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Informational Role of Stock Price Synchronicity: Evidence from an Emerging Market

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A Thesis Submitted to

The Department of Management

in partial fulfillment of the requirements for

the degree of Master of Science in Finance

by Moataz Mohamed Magdy Hamouda

(under the supervision of Dr. Omar Farooq)*

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ABSTRACT

The informational role of price synchronicity, the degree of co-movement a stock has with the entire market, has been the subject of investigation in this research. More precisely, the lead-lag relationship between stocks which exhibit high price synchronicity (high R^2) and low price synchronicity (low R^2) was studied using a VAR model. In testing the hypothesis that high R^2 stocks lead the low R^2 stocks, all the listed stocks in Bombay Stock Exchange (BSE) from January 1999 to December 2012 were examined and portfolios of equally weighted and value weighted High R^2 (HS) and Low R^2 (LS) were formed. It was found that both the equally weighted and value weighted high R^2 stocks lead the low R^2 stocks and not vice versa. Additionally, it was found that the high R^2 stocks lead the returns of the entire market.

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CHAPTER I

INTRODUCTION

Imagine having a crystal ball at your disposal which can tell you with a high level of accuracy how certain stocks will behave tomorrow! The ability to predict stock returns in the ever unpredictable stock market can give investors with this new foresight a huge advantage over the rest. This research is based on one simple premise: some stocks are more informative than the rest of the stocks in the market so they can act as a crystal ball or, more scientifically, as a weather forecast for tomorrow's climate. If investors pay particular attention to those stocks, then they will be capable to identify certain opportunities or avoid certain threats before it is too late.

In efficient markets it is assumed that stock prices reflect all the relevant future information. Theoretically, this means that all the probable cash flows generated by the firm in the future discounted by the appropriate discount rate taking into consideration the firm's risk. The only way to constantly know the actual value of a certain stock is, therefore, limited by the amount of relevant information disclosed by the firm itself. For that reason we almost always find two types of stocks traded in the market: firms with good corporate governance mechanisms which reveal relevant information continuously, and firms with bad governance which do not.

From a statistical perspective, stocks can also be classified into stocks with returns highly correlated with the market returns (high price synchronicity) and others with little or no correlation whatsoever (low price synchronicity). A great deal of publications in the literature links between revealing of information by firms (price informativeness) and price synchronicity.

This research project adds to the debate on which of the two – low stock price synchronicity or high stock price synchronicity –is the measure of price informativeness.

Does incorporation of higher proportion of firm-specific information in prices mean higher price informativeness or vice versa? Our results show that information originating from portfolio consisting of firms with high synchronicity not only predicts returns of market but also predicts returns of portfolio consisting of firms with low synchronicity. We argue that marginal investors in firms exhibiting high synchronicity are, generally, institutional investors (Kelly, 2007). These investors have ability, resources, and incentives to gather and interpret firm-specific as well as market-specific information. As a result, they are able to make prices of firms held by them more informative relative to other firms. It may be the reason behind why returns of these firms are able to predict returns of the market and returns of firms with low synchronicity.

The remainder of the thesis is structured as follows: Chapter 2 briefly presents motivation and background for this study. Chapter 3 summarizes the data. Chapter 4 presents assessment of our hypotheses and Chapter 5 document robustness of our analysis. Chapter 6 presents discussion of our results and the paper ends with Chapter 7 where we present conclusions.

CHAPTER II

LITERATURE REVIEW

The notion of price synchronicity and its implications has been a source of huge debate in the Corporate Governance (CG) literature for quite some time.

2.1 Definition:

Most of the literature concerned with price synchronicity uses the R^2 statistic between a certain stock returns and a market index returns. However, some exceptions like Chan and Chan (2014) calculate price synchronicity as the logit transformation of the R^2 statistic calculated from a two factor regression model where R^2 has two components: the market and the industry.

We define price synchronicity as the degree of co-movement stock returns have with respect to the entire market. The most common way of measuring price synchronicity is via the coefficient of determination (R^2) between the stock returns and the market index.

2.2 Literature supporting high price synchronicity as a measure of better CG:

The majority of researchers (Chan and Hameed, 2006; Dasgupta et al., 2010; Claessens and Yafeh, 2011; Farooq and Ahmed, 2014) believe that high price synchronicity, measured by high R^2, is associated with both better governance and high transparency than low price synchronicity stocks. That is: firms with better governance exhibit higher price synchronicity than others in the market. In addition, Chan and Hameed (2006) and Claessens and Yafeh (2011) argue that as the level of analyst coverage increases price synchronicity of stocks increases as well. It has been generally accepted in corporate governance literature (e.g. Michaely and Womack, 1999; Chen and Steiner, 2000) that analyst coverage is an important mechanism for improving stock's transparency and information flow. For US stocks, Barberis et al. (2005) found that a stock's addition to the S&P 500 index increases the stock's synchronicity because this event results into

improving the firm's information environment. In another research, which further bolster the above findings, Kelly (2007) found that low price synchronicity reflects poor corporate governance and flow of information.

Further investigating the relationship between price synchronicity and corporate governance, Dasgupta et al. (2010) maintain that firms with good corporate governance mechanisms enhance the forecasting abilities of investors. This is attributed to the fact that in efficient markets stock returns respond mainly to unexpected events while the market wide information is already incorporated in the stock price. Consequently when transparency increases, investors are more capable to forecast firm-specific risk. Through constant awareness via corporate disclosure, investors are unlikely to frequently change the stock price by altering their future expectations much, making the stock more correlated with the market, hence the higher price synchronicity.

By studying 5,087 Seasoned Equity Offerings (SEO's) in NASDAQ, NYSE and Amex, Chan and Chan (2014) found that the SEO discounts, which investors require to mitigate against any unknown risk managers may hide from the investors, are negatively related to the price synchronicity of the stock. That is investors require lower discounts from high synchronicity stocks and higher discounts from the other stocks indicating the better transparency and price infromativeness of high synchronicity stocks.

2.3 Literature supporting low price synchronicity as a proxy of better CG:

Few researchers, though, like Hutton et al. (2009) and Gul et al. (2010), postulate that low R^2 values should determine better transparency and not vice versa. In their opinion, the more a certain firm reveals firm-specific information the more it becomes less correlated with the rest of the herd, the rest of the market, hence the lower its R^2 value.

Hasan et al (2014) claim that pluralistic regimes (e.g. China) aid to reduce the price synchronicity of stocks because it reduces the uncertainty and opaqueness regarding government intervention and therefore increase the value of firm-specific information which will consequently reduce the price synchronicity.

On the contrary of the findings of Hasan et al (2014), Eun et al (2014) found that stock prices co-move more (higher price synchronicity) in culturally tight and collectivistic countries (e.g. China) and co-move less (lower price synchronicity) in culturally loose and individualistic countries (e.g. USA). The findings of Eun et al (2014) indicate that culture is a usually omitted variable in studying price synchronicity.

Hsin and Tseng (2012) found out that high price synchronicity is usually noticed in bearish markets as lots of investors become loss-averse during that period. Cheng et al (2014) confirm the findings of Hsin and Tseng (2012) in their study of the change in R^2 of stocks corresponding to the revealed information by the firms in the Chinese market and inferred that the market is more reactive to bad information than good information. Hence, price synchronicity of stocks increases during periods marked with great losses.

2.4 The role of institutional investors in high R^2 stocks:

Related to the issue of forecasting abilities aroused by Dasgupta et al. (2010) is the level of sophistication and skill of the investors. Individual investors usually don't possess a high degree of financial dexterity to adjust their forecasts based on newly released information, however, institutional investors do. We argue that institutional investors have the necessary skill and sophistication to interpret and use the disclosed information by firms and this makes them more prone to investing in high price synchronous stocks.

Confirming with our premise, in his research Kelly (2007) found that institutional investors are the dominant investors in high price synchronous stocks. Gaining dominant shareholdings in those stocks make institutional investors take the role of the marginal investor in them. Because institutional investors have huge capital to invest under their disposal, then the portfolio they own is almost always a diversified one which obliterates the firm-specific risk resulting into the market risk being the only priced risk by the institutional investors. For this reason, most of the stock returns variation is attributable to the market variation, hence the higher price synchronicity.

Regarding the informational role of institutional investing, He et al (2013) found in their study that Large Foreign Ownership (LFO) is positively correlated with price

informativeness. Indicating that institutional investors have a significant contribution in the process of information disclosure of the stocks they hold, or it is the other way around that institutional investors prefer to invest in corporations which exhibit high information disclosure and transparency. Further, the researchers found that price informativeness is stronger in developed economies where better corporate governance mechanisms exist like investor protection rights and transparency.

On the topic of large investors in developed economies and price synchronicity, Boubaker et al (2014) found after studying a unique set of 654 listed French companies that price synchronicity increases when the controlling shareholders have more controlling rights than cash flow rights and vice versa.

2.5 Hypothesis

In this research project we argue that information flow is highly impacted by the above-mentioned two reasons namely, good corporate governance and having institutional investors as the marginal investor. We further argue that the returns of high price synchronicity stocks should lead the low price synchronicity stocks returns because they reflect information faster. This lead-lag relationship can be explained as follows: better corporate governance and owning a large share by institutional investors result in not only the better gathering of information but also better information interpretation and usage. Hence, our hypothesis is that returns of high price synchronicity stocks should lead the returns of low price synchronicity stocks.

CHAPTER III

DATA

This research documents the informational role of stock price synchronicity in India during the period between 1999 and 2012. Specifically, we opted for Bombay Stock Exchange (BSE) for two reasons: first, it is an example of an emerging market. Second, it has large number of listed stocks that can be used in testing our hypothesis. The data downloaded was composed of total 2394 stocks listed in BSE. Our measure of stock price synchronicity is derived from Morck et al. (2000). As a first step, we estimate the following regression with return of stock 'i' during week 't' ($R_{i,t}$) as a dependent variable and return of market index 'M' for the same week ($R_{M,t}$) as an independent variable. It is important to note here that, similar to Morck et al. (2000), we estimate the following equation for those firms for which we have at least 40 weekly observations of returns in a year. The weekly, **daily** stock prices and volumes were obtained from Datastream, while Reuters Eikon is used to get corresponding values for market index (BSE-100).

$$R_{i,t} = \alpha + \beta(R_{M,t}) + \varepsilon_{i,t} \quad (1)$$

The coefficient of determination (or R^2) obtained from the estimation of the above equation is the measure of synchronicity. The higher the measure of synchronicity, the greater is the proportion of returns explained by the market. We use the synchronicity (or R^2) to categorize firms in two groups. The first group (HS) consists of firms that have synchronicity in the top two deciles and the second group (LS) consists of firms that have synchronicity in the bottom two deciles. We compute daily equally-weighted and value-weighted returns for both portfolios. Table 1 documents the descriptive statistics for both portfolios.

Table 1: Descriptive statistics for portfolio with high synchronicity and portfolio with low synchronicity

Following table documents the descriptive statistics for the returns of the portfolio with high synchronicity and portfolio with low synchronicity in India. The sample period is from January 1999 to December 2012.

	Equally-Weighted Portfolio		Value-Weighted Portfolio	
	High Synchronicity	**Low Synchronicity**	**High Synchronicity**	**Low Synchronicity**
Mean	0.00049	0.00001	-0.00101	-0.00082
Median	0.00000	0.00000	0.00000	0.00000
Standard Deviation	0.01323	0.01984	0.01714	0.02281
Skewness	0.30603	-0.19371	-1.45201	-0.32003
Kurtosis	3.76435	2.84519	17.74040	3.12060
No. of Observations	3643	3643	3643	3643

Table 2: Descriptive statistics for portfolios with equally weighted low synchronicity stocks from 1999-2012

Following table documents the descriptive statistics for the returns of the portfolio with low synchronicity in India. The sample period is from January 1999 to December 2012.

	99	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**
No. of Stocks	66	53	42	65	91	124	166	215	244	244	253	290	281	277
Mean	0.003	-0.001	-0.002	0.000	0.002	0.001	0.001	0.001	0.003	-0.003	0.001	0.000	-0.001	0.000
Median	0.000	-0.002	-0.001	0.000	0.000	0.001	0.000	0.000	0.001	-0.002	0.001	0.001	-0.001	0.000
Standard Deviation	0.019	0.014	0.017	0.016	0.016	0.013	0.019	0.008	0.011	0.010	0.005	0.006	0.004	0.003
Skewness	0.636	0.164	-0.038	0.161	0.497	0.155	-0.095	-0.021	0.373	-0.564	1.030	-0.618	-0.082	-0.025
Kurtosis	1.889	0.702	2.137	1.008	1.666	0.278	0.824	1.078	1.997	1.141	3.278	3.922	1.208	1.470
No. of Observations	259	260	260	260	260	261	260	260	260	261	260	260	260	261

Table 3: Descriptive statistics for portfolios with value weighted low synchronicity stocks from 1999-2012

Following table documents the descriptive statistics for the returns of the portfolio with low synchronicity in India. The sample period is from January 1999 to December 2012.

	99	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**
No. of Stocks	66	53	42	65	91	124	166	215	244	244	253	290	281	277
Mean	0.000	-0.0029	-0.004	-0.002	0.002	-0.000	0.001	0.000	0.003	-0.005	0.000	-0.002	-0.003	-0.000
Median	0.000	-0.0020	-0.003	0.000	0.000	0.000	0.000	0.000	0.002	-0.003	0.000	0.000	-0.002	0.000
Standard Deviation	0.020	0.0160	0.015	0.015	0.017	0.020	0.018	0.019	0.011	0.019	0.013	0.023	0.013	0.007
Skewness	0.367	-0.1904	-0.193	-0.225	0.318	-1.025	-0.336	-6.937	-0.002	-2.502	0.205	-1.582	-0.189	-0.245
Kurtosis	1.790	0.2837	0.306	1.770	0.810	4.368	0.807	86.589	1.389	20.347	3.415	10.167	8.405	1.550
No. of Observations	259	260	260	260	260	261	260	260	260	261	260	260	260	261

Table 4: Descriptive statistics for portfolios with equally weighted high synchronicity stocks from 1999-2012

Following table documents the descriptive statistics for the returns of the portfolio with high synchronicity in India. The sample period is from January 1999 to December 2012.

	99	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**
No. of Stocks	65	60	45	64	95	123	169	218	243	243	252	290	281	276
Mean	0.003	-0.002	-0.002	0.000	0.002	0.001	0.001	-0.000	0.002	-0.005	0.002	0.000	-0.002	0.000
Median	0.000	-0.004	-0.000	0.000	0.000	0.001	0.002	0.000	0.002	-0.001	0.000	0.001	-0.000	0.000
Standard Deviation	0.027	0.022	0.028	0.021	0.019	0.020	0.019	0.018	0.012	0.024	0.017	0.012	0.012	0.007
Skewness	0.370	0.155	-0.030	0.201	0.353	-0.837	-0.759	-0.956	-0.615	-0.611	0.400	-1.016	-0.112	-0.121
Kurtosis	0.737	0.132	1.351	2.375	0.878	2.523	1.811	3.796	2.068	1.534	2.714	3.624	1.871	0.673
No. of Observations	259	260	260	260	260	261	260	260	260	261	260	260	260	261

Table 5: Descriptive statistics for portfolios with value weighted high synchronicity stocks from 1999-2012

Following table documents the descriptive statistics for the returns of the portfolio with high synchronicity in India. The sample period is from January 1999 to December 2012.

	99	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**
No. of Stocks	65	60	45	64	95	123	169	218	243	243	252	290	281	276
Mean	0.003	-0.004	-0.004	-0.001	0.000	0.000	0.000	-0.000	0.001	-0.006	0.001	0.000	-0.002	0.000
Median	0.000	-0.000	-0.000	0.000	0.000	0.001	0.000	0.000	0.003	-0.002	0.000	0.001	-0.000	0.000
Standard Deviation	0.033	0.038	0.034	0.022	0.019	0.020	0.018	0.018	0.013	0.024	0.018	0.012	0.013	0.009
Skewness	0.182	0.069	-0.367	0.047	0.482	-1.155	-0.875	-0.982	-0.713	-0.684	0.121	-0.989	-0.329	-0.148
Kurtosis	0.507	-0.493	1.221	2.404	0.610	5.064	2.924	3.092	1.433	1.790	2.042	3.353	1.262	0.934
No. of Observations	259	260	260	260	260	261	260	260	260	261	260	260	260	261

CHAPTER IV

METHODOLOGY AND RESULTS

To start we downloaded all the listed stocks in Bombay Stock Exchange (BSE) using Datastream. For those stocks we obtained the weekly prices from which the weekly returns were calculated. To insure that our sample does not have illiquid stocks or stocks with lots of missing data we applied the following selection criterion: we omit any stock with less than 40 non-zero returns in any given year.

Chapter 2 argues that portfolios consisting of firms with high stock price synchronicity are more informative than portfolios consisting of firms with low stock price synchronicity. As a result, returns of these portfolios ($RET_{HS,t}$) should lead the returns of portfolios with low stock price synchronicity ($RET_{LS,t}$). In order to test this conjecture, we use the following bivariate VAR regressions. The VAR methodology is traditionally employed to investigate the lead-lag relation between portfolio returns (Brennan et al. 1993; Chuang and Lee, 2011). Chuang and Lee (2011) argue that the returns of portfolios that are first to reflect information will predict the returns of portfolios that reflect information later.[1]

$$RET_{LS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1}\right) + \beta_{HS}\left(RET_{HS,t-1}\right) + \varepsilon_{LS,t} \quad (2)$$

And

$$RET_{HS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1}\right) + \beta_{HS}\left(RET_{HS,t-1}\right) + \varepsilon_{HS,t} \quad (3)$$

[1] We would like to mention the Akaike information criterion (AIC) and the Schwarz information criterion (SIC) is used to determine the appropriate lags to be used in the VAR regressions. Incidentally, the appropriate lag came out to be one in all regressions.

The results of our analysis are reported in Table 6. Our results show that returns of portfolio with high synchronicity (HS) are able to predict returns of portfolio with low synchronicity (LS). We report significantly positive coefficient of $RET_{HS,t-1}$ in Equation (2). We also show that the converse does not hold – returns of LS do not predict returns of HS. We report insignificant coefficient of $RET_{LS,t-1}$ in Equation (3). Our results in Table 2 also indicate that returns of portfolio with high synchronicity Granger-cause returns of portfolio with low synchronicity. However, the opposite does not hold. We report significant chi-square values for tests showing that returns of HS Granger-cause returns of LS and insignificant chi-square values for tests showing that returns of LS Granger-cause returns of HS.

Table 6: Informational role of stock price synchronicity
Bivariate VAR, as specified in Equation (2) and Equation (3), is estimated to examine the relative ability of portfolio with high synchronicity portfolio to predict returns of portfolio with low synchronicity and vice versa in India. The sample period is from January 1999 to December 2012. Coefficients with 1% significance are followed by ***, coefficient with 5% by **, and coefficients with 10% by *.

	Equally-Weighted Portfolio		**Value-Weighted Portfolio**	
	Equation (2)	**Equation (3)**	**Equation (2)**	**Equation (3)**
$RET_{LS,t-1}$	0.25258***	0.00387	0.19554***	-0.03416*
$RET_{HS,t-1}$	0.09714***	0.312443***	0.05903***	0.24263***
No. of Observations	3642	3642	3642	3642
Adjusted R-Square	0.13207	0.09824	0.05714	0.05365
$RET_{HS,t-1}$ Granger Cause $RET_{LS,t}$	52.06000***	-	19.38500***	
$RET_{LS,t-1}$ Granger Cause $RET_{HS,t}$	-	0.01000		2.06000

Figure 1 shows the impulse responses to highlight the cross relation of each variable on the other. Impulse responses trace out the response of future values of each of the variables to a one-unit increase in the current value of one of the VAR errors, assuming that this error returns to zero in subsequent periods and that all other errors are equal to zero. The graphs in Figure 1 indicate that returns of portfolios with high synchronicity have an impact on returns of portfolios with low synchronicity. As was shown in Table 2, the opposite does not hold.

Figures 1-4: Impulse response graphs

Following figures present impulse response graphs for the Bivariate VAR, as specified in Equation (2) and Equation (3). The sample period is from January 1999 to December 2012.

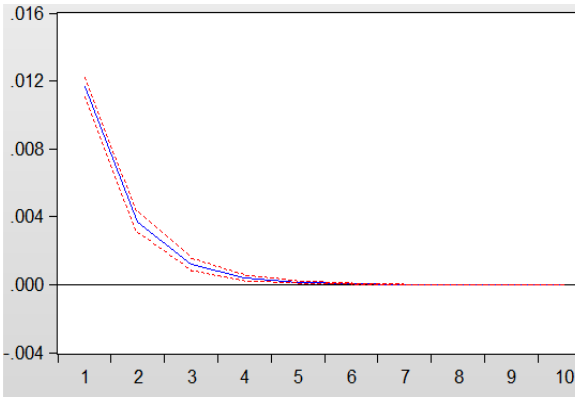

Figure 5: Impulse Response of RET_{HS} on RET_{LS} (Equal)

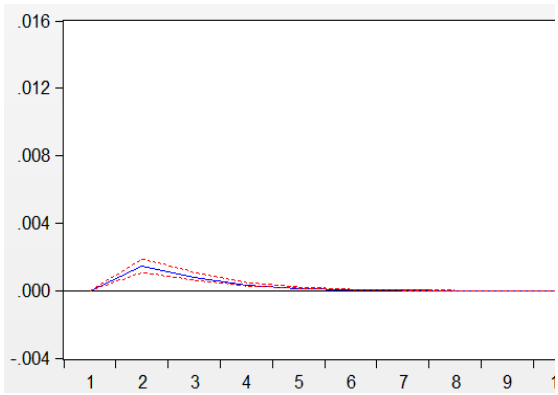

Figure 6: Impulse Response RET_{LS} on RET_{HS} (Equal)

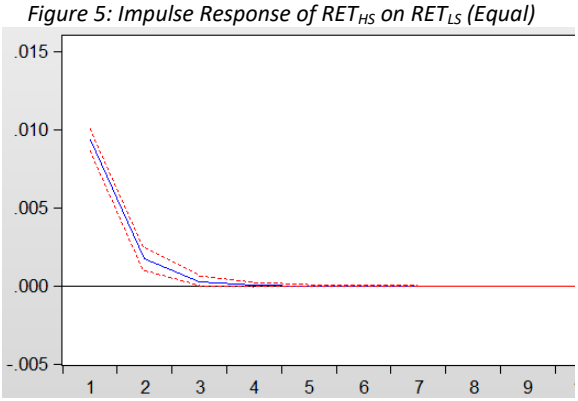

Figure 7: Impulse Response RET_{HS} on RET_{LS} (Value)

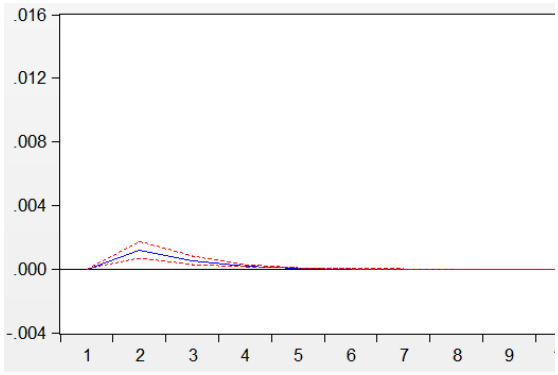

Figure 8: Impulse Response RET_{LS} on RET_{HS} (Value)

CHAPTER V

ROBUSTNESS OF RESULTS

5.1 Effect of positive and negative information in high synchronicity portfolio on the informational role of stock price synchronicity

Given that returns of portfolio with high synchronicity Granger-cause returns of portfolio with low synchronicity, it is worth exploring whether this causality holds in the presence of positive or negative information originating in portfolio with high synchronicity. Furthermore, we also want to confirm whether irrelevance of $RET_{LS,t-1}$ for $RET_{HS,t}$ holds when positive or negative information is generated in portfolio with high synchronicity. In order to test this conjecture, we estimate the following bivariate VAR regressions. In the following equations, $DUM_{HS,t}$ takes the value of 1 if returns of HS is positive and 0 otherwise.

$$\begin{aligned} RET_{LS,t} &= \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{HS,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{HS,t-1}\right]\right) \\ &+ \beta_{HS}\left(RET_{HS,t-1} * DUM_{HS,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{HS,t-1}\right]\right) + \varepsilon_{LS,t} \end{aligned} \quad (4)$$

And

$$\begin{aligned} RET_{HS,t} &= \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{HS,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{HS,t-1}\right]\right) \\ &+ \beta_{HS}\left(RET_{HS,t-1} * DUM_{HS,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{HS,t-1}\right]\right) + \varepsilon_{HS,t} \end{aligned} \quad (5)$$

The results of our analysis are reported in Table 7. Our results show that the positive relationship between $RET_{HS,t-1}$ and $RET_{LS,t}$ holds for both portfolios (equally-weighted and value-weighted) in regime characterized by negative information. We report significantly positive coefficient of $RET_{HS,t-1}*[1 - DUM_{HS,t-1}]$ in Equation (4) for both portfolios. This relationship, however, turns insignificant for value-weighted portfolios in the regime characterized by positive information. Our results also confirm our previous findings by

reporting insignificant coefficients of $RET_{LS,t-1}$* $DUM_{HS,t-1}$ and $RET_{LS,t-1}$*[1 – $DUM_{HS,t-1}$] in Equation (5). It indicates no impact of $RET_{LS,t-1}$ on $RET_{HS,t}$ in the two information regimes. An interesting observation from Table 3 is that the impact of returns of HS on returns of LS is almost triple in the regime characterized by negative information than in regime characterized by positive information.

Table 7: Effect of positive and negative information in high synchronicity portfolio on the informational role of stock price synchronicity

Bivariate VAR, as specified in Equation (4) and Equation (5), is estimated to examine the effect of positive and negative information in high synchronicity portfolio on the informational role of stock price synchronicity in India. The sample period is from January 1999 to December 2012. Coefficients with 1% significance are followed by ***, coefficient with 5% by **, and coefficients with 10% by *.

	Equally-Weighted Portfolio		**Value-Weighted Portfolio**	
	Equation (4)	**Equation (5)**	**Equation (4)**	**Equation (5)**
$RET_{LS,t-1}$*$DUM_{HS,t-1}$	0.31621***	0.05832	0.18626***	-0.00101
$RET_{LS,t-1}$*(1 – $DUM_{HS,t-1}$)	0.16247***	-0.07468	0.19865***	-0.06262*
$RET_{HS,t-1}$*$DUM_{HS,t-1}$	0.05660***	0.30201***	0.02412	0.25268***
$RET_{HS,t-1}$*(1 – $DUM_{HS,t-1}$)	0.14433***	0.33147***	0.08767***	0.23861***
No. of Observations	3642	3642	3642	3642
Adjusted R-Square	0.13504	0.09898	0.05768	0.05369

5.2 Effect of positive and negative information in low synchronicity portfolio on the informational role of stock price synchronicity

Another important question to ponder is whether the relationship obtained above is robust across regimes characterized by positive and negative information in portfolios with low synchronicity. It is very much possible that returns of HS Granger-cause returns of LS only when LS is not performing well. In order to test this conjecture, we estimate the following bivariate VAR regressions. In the following equations, $DUM_{LS,t}$ takes the value of 1 if return of portfolio with low synchronicity is positive and 0 otherwise.

$$RET_{LS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{LS,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{LS,t-1}\right]\right) + \beta_{HS}\left(RET_{HS,t-1} * DUM_{LS,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{LS,t-1}\right]\right) + \varepsilon_{LS,t} \quad (6)$$

And

$$RET_{HS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{LS,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{LS,t-1}\right]\right) + \beta_{HS}\left(RET_{HS,t-1} * DUM_{LS,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{LS,t-1}\right]\right) + \varepsilon_{HS,t} \quad (7)$$

The results of our analysis are reported in Table 8. Our results show that the positive relationship between $RET_{HS,t-1}$ and $RET_{LS,t}$ hold in both regimes characterized. We report significantly positive coefficient of $RET_{HS,t-1}*DUM_{LS,t-1}$ and $RET_{HS,t-1}*[1 - DUM_{LS,t-1}]$ in Equation (6) for both portfolios. Our results also confirm our previous findings by reporting insignificant coefficients of $RET_{LS,t-1}*DUM_{LS,t-1}$ and $RET_{LS,t-1}*[1 - DUM_{LS,t-1}]$ in Equation (7). It indicates no impact of $RET_{LS,t-1}$ on $RET_{HS,t}$ in the two information regimes.

Table 8: Effect of positive and negative information in low synchronicity portfolio on the informational role of stock price synchronicity

Bivariate VAR, as specified in Equation (6) and Equation (7), is estimated to examine the effect of positive and negative information in low synchronicity portfolio on the informational role of stock price synchronicity in India. The sample period is from January 1999 to December 2012. Coefficients with 1% significance are followed by ***, coefficient with 5% by **, and coefficients with 10% by *.

	Equally-Weighted Portfolio		**Value-Weighted Portfolio**	
	Equation (6)	**Equation (7)**	**Equation (6)**	**Equation (7)**
$RET_{LS,t-1}*DUM_{LS,t-1}$	0.29353***	0.00440	0.17913***	-0.02203
$RET_{LS,t-1}*(1 - DUM_{LS,t-1})$	0.19968***	-0.00852	0.20773***	-0.04216
$RET_{HS,t-1}*DUM_{LS,t-1}$	0.09952***	0.34824***	0.04001*	0.22804***
$RET_{HS,t-1}*(1 - DUM_{LS,t-1})$	0.09893***	0.28771***	0.07130***	0.25191***
No. of Observations	3642	3642	3642	3642
Adjusted R-Square	0.13280	0.09856	0.05721	0.05325

5.3 Effect of positive and negative information in market portfolio on the informational role of stock price synchronicity

In this section, we test whether results obtained in above are robust under regimes characterized by positive and negative market-specific information. Lo and Mackinlay (1990) argue that it is possible that certain firms show slower response to positive market-specific news and faster response to negative market-specific news. In order to test this

conjecture, we estimate the following bivariate VAR regressions. In the following equations, $DUM_{M,t}$ takes the value of 1 if market return is positive and 0 otherwise.

$$RET_{LS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{M,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{M,t-1}\right]\right) + \beta_{HS}\left(RET_{HS,t-1} * DUM_{M,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{M,t-1}\right]\right) + \varepsilon_{LS,t} \quad (8)$$

And

$$RET_{HS,t} = \alpha + \beta_{LS}\left(RET_{LS,t-1} * DUM_{M,t-1}\right) + \varphi_{LS}\left(RET_{LS,t-1} * \left[1 - DUM_{M,t-1}\right]\right) + \beta_{HS}\left(RET_{HS,t-1} * DUM_{M,t-1}\right) + \varphi_{HS}\left(RET_{HS,t-1} * \left[1 - DUM_{M,t-1}\right]\right) + \varepsilon_{HS,t} \quad (9)$$

The results of our analysis are reported in Table 9. Our results show that the positive relationship between $RET_{HS,t-1}$ and $RET_{LS,t}$ holds in regimes characterized by both positive and negative market information. We report significantly positive coefficient of $RET_{HS,t-1}*DUM_{M,t-1}$ and $RET_{HS,t-1}*[1 - DUM_{M,t-1}]$ in Equation (8) for both portfolios. The converse, however, does not hold in case of equally-weighted portfolio. We report insignificant coefficient of $RET_{LS,t-1}*DUM_{M,t-1}$ and $RET_{LS,t-1}*[1 - DUM_{M,t-1}]$ in Equation (9) for both equally-weighted portfolio. Surprisingly, our results show that when market is doing well, returns in LS negatively affect returns in HS in value-weighted portfolios. We report significantly negative coefficient of $RET_{LS,t-1}*DUM_{M,t-1}$.

Table 9: Effect of positive and negative information in market portfolio on the informational role of stock price synchronicity

Bivariate VAR, as specified in Equation (8) and Equation (9), is estimated to examine the effect of positive and negative information in market portfolio on the informational role of stock price synchronicity in India. The sample period is from January 1999 to December 2012. Coefficients with 1% significance are followed by ***, coefficient with 5% by **, and coefficients with 10% by *.

	Equally-Weighted Portfolio		**Value-Weighted Portfolio**	
	Equation (8)	**Equation (9)**	**Equation (8)**	**Equation (9)**
$RET_{LS,t-1}*DUM_{M,t-1}$	0.30803***	-0.01496	0.18432***	-0.07532***
$RET_{LS,t-1}*(1 - DUM_{M,t-1})$	0.22455***	-0.03195	0.21012***	0.01717
$RET_{HS,t-1}*DUM_{M,t-1}$	0.08043***	0.32555***	0.06181***	0.28960***
$RET_{HS,t-1}*(1 - DUM_{M,t-1})$	0.13446***	0.37975***	0.08257***	0.24663***

No. of Observations	3642	3642	3642	3642
Adjusted R-Square	0.12194	0.09574	0.05432	0.05364

CHAPTER VI

DISCUSSION OF RESULTS

Our results show that information generated in portfolios with high synchronicity is superior to information generated in low synchronicity portfolio. We argued that this superior information generation is a result of better governance environment prevailing in portfolios with high synchronicity. It may be possible that information generated in portfolios with high synchronicity may be able to lead returns of the market. In order to test this argument, we estimate the following bivariate VAR regressions.

$$RET_{M,t} = \alpha + \beta_{LS}(RET_{M,t-1}) + \beta_{HS}(RET_{HS,t-1}) + \varepsilon_{LS,t} \quad (10)$$

And

$$RET_{HS,t} = \alpha + \beta_{LS}(RET_{M,t-1}) + \beta_{HS}(RET_{HS,t-1}) + \varepsilon_{HS,t} \quad (11)$$

The results of our analysis are reported in Table 10. Our results show that information flow takes place from portfolio with high synchronicity to market portfolio in the equally-weighted case. It also shows that no information flow takes place from market portfolio to portfolio with high synchronicity.

Table 10: Market portfolio and informational role of stock price synchronicity
Bivariate VAR, as specified in Equation (10) and Equation (11), is estimated to examine the relative ability of portfolio with high synchronicity portfolio to predict returns of market portfolio and vice versa in India. The sample period is from January 1999 to December 2012. Coefficients with 1% significance are followed by ***, coefficient with 5% by **, and coefficients with 10% by *.

	Equally-Weighted Portfolio		**Value-Weighted Portfolio**	
	Equation (10)	**Equation (11)**	**Equation (10)**	**Equation (11)**
$RET_{M,t-1}$	0.01657	-0.00001	0.03393*	-0.00001

$RET_{HS,t-1}$	0.04098***	0.36210***	0.01457	0.27298***
No. of Observations	3642	3642	3642	3642
Adjusted R-Square	0.00298	0.13100	0.00174	0.07425

It is evident that in all the tests equally weighted portfolio of HS stocks fulfills our expectations of better and more significant price informativeness than the value weighted portfolio. This could be attributed to the fact that the equally weighted portfolio returns are more normally distributed than the value weighted portfolio as measured by kurtosis and skewenss (see Table 1). Even though, the value weighted portfolio also follow the equally weighted one in most of the results with the same sign.

Table 7 also shows a peculiar phenomenon: if the HS portfolio did badly on the previous day (negative return) then the LS portfolio will most likely earn a positive return around 14% the next day (significant at 1% level). This phenomenon is seen also in the value weighted portfolios. A positive return, on the other hand, of the equally weighted HS portfolio is also followed by a positive return of the LS stock in our sample period but at a much lower value around 5%. This lower return value is not exhibited in the value weighted portfolio. However, both outcomes indicate superior returns of LS stocks compared to HS stocks which was indeed the case in our sample period from January 1999 to December 2012 in Bombay Stock Exchange.

This could be explained by the level of competition in the HS stocks is very high which eats up any supernatural return that may take place as a result of the constant disclosure of the relevant information. On the other hand, the LS portfolio is composed of stocks with very limited information disclosure which results into huge profits in the case of good performance of the firms.

CHAPTER VII

CONCLUSION AND FUTURE WORK

Finally, this work had been done to test the hypothesis that stocks which exhibit price synchronicity also play a role in price informativeness. For that purpose we used all the listed stocks in Bombay Stock Exchange (BSE) from January 1999 to December 2012 and found that high synchronicity stocks (HS) always lead the returns of low synchronicity stocks (LS). Our results are also robust as we checked also the asymmetric response and found that the lead-lag relation also exists. We also came up with the conclusion that the HS stocks not only lead the returns of the LS stocks but also the returns of the entire market.

For the future work we could investigate the information role of HS stocks in a sample of developed markets to see if it holds. Additionally, the creation of an investment strategy which exploits the informational role of HS stocks may be devised and tested.

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