year ordinary shares which are listed on NASDAQ, AMEX or NYSE with 52 weekly returns are arranged in 10 NYSE breaking point portfolio or sets of stocks based on R square. For each Data starting from 1983 to 2002 is taken to calculate year wise averages for every R square portfolio.

As many studies argue that synchronicity and price informativeness are inversely related to each other, which leads to the strong fact that the firm specific information should have negative impact on market model R square. This study also examines this strong perception by using different techniques and results of all lead to the similar conclusion. Lower R square of market model--higher idiosyncratic volatility—is primarily determined by the reasons other than the private information.

If price informativeness is negatively associated to the R square, then it is expected that there would be more well informed investor or traders and in that situation higher analyst coverage. But this study have different results, stock with low R square are covered by only few stock analysts and more likely to have minor increase in

institutional ownership. This would not be an issue if investors who makes portfolios are capable of return from mispricing, and thereby adjusting prices correctly. However, study finds that stocks which have low R square are smaller and this factor makes these stocks less valuable for investors to trade and consequently these stocks are less frequently traded in stock market making them very tough to trade. In such case, trading costs of these stock get higher which have a negative effect on stock prices and this aspect results in less profitability on stock price.

Another important point which is examined in this study is the effect of private information on stock prices, and the results indicate that private information describes around 14 percent of returns for lower R square stock regression by using weekly data. However, on the other hand over 80 percent of returns of these same stocks continue to be unexplained either by private information or by shared causes of return comovement. Moreover, another finding of this study indicates that stock with high R square have much more private information event frequently than the stocks of lower R square. Contrary to other studies, conclusion of this study recommends that R square is not a great and significant measure of stock price informativeness or information efficiency.

Data of twenty one developed equity markets is analyzed by Skaife, Gassen, & LaFond (2006) for the period of 1990 to 2002 for analysis of stock price synchronization. The study argues that differences in synchronicity of stock prices across countries are due to differences in property rights. Country level R square represents the level of information incorporated in prices and this measure is used to describe the cross country differences in event of interest to accounting and finance researchers. This study is conducted to investigate the authenticity of information based clarification of synchronicity of stock prices in six big equity markets. Results based on these markets suggests that the differences in stock price synchronicity across companies in international markets are outcomes of differences in level of firm specific information.

The analysis focuses the proxies for the companies' private and public information during the mid-1990s and the quality of companies' real information is evaluated through AIMR scores. The study analyses the relationship among AIMR scores and R

Square and zero return metric, and this analysis is done for U.S. only because AIMR scores is mainly available for U.S. Stock market firms. Results indicates that there is positive relation between AIMR score and the R square measure and reason behind this association is that the firms with healthier disclosure according to AIMR has more stock prices synchronicity than companies with lower disclosure. Moreover, another finding is negative relationship between AIMR score and zero return metric, specifying that if forecasters have better disclosure for a stock, are more prone to produce returns.

However their interpretation of zero return metric as the measure to calculate the relative quantity of firm specific information is revealed. Study examines the relationship between zero return metric and average magnitude of returns in different economies. If zero return measure captures the degree to which information related to firm is accruing outside of price making process, there must be a positive relationship between returns magnitude and zero return measure. Results confirms this theory and finds positive association between magnitude of return and zero return measure in analysis for Australia, Japan , Germany U.K and U.S. This result is consistent with zero return metric and captures the relative level of information reflected in the stock returns.

Zero metric return that means the percentage of zero return days which is another comparative measure of firm specific information reflected in the stock prices internationally. Results which are based on the multitude tests concludes that that zero return metric is more beneficial and useful method in calculating the variations in information environments across companies than measure of stock price synchronicity. Various different studies use percentage of zero return days for the measure of liquidity in which the smaller prices represent higher liquid stocks. However the research does not clarify that the zero return metric is incorporated into stock prices as it is used as proxy for liquidity or proxy for information or both at the same time.

Another important aspect which can be reason for effecting the stock price synchronicity is voluntary disclosures by the firms. Research conducted by Haggard, Martin, & Pereira (2008) examine the effect of voluntary disclosure on stock price

synchronicity and the degree of stock price crashes. Their data consist of 2084 firms for the years starting from 1982 to 1995 and the sample is limited to firms for which disclosure data is available in AIMR's annual volume and contains no firm in regulated industries.

The study uses analyst assessments of firm disclosure policy to get objective measure of the firm disclosure policy. Theory explains that in case when firm specific information is absent, the stock prices will fluctuate more with high level of market level information and exhibit higher synchronization of stock prices with the other firms within same industry and the broad market index. Higher disclosure means increased level of firm specific information which is available to market participants then it indicates the negative association between stock price synchronicity and disclosure of firm specific information. Results of this study confirms the negative relation between stock price comovement and high level of disclosure, which means disclosure rises the firm specific information available to investor.

Insiders in the market can benefit themselves by taking the advantage of opaqueness and positive firm specific news to underreport the firms' cash flows and focus on the part of these cash flow. But if bad news related to firm specific continue to stay for more period intervals then it will force the insider to reach at a level where the cost associated to hide bad firm specific information will be higher than the cost of releasing in the market. And when insiders eventually reach at this point, they release all bad firm specific information in the market which will ultimately have the consequences of drastically decline in stock prices soon, when the effect of bad firm specific information incorporated in the stock prices. Resultantly, theory predicts higher degree of negative stock prices decreases for the firms that have more opacity. But if higher disclosure improves the firm specific information which is available to investor then insider will be less expose to firm specific risk as well as chances of stock prices crashes will be reduced. This argument is supported by the result that reports negative association between crash probability and disclosure of firm specific information.

Moreover, results of this study are also in favour of effectiveness of disclosure policy, which leads to reduction in the cost to access the firm specific information and also results in increasing the firm specific information which is incorporated into stock returns. So it is evident by this study that the voluntary higher disclosure efficiently decreases the stock price synchronicity as well as probability of stock price crashes in the market. Because disclosure increase the investor access to the firm related information and improves stock price informativeness, which consequently in turn increases the efficiency of firm investment and corporate governance in the stock market.

Another study is conducted by Kim, & Shi, (2010) to understand the effect of voluntary IFRS adoption by the listed firms. Research has been conducted on the large sample of more than 15000 firms including the firms who adopted IFRS and who did not adopt IFRS, taking form 34 countries for the period of 16 years from 1998-2004. Sample period ends 2004 and reason behind that listed firms in European Union are instructed to adopt IFRS at the start of 2005. In this research, synchronicity is dependent variable and calculated through R square method. Results of this analysis suggest that even after controlling other aspects ( analyst following, reporting frequency, accounting opaqueness, cross listing as well as differences between IFRS and local GAAP), the stock price synchronization is pointedly lower for the firms who adopted voluntary IFRS as compared to the firms which were non IFRS adopter.

Furthermore, results suggest that the market considers full adoption of IFRS to be more reliable to greater disclosures than the partial adoption of IFRS. This findings indicate that the level of stock price synchronicity is reduced meaningfully after the adoption of IFRS as compared to the preadoption period where synchronicity is higher than post adoption period. Another finding indicates that lower synchronization effect is lessened for the companies with high analyst followings, strong institutional infrastructure and poor accrual quality.

Overall their research confirms that voluntary adoption of IFRS incredibly helps the informed traders to gather, process and making decision on specific trade based on firm specific information which definitely leads to significantly reduce the stock price

synchronicity or raise in firm specific information which is incorporated in stock prices.

Although previous studies exhibit that IFRS adoption enhances both the quality and quantity of firm specific information in the stock market, attention is paid to the role of voluntary adoption of IFRS in smoothing flows of firm specific information in the stock market. So this research focuses more on enhanced disclosure of IFRS adoption in a broader way (Kim, & Shi, 2010).

Another important study carried out by Beuselinck, Joos, Khurana, & Van der Meulen, (2009), on the sample of all firms from EU 14 countries for the period of 2003-2007 which includes the 1904 EU companies. With the purpose to explain on the effects of mandatory adoption of IFRS, this study excluded firms that adopted voluntarily IFRS adoption before 2005 and the firms that adopted IFRS after 2007.

This research examines the degree to which mandatory adoption of IFRS influence the flow of information and contribute the stock informativeness during 2005 when IFRS adoption is restricted in EU, and during the post adoption period of 2006 and 2007 in comparison with the pre adoption period of 2003 and 2004. Study reports that stock return synchronicity declines in post adoption time duration as compared to the amount of pre adoption period. But afterwards again increases in post adoption period to the amount even higher than the pre adoption period. These results are consistent to the theory that mandatory IFRS adoption is first expected to improve the flow of private information which is impounded in the stock prices and then subsequently decreases the surprise effects of future information announcements.

Furthermore, analysts' activities lead to higher stock return synchronicity after the mandatory IFRS adoption, which is consistent with idea that IFRS facilitates financial specialists in interpreting and spreading the common news across all companies in the industry. However, study provides the evidence that higher amount of institutional possessions influence stock return synchronicity in a different way during mandatory IFRS adoption or in the post adoption period which indicates that IFRS mandatory adoption does not modify the private information benefit enjoyed by institutional

stockholders. In addition, findings propose that V shape synchronicity impact is more prominent for companies working in economies where local GAAP is different from IFRS. Overall these results make an understanding that how mandatory financial reporting harmonization procedure shapes flow of capital market information as well as distinct role that played by information environment of the firms on this specific process.

A study is carried out in Australian market for the period from 1999 to 2008 and 7661 firm year's observation is taken for this analysis. The study adopts different approach by focusing on the industry and market wide information effects from the compulsory adoption of IFRS in 2005 in Australia. Study exploit a setting in Australia, where voluntary adoption was not allowed before mandatory adoption, and where some economic variables that possibly can affect results are mitigated. Industry results show a decrease and then substantial increase in stock synchronicity which is at higher level during the end of 2008 as compared to prior 2008. This can be explained by two possibilities. First, the result is constant with the comparative objective of IASB structure as a qualitative measure of financial reports. That means greater relevance of accounting regime rises stock price synchronicity, because comparability among firms increases due to high confidence in financial reports and market continuously re-evaluates the weight put on firm specific information. Another possible reason is that IFRS financial reports are subjective or/and extremely firm specific thus leading to reducing comparability and authenticity which compels investors to focus on other macro factors to evaluate value, instead of accounting of reports.

Study has found more evidence on this contradictory arguments by investigating two sets of data of financial analyst prediction errors and found that they are usually lower after IFRS mandatory adoption. Especially the error coefficient during 2008 for both sets of data is pointedly lower which means that increased synchronicity during 2008 had a constructive or positive information effect. For Firms which are followed by analysts (one third of total sample of this analysis), results are in favour of IFRS hypothesis.



Finally, financial analysts are considered a sophisticated extractor of financial information as well as strongly in support of IFRS and accurate value concept. This study can be viewed as restricted, as it supports only information content for probably the highly informed demanders of information. Moreover, either it favours the information content for general market participant or important information gift to market analysts is significant empirical question that is not answered yet (Bissessur, & Hodgson, 2012)..

Study conducted by Dasgupta, Gan, & Gao, (2010) uses the sample taken from SDC (Securities Data Company) for the firms which have issue size more than \$10 million dollars of ordinary share. Right share are excluded right shares because right shares are issued to the existing shareholders. For ADR sample, study includes firm which are covered by WorldSchope database for period starting from 1980 to 2004 and sample of this consists of 20544 firms. The perception that if the information environment of firm is the reason that stock prices represent firm specific information then market variables should describe less changes in the stock return. This research provide another aspects that stock prices react to the announcement of information which is not already predicted by the stock market. If information environment of the firm gets better and produce more authentic firm specific information which is available to the investor than investors' ability to predict the future incidents will get improved. Consequently, the shocking effect on stock return will be lesser on the occurrence of the actual event, and stock return synchronicity will be greater. Empirical results of this study drawn from three setting. First one is, with consistent learning about time invariant information, evidence suggests that stock return synchronicity is substantially greater for the older firms. Talking about other two is that manipulating setting with releasing of significant information related to firm, in ADR and SEO's listing, study has found that there are vibrant reaction of stock return synchronicity which are constant with early and lumpy disclosure of information related to future happening of events, as well as information disclosure relevant to time invariant firm features that have relevance for future cash flows. Specially, stock return synchronicity declines at starting of these future events but rises afterwards.

One concern is that ADR or SEO events may be associated to other substantial corporate events then it is possible that disclosure of information around these happenings, rather than ADR or SEO events, lead to detect changes in stock return synchronicity. It is important to mention that although this hypothesis changes the explanation of results but there is no doubt that there is dynamic pattern in the stock return synchronicity surrounding disclosure of information and that dynamic change is not persistent with the conventional perception. Moreover, timings of other events has to be accurately same as ADR/SEO event otherwise it is not possible to notice the dynamic pattern around the latter, because it is strength of the empirical design.

Thus this Study makes two important contribution to literature, one by displaying that both with the empirical and theoretical evidence that return synchronicity may rises with enhanced firm transparency. Study point out the significance of understanding the type of information detection and dynamics of the reactions of return synchronicity to changes in environment. Other contribution is their analysis contributes to the developing body of literature on disclosure of information about the security issuance occasions.

Ownership structure is important factor which can significantly influence the level of stock price and stock return synchronicity. Study conducted by Boubaker, Mansali, & Rjiba, (2014) on sample of French listed firms for the period of 10 years from 1998-2007 to examine the impact on stock price synchronicity which comes from controlling shareholders.

The findings of this study propose the strong evidence that there is positive and strong association between the cash flow rights and separation of control with the amount of the industry and market level of information incorporated into the stock prices. The finding that the controlling shareholding rights give shareholders an incentive to control the amount of information (firm specific) in the market which helps to keep any opportunistic market participants outside.

Moreover, another factor which is found in their empirical results suggest that firms with controlling ownership are more expose to high frequency of crashes. Reason

behind these crashes is that controlling shareholder limit the amount of information to market and also are able to hide the firm specific information up to a certain level. And when it reaches to a threshold point then bad information hit the market which lead to high frequency of stock price crashes. Another finding concerns to the impact of concentration of cash flow on the synchronicity of stock price ad crash risk. Results indicate that when controlling shareholders own a large portion of cash flow rights then share prices are less synchronous and less exposed to stock crashes. So controlled ownership improves the environment for firm specific information. Another finding of this research is to provide evidence about the importance of corporate structure ownership to explain the stock return behaviour and improve the understanding of corporate governance role in focused or concentrated ownership environment.

Study is conducted by Feng, Hu, & Johansson, (2016) on the sample which includes publically traded all firms on the Shenzhen and Shanghai stock exchange in china for eight years starting from 2005 to 2012.

Results suggests that although continuous increment in disclosure quality and corporate transparency, improvement in corporate governance as well as adoption of IAAS (International Auditing and Assurance Standard) and IFRS, market participants in china still do not trust the quality of financial reports and perceive that these reports do not provide enough financial information. So, regulators must focus on the causes which lead to environment characterized by poor disclosure.

Analysis for the period of 8 years in Chinese market describes that how ownership structure influence the information environment of stocks of listed firms. Concentrated ownership and separation of ownership rights and control lead to agency clashes between minority shareholders and controlling shareholders. Resultantly, controlling shareholders hesitate to disclose firm specific information in the stock market and the reason is to reduce the costs of their full controlling decision rights. So this study analyses the impact of analyst coverage and ownership structure on the return synchronicity. Results suggests that the separation of ownership rights and control positively and substantially accelerate the response coefficient of return

synchronicity on the market analyst coverage. So, at the same level of stock market analyst coverage, with increasing the separation of ownership rights and control leads to rise in the level of stock return synchronicity and even robustness test conforms these results as well. So it can be rule out that noise in trading can be a probable driver behind these findings. An incentive to expropriate fund from the minor stockholders resulting from separation of control rights and ownership improves the level of corporate opaqueness which leads the market analysts to spread market wide information in china. So overall findings indicate direct implication for regulators to focus on the significance of corporate transparency improvement in china and these findings are also helpful to understand the problems in different emerging markets which have almost same firm structures and ownership pattern.

A study carried out by Gul, Kim, & Qiu, (2010) on the non-financial firms of china stock market for the period of 1998 to 2003 which includes 1142 non-financial firms, test that whether the stock price synchronicity is related to firm and institutional level corporate governance in china. Variables for firm level governance, study analyses ownership concentration for major shareholder which means whether the stockholder is associated to government, foreign participant ownership and quality of outside auditor as well. For the level of institution governance, study analyses the differences in investor protection between Shanghai & Shenzhen and Hong Kong market. Results lead to following five main conclusion.

First, evidence indicates that there is concave association between ownership structure and stock synchronicity as concentration rises synchronicity accelerate at a declining rate to its highest threshold, and after that it starts to decrease. Second, if the major stockholder is government related, synchronicity is tend to be high. Third, ownership of foreign investor improves the capitalization of firm related information into the share prices which leads to mitigate stock synchronicity. Fourth, level of stock synchronicity is noticeably lesser for A- share firm with H-share transacted in the market of Hong Kong than the A-share companies with B-share transacted in Shenzhen or Shanghai stock market, indicating that the effectiveness of institution level governance elements influence the degree to which firm related information is impounded into stock prices. Lastly, appointment of the major Big four auditors is linked with low synchronicity, indicating that an important role is played by them in

spreading authentic and firm specific information by lending reliability to financial reports. Strength of firm level governance improves the environment of information in emerging economies where the investor has comparatively poor protection.

The findings of the study provide policy implications to regulators of stock market in emerging economies. One substantial policy objective is the allocation of capital in emerging markets efficiently. This purpose can be attained when share prices track firm fundamental by representing all available and firm specific information in timely and accurate manner. To attain the functional and informational efficiency of markets, improvement of firm level governance is very important just as improvement of country level governance. Results of this study point out that capitalization of firm related information into the share price in emerging economies can be facilitated by lessening concentrated ownership in general, and state level ownership in particular, enhancing audit quality, boosting participation of foreign investor, and improving investor protection at institution level.

A study is conducted by An & Zhang, (2013) to investigate the impact of institutional investors on crash risk of holding companies and stock price synchronicity. For analysis, data is taken from 1987 to 2010 over the period of 23 years in U.S. market which includes 10053 firms. Study focuses on the effect of institutional investors on the crash risk of holding firms as well as on the stock price synchronicity. Results indicates that committed institutional ownership is negatively associated to the stock price synchronicity and vice versa.

Since committed ownership by institutions have the reason to strictly monitor because of long investment horizon and their huge holdings, it is difficult for management to hide and capture cash flow of firm and consequently lower capture reduces R square. In comparison, weak monitoring of uncommitted institutions because of their minor holdings and short term horizon helps the management to capture firms' cash flow which results in greater R square.

Moreover, study indicates that temporary institutional ownership is positively associated with firm's crash risk and vice versa. The positive association between transient ownership and stock crash is constant with the fact that the weak monitoring

by transient institutional investors exacerbates managerial hoarding of bad news which outcome in stock price crashes, when the hoarded bad news is finally disclosed in the stock market.

Jin, & Myers, (2006) investigate the return of all stock for the period from 1990 to 2001 along with dividend and price changes. Data for stock in thirty countries are taken, this study test the hypothesis that whether R square have positive association with the frequency of stock price crashes.

The finding provide that R square in stock market are higher in economies which have less developed financial structure as well as where corporate governance is poor. The reason is the effect of opacity on the division of risk between the outside investor and inside management. Insiders have the opportunity that more opaqueness permits inside manager to focus more on cash flow when firm is progressing well but the bad thing is that, inside managers have to get residual right and bear downside risk. They are able to leave that residual claim and disclose the downside information to the outsiders, but abandoning this choice is very expensive which cannot be implemented very frequently. Reason behind not exercising this option is that, it can lead to the grounds for crashes which may result in huge negative residual return.

Some earlier studies imitated these results for bigger sample as compared to the MYY's findings that confirms this hypothesis that R square and frequency of stock prices crash are positively associated. The study used five measure of opacity and suggest that these five measures help describe both crashes frequency as well as R square, and the results are more direct test for their concept, but these results hold when local stock market volatility is used as a control. But when Kurtosis is used as a control variable, model fails. Moreover, the study does not describe why or how it influence R square significantly. This study only investigates the country average crashes and country average R square because there is variation across countries as well as over time. Similarly there are variation in opaqueness within the countries, explanation behind this reason is that some industries may have more opacity than others. For example firms which have higher trading volume usually are more transparent while firms with lower trading volume are relatively have more

opaqueness. Growth companies which have greater need of capital, may choose to become more transparent to encourage investors while conglomerates may have higher opaqueness than others. Study confirms that crashes transmit firm specific negative news but nature of this news is not investigated in the study. Their perception of bad news is explained as abandoning by insiders, but of course, there may be other reasons of bad news which are firm specific.

Research conducted by Morck, Yeung, & Yu, (2000) by using data of mid 90's for 40 firms to examine the stock price synchronicity in emerging and developed economies. Results of the study indicates that in emerging economies the level of stock price synchronicity is higher than the developed economies. These results are not due to structural features of economies, such as country size, market size, fundamentals variation, economy diversification or the synchronicity of firm level fundamentals. Although some of these factor contribute to the stock return synchronicity but a higher residual effect rests and this remaining effect is associated with the measures of institutional advancement. Moreover, less emphasis on private property by the government is related with high market wide stock price changes which ultimately leads to the more synchronization of stock price movements. As explained earlier, because these market wide variations are not associated with fundamentals, their assumption is that the poor property rights may lead to discourage risk portfolio which creates conditions favourable for noise trading. Because they may be controlling fundamental variability improperly so other possible justification cannot be rule out. Furthermore, the study also present that provision of public stockholder with solid legal protection against the insiders in developed economies are related with lower level of stock price synchronicity.

Moreover, this study proposes that in those countries where government provides strong public property rights of investors can discourage shifting inter corporate income by the controlling stockholders. Improved property rights protection reduces firm specific risk portfolio which is pretty attractive in the markets of these economies. So results clearly indicates that the emerging countries' stock markets may not be useful as variables of economic information than those of the stock markets in developed economies. The purpose of well-organized stock market is to

analyse information and then making best use of capital. But if higher stock synchronization in emerging markets is primarily due to either noise trading or political reasons that changes the property rights, investors may indulge themselves to allocate and invest capital inefficiently which will lead to deter economic growth in the country. Most of interpretations of this study are supported by their findings but some of them are remained conjectures.

A Study is conducted by Hasan, Song, Wachtel, (2014) in china which has included 1012 firms for the period 1998 to 2007 explains the link between stock price synchronicity and institutional ownership. During last 20 years, China has experienced interest changes in the establishment of strong property rights, liberalization of political institutions, and improvement of law enforcement. This research examines whether and how stock price synchronicity is related with institutional characteristics at province level in china.

Institutional Variables at province level have two measure of legal development. These are property rights and political pluralism. Results indicates that enhanced property rights, higher political pluralism, improved law enforcement are related with greater stock price informativeness. Moreover, well institutions have more prominent impact on stock price informativeness for the firms with greater ownership by government and less foreign ownership.

Furthermore, evidence clearly suggests some policy implication for emerging markets which experience greater stock price synchronicity. Because investment and capital allocation efficiency is enhanced if stock prices represent more firm specific information and results of this study strongly convince that improved institutions and political openness are related with decreased stock price synchronicity (Hasan, Song, Wachtel, 2014).

A study carried out by Chan, Hameed, & Kang, (2013) by using data of daily stock returns, number of outstanding shares and daily trading volume Literature has identified that there is negative association between liquidity and volatility, but



association between systematic volatility and liquidity is remained unidentified. This research suggests that the liquidity of individual stock is influenced by stock price synchronization. There are two hypotheses that has been developed in relation to the impact of return synchronicity on liquidity. According to “relative synchronicity” hypothesis, these exist positive association between liquidity of stock and stock return synchronicity. But according to “absolute synchronicity” the influence of systematic volatility on liquidity is not similar form that idiosyncratic volatility. Results have found clear empirical evidence in support of these hypotheses. All three variables of illiquidity i.e. Amihud illiquidity, bid-ask spreads and price impact are increased with stock return synchronicity in case of “relative synchronicity”. While on the other hand, with systematic volatility, stock illiquidity declines with systematic volatility while rises with the idiosyncratic volatility.

However the association cannot be clarified by reverse causality from liquidity to return synchronicity, because study reports almost same positive impact of co-movement of firms’ earnings on stock liquidity. Evidence also indicates that effect on liquidity is not restricted to co movement with market. Higher return synchronicity of stock prices with the industry return have positive substantial impact on liquidity after controlling for market returns. Stock liquidity also improved by bigger volatility industry beyond the impact of market wide volatility. Furthermore, for non S&P stocks, this effect of stock synchronicity on liquidity is higher than those of S&P stocks which means that degree of information asymmetry is greater for non S&P stocks, and study also focused on co movement changes and liquidity when stocks are included in S&P index. Although previous studies treat these liquidity and co movement as two separate issues but this study suggests that these two effects are associated because increase in R square lead to increase the liquidity for stocks when they added to S&P 500 index. So overall findings of this research concludes that stock return synchronicity has strong effects on asset liquidity as well.

Study employ the data for the year of 1996 for Chile for firms listed in Santiago. Data is used to explain the determinants of synchronicity. There is more synchronization of stock prices between two firms when these firms have interlocking directorship. Moreover, sets of firms belonging to a network explained by director interlocking are

probably have more stock return co movement. Study interprets the outcomes as proof that market considers director ties as major reason for highly correlated fundamentals or reason for generating opaqueness of firm specific information. First problem with this interpretation is that the board structure of every company may not be exogenous to firm specific information which creates variation in stock prices. Other factors that may be unobserved can also decide board structure may also be the reason for pair wise synchronization and these aspects can come from other different sources, example of this can be the industry level news. Firms which have directors' interlocks usually belong to the same industry and obviously the industry level news is incorporated in the stock prices of the both interlocked firm due to the existence of shared directors.

The results of the study indicate that the joint control leads to the increase synchronicity of both firms with shared directors. Director interlocks play as much the same role as equity and single owner interlocks play. Similarly interlocking directorship are more likely to create more stock return synchronicity. And even after controlling the common industry shocks, ownership ties and overall return trends, firms which have one or two common directors are noticeably have returns within same direction in any week as well as have greater correlation coefficient. Moreover, firms in same industry are more likely to have synchronous returns. So research have clear evidence that, after controlling the effect of same industry group, interlocking directorate is positively associated with stock synchronicity and this evidence is particularly strong in Chilean market (Khanna, & Thomas, 2009).

Study of (Khandaker, & Heaney, (2008) explains that emerging countries display higher degree of classical stock synchronization during the sample period. Study suggests that measures of classical stock synchronization for developed economies are 62 percent on average, but emerging economies display higher stock synchronicity that is 66 percent. Emerging markets like china, Malaysia and Turkey exhibit highest synchronization of stock during the sample period, more specifically, 73 percent for china and Malaysia and 75 percent for Turkey. Moreover, study also provides the evidence of significant correlation in time series data. Also, this correlation noticeably

higher for countries with common law. The measures of synchronization are stationary during sample period which is consist of 10 years.

Stock price synchronicity is lesser for the economies which are more transparent as compared to lower transparent countries as in case of Australia and Germany. Whereas, Japanese market displays higher stock return synchronicity in relation to other developed economies. The results are constant with the findings of Morck et al.(2000), stock market synchronicity is linked with legal origin of the country. Evidences suggest that the group of post communist countries display more stock synchronicity as compared to the civil and common law countries. Within the group of post communist countries, china displays the highest return synchronicity followed by Poland and Russia.

Lastly, findings indicate that by using measure of classical synchronicity, stock market synchronicity is greater for emerging countries financial markets than developed countries financial markets. Similarly, emerging post communist economies depict higher stock synchronicity than group of emerging countries with common law and emerging group of countries with civil law.

Similarly, study conducted by Khandaker, (2011) also states that values of R squares of developed countries are lower than the emerging countries. This study uses more than 6 million weekly company observations. In addition 12699 companies' data related to three developed economies and eight emerging economies. Evidence indicates that emerging countries display values of R square 0.177, whereas for developed countries values of R square are 0.019 during the sample period. Results signal that emerging countries like Malaysia and China can have hundred percent stock comovement in given week which means having value of R square 1.00. These results are similar to Morck et al. (2000) and Khandaker, & Heaney, (2008). Moreover, it is also evident that Japanese market displays less R square during the full observed period. In addition, analysis of sub period suggests that volatility of market and synchronicity do not capture same facets of market behaviour.

Results specifies that values of R square are lesser in counties which have higher degree of inflation than the countries with lower level of inflation, though findings are not significant statistically. In addition, it is found the evidence that the emerging

economies like Turkey displays more values of R square as well as high inflation level. However, inflation level in Turkey indicates reduction in recent years that also affects values of R square during sub period of 2002-2003 and 2004-2005.

It is also found that the R square and synchronicity are strongly effected by mechanisms of corporate governance. Two mechanisms of corporate governance are used in this study and results presents that “accountability and voice” is associated significantly with the measure of R square values. Countries with higher corporate governance mechanism display lower degree of stock market synchronization, Germany and Japan are examples of it. Economies which do not pay respect to property rights experience higher degree of corruption, which results to be ranked lower in index of corporate governance.

Another aspect that can influences the R square values as well as stock price/market synchronicity is the geographical size of that country. For example, results of analysis indicates that the most of countries conduct their major chunk of trading internally. Large countries usually have structured equity and debt markets that directly effects growth of country like in USA and Australia. While smaller economies usually have small number of large companies in capital market that can influence the financial markets which can lead to high stock price synchronicity. However, it is expected that the impact of geographical size is not significant statistically in this circumstance because of small number of larger counties in sample.

Overall, this study provides the evidence that the stock market synchronicity is greater in emerging economies as compared to the developed economies by using R square measure. In addition, high level of inflation, lower degree of corporate governance, geographical size and inflation results stock price to move same way in emerging counties. Although a large time data of three developed economies and eight emerging counties are used in this study, but it is necessary to recognize country specific characteristic regarding emerging economies synchronous behaviour.

Study carried out by Crawford, Roulstone, & So, (2012) examines how stock synchronicity is effected by analyst initiations in or to decide whether these analysts deliver firm-specific, industry specific or market specific information about stock of the firm they are involved with. Results provides that analyst initiation results in

increasing the synchronicity among companies which have no existing coverage by analysts and take this result as sign that the first report for a company largely provides market and industry specific information. While analyst report for the firms which have existing analyst coverage lead to reduce synchronicity. In case, if more analysts are also focusing a firm, then financial analysts initiate analyst coverage seem to provide more firm specific information. These findings present that information which is provided by analysts based critically on the existence of other analyst coverage. Moreover this study identify the association between analyst imitation and returns by displaying that analyst initiation are significant information events.

These findings are confirmed by verifying that analyst are robust to alternate measure of mix of firm information which is available. For example, this study disaggregate news about earnings into firm and industry specific components and then inspect every component's association with consensus forecast error. New initiations decreases the level of consensus forecast error to the earnings of industry innovations. In contrast, subsequent initiation usually reduces the relation between earnings of firm specific innovations and consensus forecast errors. These results provides the evidence that how type of analysts initiation coverage influences the type of the information which is reflected in forecasts of analysts, thus emphasizing a potential network through which financial analysts influence the mix of industry against with the firm specific information reflected into stock prices.

Study by Farooq, & Ahmed, (2014) examines the effect of corporate governance mechanisms on the synchronization of stock prices in India during the 2006 to 2008. Findings of this research exhibit that better corporate governance mechanisms lead to higher stock price synchronicity during the sample period. For example, results presents that the firms with greater analyst following, less ownership concentration and lower complexity in operations are related with greater stock price synchronicity. These findings are consistent with the Dasgupta et al., (2010), that links better governance and transparency with higher level of synchronicity. This study focuses on association between different proxies for corporate governance mechanisms and stock price synchronicity in relation with emerging economies. One of implication of

these findings is that companies with greater synchronicity (because of better corporate governance) have better performance of firms as compared to the firms who have lower stock price synchronicity. This study indicates the strong relationship between synchronicity and corporate governance.

Finally, a study by Hsin, & Tseng, (2012) which examines the synchronization of stock market of emerging economies and tries to define the phenomena with country specific dynamics. Findings of this study state the outcomes of fixed effect analysis which suggest that in most of economies, firms specific variables are less important as compared to the market level information in stock pricing because holding duration is extended from one to four weeks as the possible result of lagged spill over effect of firm specific information. It also denotes that effects of price from noise trading are not lessened by arbitrage during the four week time period. Second, in emerging markets, stock price synchronicity usually decreases with the economic development of country in relation with personal income, with the development of financial markets in relation with total market capitalization. The evidences suggest that volatility of stock return and market turnover ratio (which serve as the proxies for market's level of speculative trading) are important cross market factors of stock price synchronicity. A market which is highly speculative in nature usually creates more noise trading which lead to incorporate less firm specific information into stock prices, may experience greater stock price synchronicity.

Third, evidence also in favour of the argument that as market becomes integrated less to the world market, certain firm specific fundamental information which is related to global market may be overlooked by local traders, while certain country specific information which is diversifiable globally is still priced. The partial segmentation to the local financial market from world leads to higher stock price synchronicity. Moreover, results signify that co movements of stock prices of most of the sample markets become prominent during down markets. This aspect of asymmetric synchronization suggests that trader may have increased aversion of loss during the bear markets which reduces informed portfolio and resulting in greater stock price synchronization. The asymmetric is also constant with the fact that stocks are likely to react more rapidly to negative macroeconomic news as compared to the positive one.

## **CHAPTER 3: METHODOLOGY**

## **METHODOLOGY**

### **3.1 Data description:**

Data is taken for the firms which are the part of stock market index of Pakistan and registered in KSE 100 companies for the period of 12 years starting from 2003 to 2015. Financial firms are excluded and only non-financial firms are taken for this analysis. Initially 75 non-financial firms are considered as sample but due to non-availability of data of some companies, finally 68 companies are considered as net sample. Either stock prices or financial statements are not available for seven companies.

Stock prices as well as financial statements of ASRL (Associated services limited) are not available. Secondly SNGP (Sui Northern Gas Pipeline Limited) stock prices are not found from any of source. Similarly, FATIMA has to be excluded from the sample because of non-availability of data. So, this study have to reduce number of firms. Synchronicity (SYNCH) is measured from monthly data of stock prices collected from Karachi Stock Exchange. Data of all other variables are collected from the income statement of firms which is available on “balance sheet analysis”. Moreover, the data is secondary in nature.

This study uses the panel data analysis as data is cross sectional as well as time series which includes data of 68 companies of Pakistani stock exchange for 12 consecutive years.

Table 3.1 reports the description of sample for panel data analysis. Total 68 companies from KSE100 are considered as sample and these firms belong to the twenty one different industries. For computing NIND (number of firms in the industry), total number of firms of each sector is mentioned year wise, and last column represents the firms which are part of this study as sample.



**Table 3.1: Sample Description**

S.R	INDUSTRIES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Sample
1	<u>AUTOMOBILE ASSEMBLER</u>	11	11	12	12	12	12	12	12	12	12	12	12	12	4
2	<u>AUTO PARTS</u>	9	9	9	9	9	9	9	9	9	8	8	6	6	2
3	<u>CABLE &amp; ELECT. GOODS</u>	6	6	6	6	6	6	6	6	6	7	7	7	7	1
4	<u>CHEMICAL</u>	20	20	20	20	20	20	23	26	26	26	27	27	27	2
5	<u>FERTILIZERS</u>	4	4	4	4	4	4	4	4	5	5	5	5	5	5
6	<u>FOOD &amp; PERSONAL CARE</u>	16	16	17	17	16	16	16	16	17	17	17	17	17	6
7	<u>LEATHER &amp; TANNERIES</u>	4	4	4	4	4	4	4	4	4	5	5	5	5	1
8	<u>MISCELLANEOUS</u>	15	15	17	17	18	17	18	17	17	17	17	16	15	3
9	<u>OIL &amp; GAS EXPLORATION</u>	2	3	4	4	4	4	4	4	4	4	4	4	4	3
10	<u>OIL &amp; GAS MARKETING</u>	5	5	6	6	6	6	6	6	6	6	6	7	7	3
11	<u>PAPER AND BOARD</u>	6	7	7	7	7	7	7	6	6	6	6	6	6	1
12	<u>PHARMACEUTICALS</u>	7	8	8	8	8	8	8	9	9	9	9	9	9	4
13	<u>POWER GEN. &amp; DISTRIB.</u>	11	12	13	11	11	11	11	11	13	13	12	15	16	5
14	<u>REFINERY</u>	3	3	4	4	4	4	4	4	4	4	4	4	4	2
15	<u>TECH &amp; COMMUNICATION</u>	3	4	7	7	7	7	8	8	8	8	8	8	8	3
16	<u>VANASPATI &amp; ALLIED</u>	2	2	2	2	2	2	2	2	2	2	2	2	2	1
17	<u>GLASS &amp; CERAMICS</u>	7	7	6	7	7	7	8	8	8	8	8	8	8	1
18	<u>CEMENT</u>	17	17	17	17	18	19	20	20	19	19	19	19	19	9
19	<u>TEXTILE SECTOR</u>	199	189	182	181	180	182	167	155	155	155	156	156	157	8
20	<u>ENGINEERING</u>	9	9	9	9	9	9	9	9	9	9	10	10	10	2
21	<u>TOBACCO</u>	3	3	3	3	3	3	3	3	3	3	3	3	3	2
	<b><u>TOTAL # FIRMS IN SAMPLE</u></b>														<b>68</b>

### 3.2. Econometric Model:

To test stock prices synchronicity, the relative flow of firm-specific, industry and market information into prices, this study estimates the following cross-sectional model:

$$\begin{aligned} \text{SYNCH}_{i,t} = & \beta_0 + \beta_1(\text{Current Ratio})_{i,t} + \beta_2(\text{Herf.Index})_{i,t} + \\ & \beta_3 \log(\text{MVE})_{i,t} + \beta_4 \log(\text{Trading Volume})_{i,t} + \beta_5(\text{MB})_{i,t} + \beta_5(\text{NIND})_{i,t} + \\ & \beta_6(\text{ROA})_{i,t} + \beta_7(\text{STDROA})_{i,t} + \mu_{i,t} \quad (3.1) \end{aligned}$$

SYNCH is a measure of stock prices synchronicity of firm-level/industry-level/market level stock prices. HERF is the industry level concentration (i.e. Herfindahl index) of the firm's primary business. The Herfindahl-Hirschman index (HHI) is a commonly known measure of market concentration. It is calculated through squaring the market share of each firm competing in a market, and after then summing the resulting numbers. STDROA is the volatility of firm's earning stream measure which is calculated from last three years' standard deviation of ROA. For market size, log MVE is used i.e. log of market capitalization, NIND is the number of firms listed in the industry, TV is trading volume which is the proxy for liquidity of firm stocks, MB is market to book ratio (the company's market capitalization can be divided by the company's total book value from its balance sheet), ROA (return on asset) which is a proxy for liquidity.

Some variables are firm specific i.e. ROA, Turnover, STDROA and MB, while some are industry specific i.e. HERF (concentration in the industry) and NIND (number of firms in the industry).

#### 3.2.1 SYNCH:

SYNCH is a measure of stock prices synchronicity of firm-level stock prices. For the calculation of the synch variable, monthly prices for each firm and year from 2003 to 2015 are used. Access returns of the stocks are regressed on access market premium by using the following CAPM.

$$R_i = R_f + \beta(R_m - R_f) \quad (3.2)$$

The market model  $R^2$  is estimated and it lies between 0 to 1. The value of  $R^2$  is bounded so, to convert it into continuous variable logistic distribution is used as under

$$SYNCH = \log \left[ \frac{R^2}{1 - R^2} \right] \quad (3.3)$$

### 3.2.2 Return on Asset (ROA):

Return on asset is measure of profitability variable. It is calculated by dividing the net income of the company by its total resources of assets. Net income is calculated by deducting the company's taxes for the year.

$$ROA = \frac{\text{Net Profit after tax}}{\text{Total Assets}} \quad (3.4)$$

Traders in stock markets are more interested in the firms which have higher return on assets or profitability, because profitable companies have more returns, their stocks are traded more frequently and consequently have higher trading volume. This aspect lead to liquidity of stocks in the market and higher synchronicity in stock market.

*It is hypothesized that there is positive association between stock price synchronicity and return on assets (ROA).*

### 3.2.3 Standard Deviation of Return on Assets (STDROA):

Standard deviation of return on asset is the measure of volatility of profits. It is derived by taking standard deviation of last three years' of return on assets. Because at least three figures must be there to calculate standard deviation. So, for this study ROA for 2001 and 2002 is also used to calculate the STDROA for the year of 2003.

There would be positive association between **STDROA** and stock price synchronicity, because high volatility means less firm specific information will be available in the market as owners/mangers do not let firm's information about its bad

condition to spread in the market so firm environment becomes poorer. So, different information gets disseminated in the market and trader rely on information which is available in the market that can lead to high stock price synchronicity.

*It is hypothesized that there is positive association between stock price synchronicity and STDROA.*

### **3.2.4 Herfindahl index:**

The Herfindahl-Hirschman index (HHI) is a most commonly used measure of market concentration. It is calculated by dividing the market share of the each firm competing in a market with total market share of that specific industry.

$$\text{Herf. Index} = \frac{\text{market share of a company}}{\text{Total share of that industry}} \quad (3.5)$$

Higher the level of **HERF** index means that the firm has more market share in the industry and more firm specific information is available. Investors focus more on the firms whose HERF is higher and resultantly information environment becomes richer. So higher HERF Index for the firm is negatively related to stock price synchronicity because investors make decision on the basis of firm specific information instead of market available information.

*It is hypothesized that there is negative association between stock price synchronicity Herf. Index.*

### **3.2.5 Log of Market Value of Equity (LOGMVE):**

Market value of equity is the market capitalization of a company. It is calculated by multiplying the market value of stock price with the total number of ordinary share outstanding of that company. Firstly, yearly stock prices of each company for the month of June is taken and then multiplying with the total number of ordinary shares outstanding.

***Market Value of Equity =  
Market Price of Share \* Number of Shares Outstanding***

**(3.6)**

If larger firms have more diversified operations and trading more in line with the market, there can exist positive relationship between synchronicity and firm size because stock market index move with the movement of bigger firms.

Occasionally in some cases, if larger firms work in richer information environment because of more analyst coverage, so more firm specific information is available, which lead to lower R2 (stock price synchronicity). It means that increase in the firm size will results in decreasing the level of stock price synchronicity.

***It is hypothesized that there is positive association between stock price synchronicity and LOGMVE.***

### **3.2.6 Log of Trading Volume (LOGTV):**

LOGTV is the trading volume of the company. Just as daily share prices are available, similarly only daily trading volume are available. For this study, trading volume are summed for each year ending June. Relationship among **TURNOVER** and R2 should be positive. Reason behind this relationship is that highly liquid stock move stock market index. If any good/bad news disseminates in the market, highly liquid stocks are highly reactive to that news and adjusted accordingly. So stock prices and stock market index are aligned. On the other hand, illiquid stocks do not reactive to market and when any news hits the market, these stocks are not reactive to that new. So there exist direct relationship between trading volume and stock price synchronicity.

There is another explanation of trading volume, if there exist noise trading which means high turnover is unrelated to fundamentals, that relationship between turnover and R2 can be expected to become positive.

*It is hypothesized that there is positive association between stock price synchronicity and Trading Volume.*

### **3.2.7 Market to book value (MB):**

MB is the market value of equity in relation to book value to equity. It is calculated by the following formula;

$$\text{Market to Book value} = \frac{\text{Market value of equity}}{\text{Book value of equity}}$$

(3.7)

Big companies are the part of stock market index, if market to book ratio of a company is higher, it means that market values this company highly. This aspect increases the visibility of this company in stock market. Resultantly, stock prices of this company will align with the stock market index.

*It is hypothesized that there is positive association between stock price synchronicity and MB.*

### **3.2.8 Number of Firms in the Industry (NIND):**

NIND is the number of firms in an industry. This study divided the stock market into 21 sectors. These are auto assembler, auto parts and accessories, cable and electrical goods, chemical, engineering, fertilizers, food and personal care product, lather and tanneries, oil and gas exploration companies, oil and marketing companies, paper and board, pharmaceuticals, power generation and distribution, refinery, technology and communication, Vanaspati and allied industries, glass and ceramics, cement, textile, tobacco and miscellaneous sector. If industry is wider then it has more media coverage and more industry specific information is available to traders. Which means more traders are involved in this sector and stock prices are aligned to the stock market. On the other hand, small sector cannot dictate the stock market.

Stock market decides the index on the basis of market capitalization/size of the companies, not on sectorial basis. It is possible that there may be a sector which have high number of smaller companies, then even a big industry with high number of

smaller companies cannot qualify to stock market index due to its small size of the companies. Resultantly, higher the number of firms may reduce the synchronicity of stock prices.

*It is hypothesized that there is negative association between stock price synchronicity and NIND.*

### **3.2.9 Current Ratio (CR):**

In this model, Current ratio is taken as the measure of liquidity for a company. It is derived by dividing the total number of current assets with its current liabilities.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (3.8)$$

*It is hypothesized that there is significant association between stock price synchronicity and Current Ratio.*

## **3.3. Scheme of Data Analysis:**

### **3.3.1 Descriptive Statistics:**

Descriptive statistics is to explore the statistical behaviour of data. Firstly, this study estimates the mean, median and mode of the variables. Mean is the average of all figures or number and is also called arithmetic mean. In order to calculate mean, add all of the numbers in a set and after then dividing the sum with the total count of numbers. Statistical median refers to the middle number in the set of numbers. In order to find median, form each number according to size and the number appears in the middle is median. Mode refers to the number that appears most within the set of numbers.

Standard deviation is mostly used measure of dispersion. It is used as measure of spread for data about mean. Standard deviation is square root of sum of squared deviation from the mean and divided with the total number of observation.

According to statistics, skewness is measure of asymmetry of probability distribution of a real value random variable about its mean. Values of skewness can be negative or

positive or even undefined. The qualitative interpretation of skew is unintuitive and complicated.

Finally, in statistics, Kurtosis is a measure which is used to define the distribution or skewness of data around mean. It is sometimes referred as volatility of volatility. Kurtosis is commonly used in statistical field to define inclinations in charts. Moreover, kurtosis can be present in charts with fat tails low, even distribution as well as with skinny tails and a distribution concentrated towards mean.

### **3.3.2 Correlation Matrix:**

Secondly, correlation analysis is performed to identify the multicollinearity among variables all independent variables. Multicollinearity is a situation where two or more independent variables in multivariable regression are highly correlated, which means that one can predict the other linearly with the significant degree of accuracy.

### **3.3.3 Panel Data Analysis:**

Thirdly, this study uses the panel data analysis as it has cross sections as well as time series data, as defined earlier, requires the selection of model in panel data analysis. Panel data analysis be estimated by using three types of different models, i.e. with a common constant (common coefficient model), fixed effect model and random effect model.

Common constant method presents results according the principal assumption that there is no difference among data matrices of cross sectional dimension. It means that the model calculate the common constant for all cross sections. In case of this study, common constant for all 68 companies of KSE100 index for the period July 2003 to June 2015.

F-statistics is used to select between common coefficient model and fixed effect model. If results of F-statistics is insignificant for fixed effect model, then analysis used the assumption of common coefficient model.

In fixed effects method, constant is taken as group specific. It means that model permits different constant for each of the group. This fixed effect estimator is also called least squares dummy variable estimator, as it allows different constant for each group. This can be explained by following model:



$$Y_{i,t} = \beta_0 + \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \beta_3 X_{3i,t} + \beta_4 X_{4i,t} + \beta_5 X_{5i,t} + \dots + \beta_k X_{ki,t} + \mu_{i,t} \quad (3.9)$$

For this study, it is written in following from:

$$\begin{aligned} SYNCH_{i,t} = & \beta_0 + \beta_1 (Current\ Ratio)_{i,t} + \beta_2 (Herf.\ Index)_{i,t} + \beta_3 \log(MVE)_{i,t} \\ & + \beta_4 \log(Trading\ Volume)_{i,t} + \beta_5 (MB)_{i,t} + \beta_6 (NIND)_{i,t} \\ & + \beta_7 (ROA)_{i,t} + \beta_8 (STDROA)_{i,t} + \mu_{i,t} \end{aligned} \quad (3.10)$$

In selection between common coefficient and fixed effect method, if F-Statistics is significant for fixed effect model, it means fixed effect model is better than common coefficient model. In this study, panel analysis is performed under the assumption that fixed effect model.

F-statistics is:

$$F = \frac{(R_{FE}^2 - R_{CC}^2) / (N - 1)}{(1 - R_{FE}^2) / (NT - N - k)} \sim F(N - 1, NT - N - k) \quad (3.11)$$

Where  $R_{FE}^2$  is coefficient of determination for fixed effect while  $R_{CC}^2$  is coefficient of common coefficient model.

Finally, third method of estimating a model is random effect model. Difference of random effects model from the fixed effects model is that it deals the constants for each section not as fixed but as random parameters. Random effects model takes the following form:

$$\begin{aligned} 1. \ Y_{i,t} = & (a + v_i) + \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \beta_3 X_{3i,t} + \beta_4 X_{4i,t} + \\ & \beta_5 X_{5i,t} + \dots + \beta_k X_{ki,t} + \mu_{i,t} \end{aligned} \quad (3.12)$$

$$\begin{aligned}
2. Y_{i,t} = & \\
& a + \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \beta_3 X_{3i,t} + \beta_4 X_{4i,t} + \beta_5 X_{5i,t} + \dots + \beta_k X_{ki,t} + \\
& (v_i + \mu_{i,t})
\end{aligned}
\tag{3.13}$$

Where,  $\beta_0 = a + v_i$ ,  $v_i$  is a zero mean standard random variable.

In case of this study, following model is suggested:

$$\begin{aligned}
1. SYNCH_{i,t} = & (a + v_i) + \beta_1 (Current\ Ratio)_{i,t} + \beta_2 (Herf.\ Index)_{i,t} + \\
& \beta_3 \log(MVE)_{i,t} + \beta_4 \log(Trading\ Volume)_{i,t} + \beta_5 (MB)_{i,t} + \\
& \beta_6 (NIND)_{i,t} + \beta_7 (ROA)_{i,t} + \beta_8 (STDROA)_{i,t} + \mu_{i,t}
\end{aligned}
\tag{3.14}$$

$$\begin{aligned}
2. SYNCH_{i,t} = & a + \beta_1 (Current\ Ratio)_{i,t} + \beta_2 (Herf.\ Index)_{i,t} + \\
& \beta_3 \log(MVE)_{i,t} + \beta_4 \log(Trading\ Volume)_{i,t} + \beta_5 (MB)_{i,t} + \\
& \beta_6 (NIND)_{i,t} + \beta_7 (ROA)_{i,t} + \beta_8 (STDROA)_{i,t} + (v_i + \mu_{i,t})
\end{aligned}
\tag{3.15}$$

Houseman test is performed in order to make choice between the random effect and fixed effects models. This test is based on the notion that, according to hypothesis of no correlation, both of GLS and OLS consistent but OLS is inefficient. While according to the other OLS is consistent, but at the same time GLS is not.

$$H = (\beta^{FE} - \beta^{RE})' [Var(\beta^{FE}) - Var(\beta^{RE})] (\beta^{FE} - \beta^{RE}) \sim \chi^2(k)
\tag{3.16}$$

### 3.4 Financial Crises and Stock Price Synchronization:

In this study, three analyses are performed in order to identify the determinants of stock price synchronicity in Pakistan. First analysis reports the variables that affect

the stock price synchronization. Second analysis uses a dummy of year 2008 crises year, when Pakistani stock market were crashed to understand, either 2008 crises have any effect on stock price synchronicity which is different from other periods or not. Following model is used to identify the synchronization of stock price during 2008:

$$\begin{aligned}
 \mathbf{Synch} = & \beta_0 + \beta_1(\mathbf{Current\ Ratio})_{i,t} + \beta_2(\mathbf{Herf.\ Index})_{i,t} + \beta_3\log(\mathbf{MVE})_{i,t} \\
 & + \beta_4(\mathbf{NIND})_{i,t} + \beta_5(\mathbf{ROA})_{i,t} + + \beta_6(\mathbf{STDROA})_{i,t} \\
 & + \beta_7(\mathbf{CRISES2008})_{i,t} + \mu_{i,t}
 \end{aligned}
 \tag{3.17}$$

### 3.5 Stock Price Synchronization across Industries:

And lastly, this study reports the industry wise analysis to understand that, is there synchronicity of stock price of any industry in KSE is different from other sectors? For this purpose, this study divided all firms in big 13 sectors and MISC sector is taken as reference. Equation for this analysis is as follows:

$$\begin{aligned}
 \mathbf{Synch} = & \beta_0 + \beta_1(\mathbf{Current\ Ratio})_{i,t} + \beta_2(\mathbf{Herf.\ Index})_{i,t} + \beta_3\log(\mathbf{MVE})_{i,t} \\
 & + \beta_4(\mathbf{NIND})_{i,t} + \beta_5(\mathbf{ROA})_{i,t} + + \beta_6(\mathbf{STDROA})_{i,t} \\
 & + \beta_7(\mathbf{INDUSTRIES})_{i,t} + \mu_{i,t}
 \end{aligned}
 \tag{3.18}$$

## **CHAPTER 4: DATA ANALYSIS & DISCUSSION**

## **DATA ANALYSIS AND DISCUSSION**

### **4.1 Descriptive Statistics:**

Table 4.1 reports the values of mean, median, maximum and minimum, Standard Dev., skewness and kurtosis of all independent variable.

Average STDROA of sample during the period is 5.26, maximum STDROA during this period is 88.6% while minimum STDROA is 2.7%. Average variation in STDROA is observed as 6.97% while data is found positively skewed and Value of Kurtosis is 77.26%. As value of kurtosis is more than 3 so we can say that the data is peaked. While JB test indicates that data is not normally distributed. Average of number of firms in the industry in this sample during the period is 30.1, maximum number of firms in an industry are 199 while minimum number of firms in an industry during the period are 2. Average variation in number of firms is observed 52.32 while data is positively skewed and Value of Kurtosis is 6.54. Value of kurtosis is more than 3 which indicate that the data is peaked and JB test indicates that data is not normally distributed.

In this study, Average of market to book ratio of sample during the period 2.42, maximum market to book ratio observed during the period 4.34% while minimum market to book ratio is -3.34%. Average variation in MB is observed as 3.7% and data is found positively skewed. Value of Kurtosis is 41.7, which is more than 3 so we can say that the data is peaked. Lastly, JB test suggests that data is not normally distributed. Similarly, average log of trading volume is 16.6, maximum trading volume observed during this period is 23.5 while minimum trading volume is 6.907. Average variation in trading is observed as 3.27. Data of LOGTV is negatively skewed and Value of Kurtosis is 2.303. As value of kurtosis is less than 3 which suggests that the data is flat and JB test indicates that data is not normally distributed.

Average of log of market value of equity is 9.1, maximum market capitalization during the period is 13.9 while minimum is 3.25. Average volatility in capitalization is observed as 1.7% while data is found negatively skewed. Value of Kurtosis is 3.58, which means data is marginally peaked and data is not normally distributed. Moreover, average concentration (Herf. Index) of sample during the period 20.43458, maximum concentration level during the period is observed 98.35494 while minimum

concentration during the period is 0%. Average variation in concentration level is observed 19% while data is found positively skewed. Value of Kurtosis is 11.5237, which is slightly higher than 3 so we can say that the data is marginally peaked. Lastly, JB test indicates that data is not normally distributed.

Average Current ratio of sample during the period is 2.226394 times, maximum current ratio during the period is 95.55, while minimum is 0.206. Average volatility in current ratio is observed as 5.39936. Data is found positively skewed and Value of Kurtosis is 11.5237. Data of Current Ratio is peak and not normally distributed. Lastly, average return on asset of the sample during the period is 13.30725, maximum profit earned during the period is 68.8 while minimum loss incurred during the period is 141.2. Average volatility in the profit is observed as 13.76% while data is found negatively skewed and Value of Kurtosis is 23.29425. Data is peaked and not normally distributed as well.

Table # 4.1: Descriptive Statistics

	<b>CR</b>	<b>HI</b>	<b>LOGMVE</b>	<b>LOGTV</b>	<b>MB</b>	<b>NIND</b>	<b>ROA</b>	<b>STDROA</b>
<b>Mean</b>	2.226394	20.43458	9.126907	16.68097	2.427338	30.18194	13.30725	5.269107
<b>Median</b>	1.405	13.18591	9.300503	16.80918	1.499532	12	11.45729	3.747641
<b>Maximum</b>	95.55	98.35494	13.93218	23.50727	40.34266	199	68.8	88.67136
<b>Minimum</b>	0.206	0	3.259634	6.907755	-3.34294	2	-141.2	0.027325
<b>Std. Dev.</b>	5.399363	19s.31451	1.749305	3.277405	3.72601	52.32088	13.76892	6.974415
<b>Skewness</b>	11.5237	1.25519	-0.38797	-0.32220	5.486876	2.311869	-1.38465	7.433108
<b>Kurtosis</b>	159.9104	4.125137	3.58819	2.303249	41.7989	6.547906	23.29425	77.26692
<b>Jarque- Bera</b>	812201.7	244.3841	30.61449	29.08598	52499.08	1096.838	13547.18	185243.7
<b>Probability</b>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

## 4.2 Correlation Matrix:

Table # 4.2 reports the correlation between all independent variables to check that if there is problem of multicollinearity exist among these variables. First, the correlation between LOGMVE and HI is 0.371743, LOGTV and LOGMVE is 0.371743, which is highest among all, MB and LOGMVE is 0.379581, HI and LOGMVE is -0.3774 and between ROA and LOGMVE is 0.315767. Relationship between all these variable is significant but this relationship is not high enough which can create or rise the problem of multicollinearity. While correlation between HI and CR is negative and 0.099. There is negative and insignificant correlation between LOGMVE and CR. Correlation between LOGTV is CR is negative and 0.12 LOGTV and HI is positive and 0.12 as well. While, there is negative and insignificant correlation between MB and CR, MB and LOGTV, but positive and insignificant between MB and HI. Similarly, correlation of NIND with CR, LOGMVE, LOGTV and MB is negative and insignificant. Return on asset (ROA) correlation with CR, LOGTV and NIND is negative and insignificant, while positive with HI and MB. Lastly, there is found positive and insignificant correlation between STDROA and CR but negative and insignificant between STDROA and all remaining variables. Overall, correlation results do not indicate any higher correlation among independent variables and all are within tolerable limit.



Table 4.2: Correlation Matrix

	<b>CR</b>	<b>HI</b>	<b>LOGMVE</b>	<b>LOGTV</b>	<b>MB</b>	<b>NIND</b>	<b>ROA</b>	<b>STDROA</b>
<b>CR</b>	1	-0.09949	-0.22497	-0.1282	-0.06225	-0.0451	-0.06877	0.254882
<b>HI</b>	-0.09949	1	0.371743	0.122326	0.205569	-0.3774	0.160228	-0.0564
<b>LOGMVE</b>	-0.22497	0.371743*	1	0.432882	0.379581	-0.2325	0.315767	-0.02461
<b>LOGTV</b>	-0.1282	0.122326	0.432882*	1	-0.14747	-0.1235	-0.11439	0.081389
<b>MB</b>	-0.06225	0.205569	0.379581*	-0.14747	1	-0.1501	0.210226	-0.01837
<b>NIND</b>	-0.04517	-0.3774*	-0.23259	-0.12353	-0.15011	1	-0.1824	-0.06845
<b>ROA</b>	-0.06877	0.160228	0.315767*	-0.11439	0.210226	-0.1824	1	-0.11188
<b>STDROA</b>	0.254882	-0.0564	-0.02461	0.081389	-0.01837	-0.0684	-0.11188	1

### 4.3. Determinants of Synchronization:

Determinants of stock price synchronicity are explained by using the following econometric model.

$$\begin{aligned}
 SYNCH_{i,t} = & \beta_0 + \beta_1(Current\ Ratio)_{i,t} + \beta_2(Herf.Index)_{i,t} \\
 & + \beta_3 \log(MVE)_{i,t} + \beta_4 \log(Trading\ Volume)_{i,t} + \beta_5(MB)_{i,t} \\
 & + \beta_5(NIND)_{i,t} + \beta_6(ROA)_{i,t} + \beta_7(STDROA)_{i,t} + \mu_{i,t}
 \end{aligned}
 \tag{4.1}$$

Table 4.3 Fixed Effect Redundancy Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.389914	-66,700	0.0262*

F-statistics is used to decide and make choice between fixed effect model and common coefficient model. Table 4.3 reports the value of F-Statistics that is 0.0262 which is significant. F-statistics indicates the fixed effect model is better than random effect model. Resultantly, this study uses fixed effect model.

Table 4.4: Determinants of Stock Price Synchronization (Fixed Effect Model)

Variable	Coefficient	t-Statistic	Prob.
C	-4.415066	-9.184339	0.0000
CR	-0.005276	-0.260182	0.7948
HI	-0.011777	-2.579354	0.0101*
LOGMVE	0.158653	2.530822	0.0116*
LOGTV	0.017641	0.713339	0.4759
MB	-0.003231	-0.137987	0.8903
NIND	-0.002286	-1.437214	0.1511
ROA	-0.001872	-0.313609	0.7539
STDROA	-0.018166	-1.791042	0.0737**

Adjusted R-squared	0.023427
S.E. of regression	2.295422
F-statistic	3.320977
Prob (F-statistic)	0.000963
Durbin-Watson stat	1.946446

Table 4.4 reports the results of stock prices synchronicity, fixed model is used to explain the impact of independent variables on stock price synchronicity. Value of Intercept is (0.0000) which is significant, that represents the indication of omitted variables. It means there are few variables which are examined in this study, while there can be other factors that can also affect the stock price synchronicity. These can be macro-economic factors, industry related variables as well as company specific variables that affect synchronicity of stock price. First variable that effects the stock prices is Herfindahl Index, i.e. is 0.0101 which is a significant value, that means there is significant relationship between Herfindahl Index and stock synchronicity. Its coefficient is -0.011777, so negative sign indicates inverse or negative relationship between Herfindahl index and synchronicity. Reason behind this relationship is that financial analysts focus more on companies which have higher Herf. Index. Consequently, information environment of firm becomes richer and more firm specific information is available to investors. Investors make their investment decision on the basis of firm specific information rather than market specific information which lead to lowering the stock price synchronicity.

P-value of log of market capitalization (LOGMVE) is 0.0116 which also represents a significant value. That means LOGMVE influences the stock price synchronicity significantly. Its coefficient is 0.158653 and sign is positive. There exist positive relationship among LOGMVE and SYNCH, companies which have high market capitalization usually have more synchronization of stock price as compared to the other low capitalization companies. Reason behind this relationship is that higher market capitalization companies are the part of stock market index. Stock market

Index and prices of these companies move together which results in higher stock price synchronicity.

Third, standard deviation of return on assets (STDROA), which is taken as measure of volatility, its Prob. is 0.0737 which represents the significant relationship between stock price synchronicity and STDROA and its coefficient is -0.018166. Negative coefficient indicates that there is negative relationship between STDROA and stock price synchronicity

Finally, P-value of current ratio (CR) is 0.80 approximately, 0.4759 for log of total volume (LOGTV), 0.8903 for market to book ratio (MB), 0.1511 for number of firms in the industry (NIND) and P-value of return on assets (ROA) is 0.7539. All these value represent insignificant association between stock synchronicity and these independent variables. It means these independent variables do not have any significant effect on stock price synchronicity.

Adjusted R-square value is 0.023427. Explanatory power of model is low which is usually on lower side in these type of studies.

F-statistics tells about the problems related to goodness of the fit of the model. Prob F-statistics is 0.000963 which means there is no problem in the model. Lastly, the Durbin-Watson stat indicates if there is any problem of autocorrelation. As value is 1.946 which is closer to 2, that means the problem of auto correlation is solved.

#### 4.4. Synchronization in Crises period 2008:

In this analysis, a dummy of crises period for the 2008 is created to understand, if stock synchronicity is different for crises year from the other periods. Model for this analysis is given below:

$$\begin{aligned}
 SYNCH_{i,t} = & \beta_0 + \beta_1(Current\ Ratio)_{i,t} + \beta_2(Herf.\ Index)_{i,t} \\
 & + \beta_3\log(MVE)_{i,t} + \beta_4(NIND)_{i,t} + \beta_5(ROA)_{i,t} \\
 & + + \beta_6(STDROA)_{i,t} + \beta_7(CRISES2008)_{i,t} + \mu_{i,t}
 \end{aligned}
 \tag{4.2}$$

Table 4.5 reports that the value of F-Statistics which is 0.0631 and significant at 90% confidence interval that indicates the fixed effect model is better than random effect model for this test.

**Table 4.5 Fixed Effect Redundancy Test**

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.2971	-66,701	0.0631*

Table 4.6 reports the analysis of dummy crises 2008 to understand that either crises year 2008 in which stock market crashed, has any significant effect on the stock price synchronicity or not. This study dropped the Current ratio (CR) and market to book ratio (MB) because of the problem of adjusted R-square value. Prob. value for dummy of crises year 2008 is 0.2173 which is not within 95% confidence interval. It means there is no significant relationship between stock price synchronicity and CRISES2008. During this period, synchronization of prices is not different than other periods. It is general perception that there must be some changes in market behaviour during crises period. But regarding synchronization, no different behaviour is observed during this period concerning stock price synchronicity.

As observed in previous determinants of synchronicity analysis, this dummy analysis also have three independent variables that effect the stock price synchronicity. Herfindhal index p-value is 0.0165, as value is within 95% confidence interval suggests that there is significant association between herfindhal index and stock price synchronicity and value of its coefficient is -0.010745. Negative sign represents the

inverse relation between them. Similarly, Prob. value of standard deviation of return on assets (STDROA) is 0.0454 which is less than 0.10 and its coefficient is -0.019537, which suggests there exist negative and significant relationship between return on assets. As return on assets increases the synchronization of stock prices decreases. Lastly, P-value of log of market capitalization (LOGMVE) is 0.0052 which is also within the confidence interval. Coefficient of LOGMVE is 0.14222 which suggests that there is direct and positive relationship between them.

**Table 4.6 Global Financial Crises Period Stock Price Synchronization (Fixed Effect Model)**

<b>Variable</b>	<b>Coefficient</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	-4.235994	-9.183394	0.0000*
HI	-0.010745	-2.403969	0.0165*
LOGMVE	0.14222	2.799927	0.0052*
LOGTV	0.013799	0.584274	0.5592
NIND	-0.002122	-1.349728	0.1775
ROA	-0.00186	-0.313497	0.754
STDROA	-0.019537	-2.00395	0.0454*
CRISES2008	-0.337523	-1.234849	0.2173

Adjusted R-squared	0.020357
S.E. of regression	2.286361
F-statistic	3.297654
Prob(F-statistic)	0.001834
Durbin-Watson stat	1.959104

All other variables i.e. LOGTV, NIND and ROA are not within 95% confidence interval which indicates that there is no relationship between stock price synchronicity and these variables. Lastly, intercept P-value is 0.0000, which is significant and indicates the case of omitted variables that can affect the stock price synchronicity.

Adjusted R-square value which is 0.020357 Explanatory of model is low which is usually on lower side in these studies as stated earlier.

F-statistics indicates if there is any problem related to goodness of the fit of the model. Prob F-statistics is 0.001834 which suggests that there is no problem in the model regarding the goodness of the fit. Finally, the value of Durbin-Watson stat is 1.959104 which is closer to 2, it indicates that the problem of auto correlation is resolved for this analysis.

#### 4.5. Stock Price Synchronicity across Industries:

To capture the behaviour of stock price synchronicity across industries, this study divided all firms into 14 sectors to analyse the industry behaviour for synchronicity.

**Table 4.7 Stock Price Synchronicity across Industries:**

Variable	Coefficient	t-Statistic	Prob.
C	-4.337613	-6.641925	0.0000
HI	-0.007674	-1.359243	0.1745
LOGMVE	0.140037	1.969402	0.0493
LOGTV	-0.015267	-0.411244	0.681
NIND	0.02217	1.618246	0.106
ROA	0.003041	0.425747	0.6704
MB	-0.051298	-1.907708	0.0568
STDROA	-0.007056	-0.570948	0.5682
AUTO_ASSEMB	-0.020345	-0.050116	0.96
CEMENT	-0.91825	-2.205749	0.0277
CHEMICAL	-0.24647	-0.524923	0.5998
ENGINEERING	0.534005	1.052279	0.293
FERTILIZERS	-0.33981	-0.695335	0.4871
FOODCARE	0.19317	0.49635	0.6198
OIL_EXPLORATION	0.146365	0.280474	0.7792
OIL_MARKETING	0.396662	0.801044	0.4234
PHARMA	0.103121	0.240868	0.8097
POWER_GENERATION	0.506642	1.059273	0.2898
REFINERY	0.159405	0.29479	0.7682
TECHNOLOGY	0.456197	0.819539	0.4127
TEXTILE	-3.919692	-1.798562	0.0725



Table 4.7 reports the industry wise analysis of stock price synchronization to check that is there any industry whose synchronization behaviour. Total 13 industries are taken to run this analysis. Result suggests that out of these thirteen industries only two industries' results are different from other industries. CEMENT and TEXTILE industries behaviour is found to be different. Prob. Value of TEXTILE industry is 0.0725 which is significant at 90% confidence interval and its coefficient is -3.919692, negative coefficient suggests that stock price synchronicity in TEXTILE sector is lower than other industries. Similarly the P-value of CEMENT sector is 0.0277 which is also lower than 10%. Again, its coefficient is -0.91825, which indicates that as in TEXTILE sector, stock price synchronization is also lower in CEMENT industry. Reason behind that lower synchronicity in TEXTILE sector is due to lower trading volume. Because these companies are smaller than in comparison with other sectors. Companies which have higher market capitalization qualify for stock market index. Resultantly, smaller textile companies do not become the part of stock index. So, there is less co-movement of stock prices in market. While bigger industries may have higher stock synchronization as compared to small industries. Moreover, all other industries' behaviour is found to be not different.

## **CHAPTER 5: CONCLUSION & RECOMMENDATIONS**

## **CONCLUSION AND RECOMMENDATIONS**

### **5.1 Conclusion:**

The purpose of this study is to identify the determinants of stock prices synchronicity in Pakistan, difference in industries' behaviour in relation with stock prices synchronicity and the behaviour of stock price synchronization during the crises period. Usually, three types of variables effect synchronicity of stock price, these are industry specific, firm specific and macroeconomic. This analysis includes the firm specific variables, but industry specific and macroeconomic factor are not considered. Sample period consists of 12 years and using the data of 68 non-financial companies of KSE100.

Firstly, results for the analysis regarding determinants of stock price synchronicity indicate that out of eight independent variable; only three independent variables are significantly affect the stock prices synchronization in Pakistan. These variables include STDROA (as measure of volatility), LOGMVE (log of market capitalization) and Herf. Index (proxy for market concentration). The hypothesis of positive association of STDROA and stock price synchronicity is rejected. Results indicate that there is negative association between STDROA and synchronicity. It means increase in STDROA by 1% will decrease stock synchronicity by -0.018166. This aspect must be considered important while making investment decision by the traders. Furthermore, hypothesis of positive association between LOGMVE and stock synchronicity is accepted, there is direct relationship between LOGMVE and synchronicity and reason is that firms with higher market capitalization can influence strongly stock market index and more aligned with market so, bigger companies and stock market index co-move more together. These results are consistent with Piotroski and Roulstone 2004, which suggests that larger firms potentially have more diversified business operations, leading these firms trading high in line with the market, and resultantly in a positive association between firm size and the R2 measure. Lastly, it is hypothesized that there is inverse association between Herf. Index and synchronization of stock price. Results signifies in favour of hypothesis, there exist negative association between Herf. index and synchronicity, as increase in 1% in market concentration will reduce synchronicity by -0.011777. More market

concentration means more firm specific information available in market because, traders focus more on firms who's Herf. Index is higher and consequently information environment becomes better and investors make decision on the basis of firm specific information rather than industry or market specific information which lead to reduce the level of stock price synchronicity. All other variables do not indicate any significant relationship with stock price synchronicity.

Secondly, in order to understand the behaviour of stock price synchronicity during the crises period 2008 is taken as crises period and a dummy is created in which all other years data is taken as zero and year 2008 as 1. Results of dummy analysis show that the stock price synchronicity does not indicate any different behaviour in crises period in relation with other years. It is general perception that there may be change in market behaviour during the crises period. But regarding synchronization, no different behaviour is observed concerning stock price synchronicity.

Lastly, industry wise analysis to understand the industries' behaviour of stock prices synchronisation, for this purpose all 68 companies are divided into 14 sectors in which miscellaneous industry is considered as reference. Results describe that out of 13 industries, only textile and cement industry behaviour is found significant. Coefficient of both industry suggests that stock synchronicity is significantly lower for both of the industries. Reason is obvious that the textile and cement industry have higher number of small firms in which market capitalization of firms are lower than other industries. As companies with higher market capitalization are able to influence the stock market index so, smaller firms are not able to dictate the market which lead to lower the stock price synchronicity in these industries.

This study contributes to the existing literature by identifying the determinant of synchronicity in Pakistani market. Local and foreign Practitioners and investor can use this information while making investment decision and analysing Pakistani stock market. As this study uses factors that are firm specific, there are industry specific as well as market specific (macroeconomic factors) variables which can also effect the stock price synchronicity. These aspect requires an insight to understand the impact on stock price synchronization. Further research can be done regarding this aspects of market specific and industry specific variables

## **5.2 Recommendations:**

1. Investor should be vigilant regarding companies that have instable profits as returns are responsive to company specific information and market based information is less preferred.
2. Stock prices of big companies respond to market specific information. So, investors should be vigilant and monitor market dynamics while investing in the company. Secondly, better estimate for expected returns can be made on the basis of behaviour of market.
3. High concentration level leads to lower R-Square. So companies with high concentration are priced on the basis of firm specific information and market fluctuations have less influence on the prices.
4. Stock price synchronization of textile and cement sector is on lower side. These industries are generally family owned and illiquid so, investor should be careful that these may not follow the market trends.
5. The global crises may not impact on the synchronization of Pakistani equity market that is indication of possible independence of these stocks.

## **5.3 Directions for Future research:**

The future research should consider the impact of corporate governance and macroeconomic dynamics of the country on stock price synchronization. Similarly the study is focused on stock price synchronization; the determinants of market synchronization should also be explored in macroeconomic context.

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