

Investor Sentiments and Stock Risk and Return: Evidence from Asian Stock Markets

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ABSTRACT

The aim of the study is to investigate the impact of sentiment of individual investors on the stock volatility and return at Asian countries stock markets. To further examine the effect of individual investor sentiment; stock return and volatility in among Asian countries. The study uses monthly consumer confidence index as a proxy of investor sentiment of nine Asian countries, published by trading economics. First, Asian countries microeconomic components were regressed on consumer confidence to identify the impact of microeconomics risk factors on sentiment of investor. Second, impulse response function (IRFs) is derived from (VAR) estimation. VAR estimation is used to examine the changes in the Asian stock markets affected by individual investor's sentiment. The (IRFs) responses of Asian stock markets return to rational and irrational investor sentiment is significantly positive. The results reveal positive rational investor sentiment tends to increase Asian Stock Market returns. The findings of Asian countries strongly support assumptions of behavioural finance theory. It further suggests that Asian investors are both rational and irrational decision markers. However, our findings do not hold for country level analysis as decision varies from country to country. For this research monthly data of Asian countries is used of over the period of January 2008 to December 2017. This study will help policy makers to maintain the stability of individual investor sentiments and to decrease financial market uncertainty and volatility. Individual investors can use certain strategies like contrarian strategy of investment for the hard to value stocks and to find out high risk in stock market. This study fills a theoretical gap to growing literature on behavioural finance and determines the impact of sentiment of investors on stock market return of nine Asian countries.

Keywords: Investor Sentiment, VAR estimation, Asian Stock Market Return, Volatility.

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INTRODUCTION

Sentiment of individual investor plays a vital role in financial stock market return and volatility. Individual investor sentiment is overall behavior of rational or irrational investor toward financial market. Over the last few decades, traditional finance theory proposed by Fama (1970) has been based on the belief that financial markets are efficient and investors are only rational toward stock prices return and volatility. Thus accordingly, sentiment of individual investors does not have any impact on the financial market stock return and volatility or impact on prices are long in duration which have the more chances to neglect or decline (for example, Friedman, 1953). Furthermore, the theory provides limited understanding on various market anomalies such as, financial crash and bubbles (Shiller 2003; Barner and Odean 2008; Naik and Padhi 2015).

In recent years, behavioral finance is becoming an alternative approach to traditional finance theory due to decision making imperfection by investors and anomalies found in financial market (Baker and Wurgler, 2007; Barner and Odean 2008; Finter et al, 2010; Hu & Wang, 2013; Naik and Padhi 2015; Vieira, 2016; Dash & Mahakud, 2017). The argument suggested by the behavioral finance is asset pricing plays an important role toward investor sentiment as in the stock market there is systemic risk and irrational behavior exist by individual investor which can limit to the rational traders (Baker and Wurgler 2007; Dash and Mahakud, 2017).

A noise trader's concept is provided by behavioral finance based on cognitive biases, irrational behavior and decision-making errors. An investor make decision without using the fundamental data or there may be a technical analysis which is also considered as a noise trader then asset price become change from its intrinsic value so individual investor sentiment which can definitely effect on stock return and volatility. (Hu and Wang, 2013; Naik and Padhi 2015) Behavioral finance state that individual investors have psychological biases such as overconfidence or conservatism and irrational behavior such as individual under react and over react to past return and fundamentals. (Beaumont et.al. 2008; Kim and Park 2015; Dash and Mahakud, 2017) However previous studies found that individual investors have worse investment performance than the institutional investor's because of irrational decision and wrong information about investment risk or return as investors beliefs that profit can't not be generate in competitive market (for example see Barner and Odean 2008; Barber et al 2009; Finter et al, 2010; Bae, Min and Jung 2011; Kim and Park 2015)

Investor behavior affected by the changes in stock price e.g., mispricing which enhances the factor of psychological biases. (Sayim, Morris and Rehman. 2013; Uygur and Tas, 2014; Kim and Park 2015). There are two crashes of financial market which defined the change in asset pricing impact on individuals; the internet bubble crash in 2000 which means collapse occur in many internets startup companies and then federal reserve increase interest rate that's why economic recession occurs and after that a rapid decline. The real bubble crash in 2008 when housing prices increased in early 2006 and then declined in

2008. This shows that investors have destructive characteristics which effect by increase or decrease asset prices. (Finter et al., 2010; Sayim, Morris & Rehman, 2013)

To further investigate the influence of sentiment of investor sentiment on stock volatility and return Economic data of monthly consumer confidence index and macroeconomics fundamentals are collected from trading economics, data.oecd.org website and financial data of monthly stock prices of nine Asian countries are collected from investing.com, Bloomberg and yahoo finance website. The total number of observations of each variable are 8640 from nine countries of Asia includes China, Hong Kong, Indonesia, japan, South Korea, Malaysia, Taiwan, Thailand, and Turkey. For this research financial and economic monthly data are used over the period of January 2008 to December 2017. This research filling a gap and offer as growing literature on behavioral finance to determine the impact of sentiment of investors on stock market return of different Asian countries.

To check the responses of return and risk to rational and irrational investor sentiment impulse response function (IRFs) is derived from (VAR) estimation. The responses of impulse of Asian Stock Markets returns to increase 1 time SD in a rational and irrational sentiment respectively. The responses of returns to rational and irrational investor sentiment is significantly positive as the rational investor sentiment tends to increase Asian Stock Market returns. The response of Asian stock markets risk to rational investor sentiment is negative as results reveals optimistic of investor sentiment which reduce risk and uncertainty of stock market returns. However, the responses to irrational investor sentiment are positive at first period and negative at second period. The results reveal at first period there are pessimistic expectations of investor sentiment in contrast optimistic expectation of investor sentiment which reducing risk and uncertainty of stock market return. The results of Asian countries strongly support behavioral finance theory but results don't hold at country level as it varies from country to country.

Next section discusses literature review, including provide theoretical and empirical insights into the phenomenon.

LITERATURE REVIEW

Theoretical Review

Over past few decades, researchers examined the impact of sentiments of individual investor on stock price volatility and stock returns to enhance theoretical implications of asset management and portfolio selection. There are various theories discussed with regards to sentiments of individual investor impact on stock risk and return. For example, traditional theory proposed by Fama (1970) state that market is efficient and investors are rational. In the recent years behavioral finance theory became an alternative view due to asset pricing and existence of systematic risk market levels. However, on a deeper level decision making errors and anomalies found in financial markets remain largely underexplored (Baker and Wurgler, 2007; Barner and Odean 2008; Finter, 2010; Hu & Wang, 2013; Sayim and Rehman 2015; Vieira, 2016; Dash & Mahakud, 2017).

Kahneman and Tversky's (1979) prospect theory stated that investors are risk seeker in the gains but become risk averse during losses. There are changes found in investor behavior while managing their stock return, volatility and uncertainties. Individual Investor doesn't focus on outcomes and only seek for the gain and loss. Investor has cognitive biases and

makes decision which is based on their own judgment. The people choose alternative for investment and outcome by the decision making remain unknown. De Long et al (1990) state that Noise trader's theory only determined the individual sentiment as the irrational traders, cognitive biases and decision-making error therefore it cannot apply on the company's investment decision. Similarly, we cannot predict and expect changes in the sentiment of individual investor of irrational traders which have strong influence on stock return and volatility because sometime irrational and rational investor find together in the financial markets.

Beaumont et al (2008) noise trader sentiment has different impacts on stock prices. It could be limited the arbitrage. The first effect is to create space in which decision-making error increase therefore stock volatility also increases. The second is Friedman effect in which investor invests in critical market timing. When all investors buy asset from market and there are no possibilities to sell asset. This situation has negative impact on stock return. The third is more hold effect in which investor holds their stock for higher return. In the last price pressure effect in which investor expect for asset price to bullish and bearish in the financial market. As bullishness increase in the market so investor invests more in the risky asset Therefore there is a possibility to increase the demand for the asset by which prices of the asset also increase and there is also possibilities of higher price of asset with low expected return. So that activities hurt to the individual investor and make them irrational toward stock return and risk.

Barber et.al (2009) individual investor makes same mistake continuously. Due to repeated mistake investor face loss in money which indicated that trades may be systematically correlated. According to the Zouaoui et al (2011) many researchers give special importance to that investor sentiment is depend on the macroeconomic fundamentals and psychological factors. Consumer confidence index which is the proxy of investor sentiment decompose into the macroeconomic fundamentals.

Empirical Review

Verma and soydemir (2006) examine the impact of institutional as well as individual investor's sentiment on U.S. markets return. The results found that there is significantly positive impact of individual investor sentiment on stock price return. The result implies that there is rational investors tend to increase share return. Schmeling, (2009) examined the consumer confidence impact on share price. He collected a sample of 18 major developed industrialized countries. The result implies that across countries there is positive impact of sentiment of investor on return and there is negative relationship between investor sentiment and share market returns.

Zouaoui et al., (2011) examine investor sentiment impact on market crises. The study considers a sample of fifteen countries of Europe and USA. Consequently, results found that if there is low investor sentiment, returns become high, shares are underpriced and experience of investor will increase as they have confidence to buy more shares. If sentiment of investor is high, returns become low, shares are overpriced and experience of investor will decrease or decline as they don't have confidence and not to buy shares. The result shows that there is negative impact of sentiment of investor on share market return and positive relationship among investor sentiment and volatility. Baker et al., (2012) examine globally, locally and contagious impact of investor sentiment on stock market

return. They took six major stock markets. The result shows negative impact of investor sentiment on forecast market return.

Sayim et al (2013) investigate the sentiment of individual investor impact on US market stock return and risk. The results found that investors are rational and sentiment has significantly positive impact on stock price return as the study support traditional theory. The sentiment of investor has significant and negative impact on stock price volatility. The result shows that high expectation from the economy can create positive outcome, can reduce uncertainty and stock price volatility. Hu and Wang (2013) examine if noise traders are exit in Chinese stock market and their relation with Chinese's market returns. They found that individual investor significantly impacts on asset valuation. The results support the risk of noise traders as there is direct relationship between higher price volatility of stock market and sentiment of investors. The result shows that uncertainty is found in stock prices which are affected by decision making error of investor.

Sayim and Rahman (2015) investigate the relation among sentiment of investors with returns and risk of Turkish stock market. They found that investors are rational and sentiment of individual investor has significantly positive impact on stock price return and investor has significant and negative impact on stock price volatility. The result shows that high expectation from the economy can create positive outcome, can reduce uncertainty and also stock price volatility decrease. It can be concluded that the investors are rational in turkey as investor sentiment increase, return can be increases and it can be reduced stock price volatility.

Vieira (2016) highlights the impact of sentiment on share returns and risk at European markets. Their finding shows negative impact between individual investor sentiment and stock price return. Iyer (2017) found that there is significantly negative relation between sentiment of investor and stock price return. The results also show that there is minimal impact of low sentiment on safe stock return. Zhu and Jiang (2017) examine investor recognition relation with share returns. They study found negative connection between investor sentiment and future stock return. The result shows that as sentiment increase it can reduce the stock return due to some psychological factors.

Bayram (2017) examines investor sentiment as rational and irrational evidence from turkey stock markets. The study finds out the significant correlation between rational and irrational business-consumer sentiment with stock markets return of turkey. The finding from that research is individual investors from turkey is rational rather than irrational. The results support traditional theory. Soydemir et al (2017) examine the unequal impact of rational and irrational sentiment on S&P 500 stock markets returns. The IRFs results suggest that both sentiments have negative impact on S& P 500 share price returns. Moreover, irrational sentiment of investors has strong impact on share price returns than rational fears.

The studies mentioned above are focused more on developed countries or major stock markets especially U.S market to examine sentiment impact on share market return and risk. Most of the research determined the impact of sentiment on returns only and neglect the impact of sentiment on emerging market returns and risk. This is latest research to compare the impact of individual sentiment on emerging Asian stock market returns and risk individually as well as altogether. Therefore, this study fills a theoretical gap and offer

as growing literature on behavioral finance to determine the impact of sentiment of investors on stock market return of nine Asian countries. The proxy of Consumer confidence index used as individual investor sentiment. As proxy is frequently used in American Association of Individual Investors for survey investor sentiment (Brown & Cliff, 2004; Qui & Welch, 2006; Finter et al, 2010; Schemling, 2009; Sayim and Rehman 2015).

Research model

This study applies similar methodology and model used as in previous studies by Verma and Soydemir (2006), Calafiore (2010), Sayim and Rehman (2015) and Bayram (2017). To determine the impact of macroeconomic risk and sentiment of individual investor, macroeconomics components have been regressed into fitted and residual value. Some researchers argue that macroeconomics factors are correlated with individual investor sentiment. (Schmeling, 2009; Sayim and Rehman, 2015) In this study the proxy of investor sentiment has been used as consumer confidence index which is very important and contains macroeconomic fundamentals information and also it can be applied to examine the investor sentiment as rational or irrational. (Qui and Welch, 2006; Sayim and Rehman 2015; Bayram, 2017) The model of investor sentiment and market fundamental as follows:

$$\text{sent}_{1t} = \alpha + \beta_1 \text{FUND}_{jt} + e_t \quad (1)$$

Where, sent_{1t} is dependent variable represent investor sentiment movement at time, α represent constant, Fund are independent variables which represent macroeconomic fundamentals variables which included balance of trade, interest rate, industrial production index, exchange rate, inflation rate and e represent random error. (Baker and Wurgler, 2006; Sayim and Rehman, 2015)

Second, after decompose investor sentiment we examine the impact of sentiment of individual investor on stock market return. In previous studies we noted that sentiment of investor could be irrational or irrational (Baker and Wurgler, 2007; Barner and Odean 2008; Finter et al., 2010; Hu & Wang, 2013; Sayim and Rehman 2015; Vieira, 2016; Dash & Mahakud, 2017) the model two is based on rational or irrational investor therefore sentiment variables is decomposed into two components rational and irrational. The model of return generating process is as follows:

$$R_t = \alpha + \beta_1 \text{Sent}_{1t-k} + \beta_2 t + \beta_3 t + \epsilon_t \quad (2)$$

Where R is dependent variable represent return, $\beta_1, \beta_2, \& \beta_3$ are estimated parameters, k represents lag length and ϵ is error. The β_1 parameter is used to determine the effect of investor sentiment on rational investors, β_2 parameter is used to capture the effect of sentiment of investor on irrational investor and β_3 parameter is used to determine the impact of investor sentiment on monthly volatility in stock prices. (Sayim and Rehman, 2015)

Third, we examine the impact of sentiment of investor on stock market volatility. To measure the stock price return uncertainty, the standard deviation is used in this study as monthly compounded return uncertainty. (Hull, 2007) The formula of uncertainty is as follows:

$$u_i = \ln \left(\frac{S_i}{S_{i-1}} \right) \quad (3)$$

Where, u_i the compounding return between the months is ended (I) and (i-1) month. S is the value of market at the month ended i. to measure the biasness of the per month standard deviation. According to the Hull (2007) the formula of standard deviation is as follows:

$$\sigma_t = 1/m \cdot \sum_{i=1}^m u_{t-i}^2 \quad (4)$$

Where, σ_t is standard deviation and m is monthly observation of the uncertainty. To measure the sentiment of individual investor impact on stock price volatility, the model is used is as follows (Calafiore, 2010):

$$\sigma_t = \beta_0 + \beta_1 \text{Sent}_{t-k} + \beta_2 \sigma_{t-1} + \beta_3 \epsilon_t \quad (5)$$

Where σ_t monthly volatility of each Asian country is, β_1 , β_2 , & β_3 are estimated parameters, k represents lag length and ϵ_t is error. The β_1 parameter is used to capture the effect of investor sentiment on rational investors, β_2 parameter is used to catch the effect of sentiment of investor on irrational investor and β_3 parameter is used to capture the impact of sentiment of investor on monthly volatility in stock prices. (Sayim and Rehman, 2015)

Methodology

Sim proposed VAR modeling in 1980s that seems to be an appropriate methodology to determine the impact of sentiment of investors on stock market returns and risk. Previous studies stated that the VAR model performance is much better or simple approach than other structural complex models to forecasting macroeconomics components (Webb, 1999; Sayim and Rehman, 2015). VAR model is used by many researchers to identify the sentiment of investors on share price returns and risk (Qui and Welch, 2006; Verma and Soydemir, 2006; Schemling, 2009; Sayim and Rehman, 2015; Bayram, 2017). The decomposition of sentiment variable on microeconomics components is useful for the VAR model to identify time period responses to unpredictable exogenous shocks. The period responses as (IRFs) Impulse Responses Function are used to identify the unpredictable movement of variables in the markets. (Hakkio and Mporris, 1984; Verma and Soydemir, 2006; Sayim and Rehman, 2015)

VAR models can catch the price index information and provided impact dynamic feedback regards to unrestricted way because all microeconomics factor have limited information that is relevant to price index prediction. Therefore, the transmission of information in time delays from the variables of fundamentals of market may create data observation lags and convert this into asset price. This is the approach existing movement in market components at unrealistic period. Moreover, this research uses the Schwarz Criterion and Alkaline Criterion to examine the lag length properly. Qui and Welch, 2006; Verma and Soydemir, 2006; Schemling, 2009; Sayim and Rehman, 2015; Bayram, 2017). In unconstrained way VAR model catch constantly change relationship and offer a good process of data generating. The VAR model present as follows

$$Z(t) = C + \sum_{s=1}^m A_s Z(t-s) + \epsilon(t) \quad (6)$$

In equation 6, Where $Z(t)$ is a vector of column, C is constant, (A_s) is a coefficient matrix, m is the length of lag and $\epsilon(t)$ is an error term.

In this research model is multifactor which implies the relationship impacts as unpredictable change in sentiment of investors. however, problems of misspecification could create as it is more complicated to interpret the coefficient from equation of

regression in VAR model or it might not to be capture full impact of independent variables (Verma and Soydemir, 2006; Sayim and Rehman, 2015; Bayram, 2017)

In this study (VAR) Vector auto regression model is used to catch the effect of linear interdependence of multiple time series and unpredictable movement to examine the changes in the Asian stock markets affected by individual investor's sentiment to stock markets returns and risk. To check the responses of return and risk to rational and irrational investor sentiment impulse response function (IRFs) is derived from (VAR) estimation. Qui and Welch, 2006; Verma and Soydemir, 2006; Schemling, 2009; Sayim et al, 2013; Sayim and Rehman, 2015; Bayram, 2017).

IRFs which represent behavior is used to catch 1 time SD shock to unpredictable change on present and future market components values and overcome misleading problems. IRFs parameter estimation is highly nonlinear therefore Monte Carlo method employ as bands of confidence are built on every side to the mean response. At 95% confidence level is considered as significant response if lower and upper band of confidence hold as it is sign (Qui and Welch, 2006; Verma and Soydemir, 2006; Verma et al, 2008; Schemling, 2009; Sayim and Rehman, 2015; Bayram, 2017, Soydemir, 2017).

Data

This study uses financial and economical monthly data over the period of January 2008 to December 2017. Asian countries include China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Taiwan, Thailand, and Turkey. Economic data which includes monthly consumer confidence index and macroeconomics fundamentals are collected from trading economics, data.oecd.org website and financial data which includes monthly stock prices of Asian countries are collected from investing.com, Bloomberg and yahoo finance website. The total number of observations of individual investor sentiment, macroeconomic fundamentals, stock return and stock price volatility are 8640 from nine countries of Asia.

This study uses stock market returns and risks of different countries of Asia includes China Shenzhen Components Stock Exchange (SZSE), Hong Kong Hang Seng stock exchange Index HIS, Indonesia Jakarta Stock Exchange Index JKSE, Japan Tokyo Stock Exchange named NI225, Malaysia Kuala Lumpur Stock Exchange KLSE, South Korea Seoul Stock Exchange KOSPI, Taiwan Stock Exchange TWSE, Thailand Stock Exchange Set Index SETI, Turkey Istanbul Stock Exchange BIST-100. All indices mention above are major indices of each nine countries of Asia. To calculate the returns and risk, share price data is obtained from investing.com website.

Consumer confidence index is used as the proxy of investor sentiment. (Qui and Welch, 2006; Sayim and Rehman, 2015, Soydemir et al, 2017) the consumer confidence index evaluated from 0 to 200. If the value is above 100, it shows optimistic consumer's confidence and if the value is below 100, it shows pessimistic confidence of consumer. (Sayim et al, 2013; Sayim and Rehman, 2015) To obtain the irrational sentiment, market fundamentals have been regressed namely balance of trade, interest rate, consumer price index, industrial production index and exchange rate. (Sayim and Rehman, 2015; Soydemir et al, 2017). In asset pricing research papers most commonly microeconomics fundamentals are as follows:

- Elton and Gruber (1991) the rate in which one country currency is exchange with another country currency is known as exchange rate.
- (Fama, 1970) the monthly change measures in industrial production index are known as economic growth. The economic growth is varying from country to country. It is determined as increases the produce amount of goods and services over the time period.
- Sharpe (2002) the inflation rate proxy is used as Consumer price index. Consumer price index is selected because it is an evaluator to measure the price changes of services and goods which are purchased by consumers.
- Campbell (1991) interest rate measured as the monthly yield of a particular country.
- Term of trades measure as Export and import monthly ratio of a country (Sayim and Reham 2015; Bayram, 2017)

Empirical and Estimation Results

This study examines the impact of sentiment of investors on share market returns and risk of each nine Asia countries empirical and estimation test are performed individually and as well as emerging market of Asia to compare the variation of results country to country respectively. For empirical results, each country variables descriptive statistics are summarizing individually and Variance Inflation Factor test is performed to determine the multi co-linearity for each independent variables of market fundamentals. The Results suggest that VIF value of each independent variable is less than 10 which represent that there is no issue of multi co-linearity as all explanatory variables are independent from each other and all explanatory variables of market fundamentals include China, Hong Kong, Indonesia, Japan, Malaysia, South Korea, Taiwan, Thailand, and Turkey represent distinctive characteristics.

For estimation results, first I performed (ADF) Augmented Dickey Fuller (Dickey & Fuller, 1979, 1981) unit root test to check each variable properties of time-series. Test of unit root were run at level with intercept and linear trend and at first difference with intercept only. The ADF test results implies that at level variables are non-stationary and at first difference results suggesting each variables properties of time series are stationary. Ordinary least square (OLS) test is performed to estimate the impact of individual investor sentiment on the market fundamentals for each nine countries of Asia. (Sayim and Hamid, 2015; Bayram, 2017; Soydemir et al, 2017). Panel least square regression with random effect is performed for Asia countries together. Then sentiment variables decompose into rational and irrational sentiment. The fitted value and residual values have been generated from ordinary least square (OLS) and panel least square to estimate the impact of investor sentiment on nine Asian stock market return and risk individually as well as together. To drive the IRFs from vector auto regression I took fitted value as rational sentiment and residual value as irrational sentiment (e.g., Verma and Soydemir, 2006; Verma et al., 2008; Sayim and Hamid, 2015; Baryam, 2017, Soydemir et al, 2017).

Descriptive Statistics

Table 1.1 summarizes descriptive statistics. China means of sentiment (SENT) is 105 percent which indicates that during the sample period mostly individual investors have been optimistic. The standard deviation of (SENT) is 4.78 percent. The (SENT) standard

deviation is lower than return (RET) which indicates that (SENT) is less volatile during the sample period. The standard deviation of return (RET) is higher than sentiment (SENT) and market fundamentals which represent return (RET) is highly volatile during the sample period. Hong Kong mean of sentiment (SENT) is 101 percent which indicates that during most of the sample period individual investors have been optimistic. The standard deviation of (SENT) is 7.28 percent. The (SENT) standard deviation is higher than return and fundamentals of markets which indicates that (SENT) is highly volatile during the sample period.

Table 1. Descriptive Statistics

Country	CHINA		HONG KONG		INDONESIA		JAPAN		MALAYSIA	
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SENT	1.05273	0.04782	1.0193	0.0728	1.0021	0.0023	0.9929	0.0110	0.9247	0.2206
RET	0.00010	0.08876	0.0026	0.0627	0.0089	0.0592	0.0051	0.0596	0.0021	0.0350
RISK	0.01803	0.01021	0.0134	0.0085	0.0115	0.0071	0.0142	0.0081	0.0063	0.0038
TOT	1.00460	0.08692	0.0777	0.0002	0.0418	0.0334	-0.0051	0.1081	0.0260	0.0177
EXC	0.06526	0.00298	1.0041	0.0071	0.0747	0.0130	0.0032	0.0023	0.0307	0.0040
INT	0.03127	0.00458	0.0316	0.0178	0.0560	0.0225	0.0033	0.0126	0.0274	0.0538
INF	0.02623	0.02085	-0.0131	0.0375	0.0021	0.0221	0.9652	0.0854	0.0350	0.0045
IPI	0.10030	0.04491	0.0113	0.0060	1.0332	0.0419	0.9898	0.1388	1.0167	0.0461
Country	SOUTH KOREA		TAIWAN		THAILAND		TURKEY		ASIA	
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SENT	1.02105	0.09118	0.7580	0.1104	0.7673	0.0350	0.9856	0.0195	0.94724	0.13935
RET	0.00345	0.04962	0.0040	0.0544	0.0077	0.0577	0.0092	0.0783	0.00479	0.06216
RISK	0.01046	0.00692	0.0106	0.0070	0.0127	0.0198	0.0149	0.0069	0.01246	0.01013
INT	0.02739	0.01133	0.0458	0.1521	0.0190	0.0227	0.0214	0.0074	0.03088	0.02957
INF	0.02279	0.01347	0.0176	0.0057	0.0226	0.0077	0.0528	0.0083	0.03331	0.02828
IPI	0.03405	0.08454	0.0092	0.0144	0.0213	0.1233	0.0809	0.0310	0.03389	0.09406
EXC	0.00220	0.03955	0.3093	0.0136	0.3276	0.0186	0.0836	0.0190	1.00256	0.06751
TOT	0.98850	0.07464	0.9378	0.0518	1.0488	0.0450	1.0237	0.0518	0.20326	0.30653

Notes: Table 1. Descriptive Statistics, variables are investor sentiment (SENT); monthly return (RET); monthly risk (RISK); balance of trade (BOT); exchange rate between countries currency & US dollar (EXC); inflation (INF); interest rate (INT); Economic Growth (IPI). Total number of observations for each country are 120 and total number of observations for Asia are 1080. For china; monthly return on the Shenzhen Component Index & exchange rate between Chinese Yuan & US dollar, For Hong Kong; monthly return on the Hang Seng Index (RET) & exchange rate between Hong Kong dollar & US dollar. For Indonesia; monthly return on the JKSE Index & exchange rate between Indonesian Rupiah & US dollar. For Japan; monthly return on the Nikkei 225 Index & exchange rate between Japanese Yen & US dollar. For Malaysia; monthly return on the FTSE Malaysia Index & exchange rate between Malaysian Ringgit & US dollar. For South Korea; monthly return on the KOSPI Index & exchange rate between South Korean Won & US dollar. For Taiwan; monthly return on the Taiwan Weighted Index & exchange rate between New Taiwan dollar & US dollar. For Thailand; monthly return on the SET Index

& exchange rate between Thai Baht & US dollar. For Turkey; monthly return on the BIST 100 Index & exchange rate between Turkish lira & US dollar.

The sentiment (SENT) SD is higher than return (RET) and fundamentals of markets which indicates that (SENT) is highly volatile during the sample period mostly. The SD of industrial production (IPI) is also higher than other markets fundamentals which represent (IPI) have been highly volatile during the sample period.

Taiwan mean of sentiment (SENT) is 75 percent which indicates that during the sample period individual investors have been pessimistic. The standard deviation of sentiment (SENT) is 11 percent. The (SENT) standard deviation is higher than return (RET) which indicates that (SENT) is highly volatile during the sample period mostly. The return (RET) SD is 0.054 which is less than (SENT) and market fundamentals indicates that return (RET) is less volatile. The standard deviation of industrial production (IPI) is also higher than other market fundamentals which represent industrial production (IPI) has been highly volatile during the most of the sample period. Thailand mean of (SENT) is 76 percent which indicates that during the most of the sample period individual investors have been pessimistic. The standard deviation of (SENT) is 3.50 percent. The sentiment (SENT) standard deviation is lower than the return which indicates that (SENT) is less volatile than return. The standard deviation of industrial production (IPI) is also higher than other market fundamentals which represent industrial production (IPI) has been highly volatile during the sample period. Turkey mean of (SENT) is 98.56 percent which indicates that during the sample period individual investors have been pessimistic. The standard deviation of (SENT) is 1.9 percent. The (SENT) standard deviation is lower than return which indicates that (SENT) is less volatile during the sample period. The standard deviation of return (RET) is also higher than the market fundamentals which represent return has been highly volatile during the sample period.

Asia means of (SENT) is 94.72 percent which indicates that during the sample period individual investors have been pessimistic. The standard deviation of (SENT) is 13.9 percent. The (SENT) standard deviation is higher than return which indicates that (SENT) is highly volatile than return during the sample period. The standard deviation of exchange rate (EXC) is also higher than other market fundamentals which represent exchange rate (EXC) have been highly volatile during the sample period. Correlation between variables which are sentiment, Asian Stock Markets return, risk and market fundamentals are summarizes in table 2.

Table 2. Correlate Matrix

	SENT	RET	RISK	INT	INF	IPI	BOT
SENT	1.000000						
RET	0.214135	1.000000					
RISK	-0.416196	-0.499607	1.000000				
INT	-0.524816	-0.232585	0.473958	1.000000			
INF	-0.059526	-0.053733	-0.000505	-0.062690	1.000000		
IPI	0.481596	-0.143915	-0.192386	-0.287760	0.195388	1.000000	
BOT	-0.063831	0.041854	0.049415	-0.063909	-0.537116	-0.306018	1.000000

Notes: table no. (2), variables are investor sentiment (SENT); Asian Stock Markets monthly return (RET); monthly risk on Asian stock markets returns (RISK); balance of trade (BOT); exchange rate (EXC); inflation (INF); interest rate (INT); Economic Growth (IPI)

The results shows that investor's sentiment (SENT) is negatively correlated with monthly risk (RISK), interest rate (INT), inflation (INF), and exchange rate (EXC). The results suggest that decrease (increase). interest rate (INT), inflation (INF), exchange rate (EXC), and monthly risk (RISK) tends to increases (decreases) investor's sentiment (SENT). In contrast the sentiment of investors (SENT) is positively correlated with return (RET) and industrial production. The results reveal that increases (decreases) in return (RET) and industrial production (IPI) tends to increase (decrease) investors sentiment. In Asian Countries the correlation between return and risk is negative. Increases in Stock Markets returns (RET) tend to decrease the investors risk.

OLS and Panel Regression

Table 1.3 summarizes OLS Ordinary Least Square and Panel Least Square Regression with random effect results which shows the impact of sentiment on market fundamentals of each country individually and emerging Asia Market, China results shows that the relationship between investor sentiment (SENT) and terms of trade (TOT) is significantly negative. The relationship between sentiment (SENT) and industrial production index (IPI) is significantly negative. Increases in the terms of trade and industrial production index tends to decrease the consumer confidence and if the terms of trade and industrial production will decrease it would increase the consumer confidence. However, the impact of exchange rate (EXC) on sentiment (SENT) is significantly positive. Increases in exchange rate tends to increases the sentiment. R-Squared value is (0.29) indicates that one third of variation in the Chinese investor sentiment explained by market fundamentals. Hong Kong results shows that the relationship between investor sentiment (SENT) and industrial production (IPI) is significantly negative. The results suggest that Increases (decreases) in the industrial production tends to decrease (increases) the consumer confidence. However, the impact of exchange rate (EXC) and inflation (INF) on sentiment (SENT) is significantly positive. Increases in exchange rate and inflation tends to increases the sentiment. R-Squared value is (0.23) indicates that one fourth of variation in the Hong Kongers investor sentiment explained by market fundamentals.

Indonesia results represent that the relationship between sentiment (SENT) and inflation (INF) is also significantly negative. Increases (decreases) in inflation tends to decrease (increases) the consumer confidence. However, the impact of industrial production (IPI) and terms of trade (TOT) on investor sentiment (SENT) is significantly positive. Increases in exchange rate tends to increases the sentiment. R-squared value is (0.46) indicates that approximately half of variation in the Indonesian investor sentiment explained by market fundamentals.

Japan results represent that the relationship between investor sentiment (SENT) and exchange rate (EXC) is significantly negative. The relationship between sentiment (SENT) and inflation (INF) is also significantly negative. Increases in the rate of exchange and inflation tends to decrease the consumer confidence and if the exchange rate and inflation rate will decrease it would increase the consumer confidence. However, the impact of

industrial production (IPI) on sentiment (SENT) is significantly positive. Increases in industrial production tends to increases the sentiment. R-squared value is (0.46) which indicates that half of the investor's sentiment explained by market fundamentals. Malaysia results represent that the relationship between investor sentiment (SENT) and terms of trade (TOT) is significantly negative. The relationship between sentiment (SENT) and exchange rate (EXC) is also significantly negative. Increases in the rate of exchange and terms of trade tends to decrease the consumer confidence and if the terms of trade and exchange rate will decrease it would increase the consumer confidence. R-squared value is (0.38) suggest that one third variation of investor sentiment explained by market fundamentals.

Malaysia results represent that the relationship between investor sentiment (SENT) and inflation (INF) is significantly negative.

Table 3. Ordinary Least Square (OLS)

Variables		China	Hong Kong	Indonesia	Japan	Malaysia	South Korea	Taiwan	Thailand	Turkey	Asia
INT	Coeff.	0.9017	1.62***	0.0179	-0.914	1.4101**	-2.3039**	-1.6603**	1.0424**	-0.26***	-0.1984
	Prob.	(0.3630)	(0.0000)	(0.2645)	(0.0971)	(0.0443)	(0.0118)	(0.0137)	(0.0430)	(0.0000)	(0.4118)
INF	Coeff.	0.0063	1.1357	0.065***	0.282***	0.153***	-1.7441**	-1.5346	0.1079	-0.068	-0.51***
	Prob.	(0.9808)	(0.3932)	(0.0000)	(0.0006)	(0.0000)	(0.0187)	(0.3772)	(0.5107)	(0.4177)	(0.0026)
IPI	Coeff.	-0.38**	0.8272**	0.01***	0.055***	-0.255	0.6285***	0.1083**	0.3029**	0.077***	0.159***
	Prob.	(0.0002)	(0.0401)	(0.0049)	(0.000)	(0.8579)	(0.0000)	(0.0443)	(0.0010)	(0.0000)	(0.0000)
TOT	Coeff.	-0.2***	0.7611	0.009**	0.028***	-3.707	0.0153	1.0247***	0.0559**	-0.494	-0.095**
	Prob.	(0.0003)	(0.5565)	(0.0544)	(0.007)	(0.4356)	(0.9213)	(0.0002)	(0.0110)	(0.0807)	(0.0542)
EXC	Coeff.	5.28***	-0.5203**	0.018**	0.0073	0.2125	-0.2109**	-7.536***	-1.37***	-0.092**	-0.113**
	Prob.	(0.0003)	(0.0543)	(0.0116)	(0.5745)	(0.5101)	(0.0140)	(0.0000)	(0.0000)	(0.0128)	(0.0435)
Constant	Coeff.	0.9339	-0.6240	0.9910	1.0182	3.667	1.3109	2.1644	0.8735	1.1141	1.0830
	Prob.	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared		0.2954	0.23804	0.4688	0.4609	0.3837	0.5273	0.4289	0.5305	0.6193	0.045
Adj. R-Squared		0.2645	0.20462	0.4455	0.4373	0.3565	0.5066	0.4038	0.5099	0.6026	0.036

Notes: Table 3 (OLS) Ordinary Least Square results of each country & Panel Least Square Regression with Random Effect results of Asia. Dependent variable is (SENT) Investor Sentiment (China, Hong Kong, Indonesia, Japan, Malaysia, South Korea, Taiwan, Thailand & Turkey), & Independent Variables are balance of trade (BOT), exchange rate (EXC) between (Chinese Yuan & US dollar, Hong Kong dollar & US dollar, Indonesian rupiah & US dollar, Japanese Yen & US dollar, Malaysian ringgit & US dollar, South Korean won & US dollar, New Taiwan dollar & US dollar, Thai Baht & US dollar, Turkish lira & US dollar) ; inflation (INF); interest rate (INT); Economic Growth (IPI). **, *** Significance level at 1 and 5 percent, respectively. The relationship between sentiment (SENT) and interest rate (INT) is significantly negative. The impact of terms of trade (TOT) on investor sentiment is strongly negative. The results reveal that Increases (decreases) in the rate of interest, terms of trade and inflation tends to decrease (increase) the consumer confidence. However, the impact of industrial production (IPI) on sentiment (SENT) is significantly positive. Increases in

industrial production tends to increase the investor's sentiment. R-squared value is (0.527) which indicates that half variation of South Korean investor's sentiment explained by market fundamentals.

Taiwan results shows that the relationship between investor sentiment (SENT) and exchange rate (EXC) is significantly negative. The relationship between sentiment (SENT) and inflation (INF) is also significantly negative. Increases in the exchange rate and inflation tends to decrease the consumer confidence and if the interest rate and inflation rate will decrease it would increase the consumer confidence. However, the impact of industrial production (IPI) and balance of trade (BOT) on sentiment (SENT) is significantly positive. Increases in industrial production and balance of trade tends to increase the sentiment. R-squared value is (0.42) which indicates that approximately half variation of the investor's sentiment explained by market fundamentals.

Thailand results shows that the relationship between investor sentiment (SENT) and exchange rate (EXC) is significantly negative. Increases in the exchange rate tends to decrease the consumer confidence and if the exchange rate will decrease it would increase the consumer confidence. On other hand the impact of balance of trade (BOT), industrial production (IPI) and interest rate (INT) on sentiment (SENT) is significantly positive. Increases in balance of trade, interest rate and industrial production tends to increase the sentiment. R-squared value is (0.53) indicates that half variation of the sentiment of investors explained by market fundamentals of Thailand. Turkey results shows that the relationship between investor sentiment (SENT) and balance of trade (BOT) is significantly negative. The relationship between sentiment (SENT) and interest rate (INT) is also significantly negative. Increases in the rate of interest and balance of trade tends to decrease the consumer confidence and if the interest rate and balance of trade will decrease it would increase the consumer confidence. However, the impact of industrial production (IPI) on sentiment (SENT) is significantly positive. Increases in industrial production tends to increase the investor's sentiment.

To determine the relationship between individual investors sentiment and stock market return. I employ a panel regression estimation with fixed and random effect model than I did Hausman test to check either random or fixed affect model is appropriate (Anusakumar et. al., 2017) The results show in table 10.3 probability value is 0.972 which support the null hypothesis. The null hypothesis is random effect model is appropriate.

A panel regression with cross section random effect model estimation is performed to estimate the impact of individual investor sentiment on the market fundamentals. The results represent in table (10.4) that the relationship between investor sentiment (SENT) and balance of trade (BOT) is significantly negative.

Table 4. Chi-Sq. Statistic

Text Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.868643	5	0.9725

Notes: Table 4, Hausman test to test either fixed or random model is appropriate.

The relationship between sentiment (SENT) and inflation (INF) is also significantly negative. The relationship between sentiment (SENT) and exchange rate (EXC) is significantly negative. The results reveal that Increases (decreases) in the inflation, exchange rate and balance of trade tends to decrease (increase) the Asian Investors sentiment. However, the impact of industrial production (IPI) on sentiment (SENT) is significantly strongly positive. Increases in industrial production tends to increases the sentiment.

Overall results provide the evidence that market fundamentals have strong impact on sentiment which support the previous studies. (Brown and Cliff, 2004; Verma 2008; Sayim, Morris and Rehman, 2013; Kim and Park, 2015; Dash and Mahakud, 2017)

IRFs Estimation

The sentiment variables decompose into rational and irrational sentiment. The fitted value and residual values have been generated from panel regression to estimate the impact of investor sentiment on Asian Stock Markets return and risk as mentioned in equation 2. I took fitted value as rational sentiment and residual value as irrational sentiment (e.g., Verma et al., 2008; Baryam, 2017). Impulse Response Function (IRFs) is performed to capture the investor sentiment unexpected movement on both return and risk. Moreover, vector auto regression (VAR) estimation is used to derive the impulse response of variables.

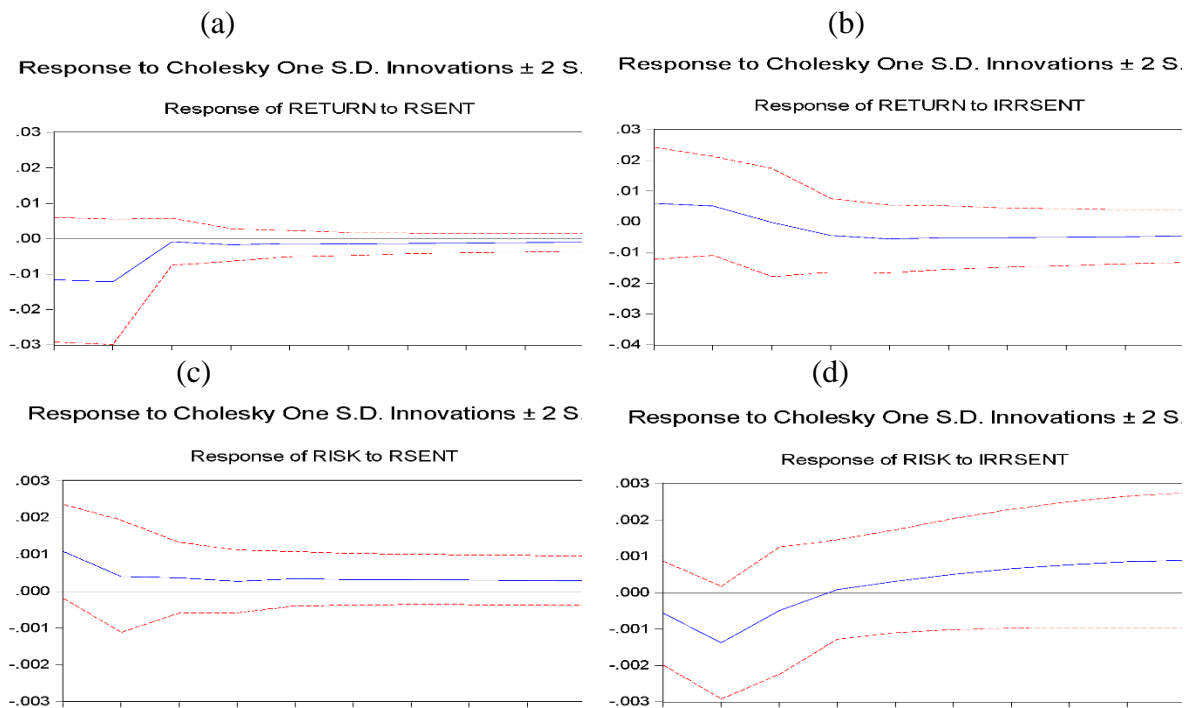


Figure 1: Graph (a) & (b), SZSE returns response to Chinese (a) rational & (b) irrational investor sentiment. Graph (c) & (d) SZSE risk response to Chinese (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 1 shows Impulse response of SZSE returns and risk to Chinese rational and irrational investor sentiment shock. From Figure 1; Graph (a) and (b) shows the responses of impulse of SZSE returns to increase 1 time SD shock in a rational and irrational sentiment respectively. The results show in plot (a) at the first and second period negative individual investor sentiment tends to increase SZSE returns and in plot (b) the results is insignificant as noise traders not applying the market fundamentals at the time of trading. The results reveal that there is negative relation between SZSE return and investor sentiment as investors are rational and have an impact of market fundamentals.

Figure 1; Graph (c) and (d) shows the response of SZSE risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) there is positive relationship between rational investor sentiment and SZSE risk. In graph (c) results reveals pessimistic explanation of investor sentiment which increase risk and certainty of stock market returns. However, in plot (d) the results show at second period negative impact of irrational investor sentiment on SZSE risk. In Graph (d) results reveals optimistic expectation of investor sentiment which reducing risk and uncertainty of stock market return.

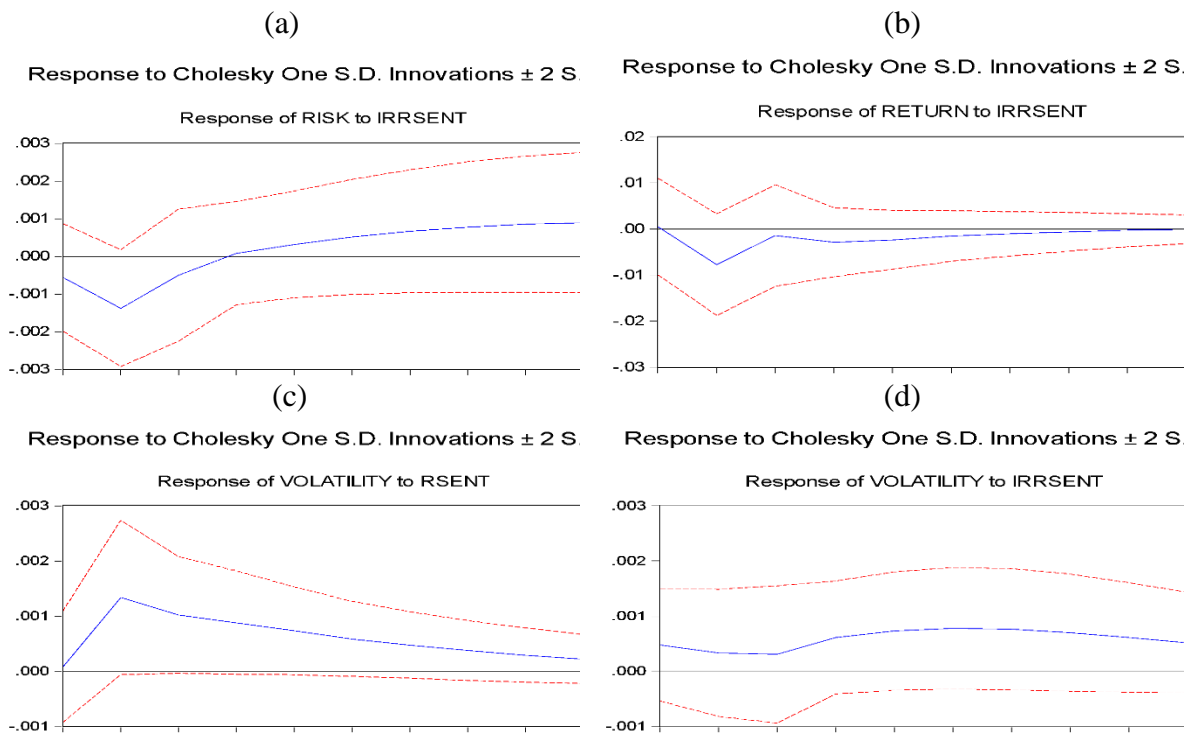
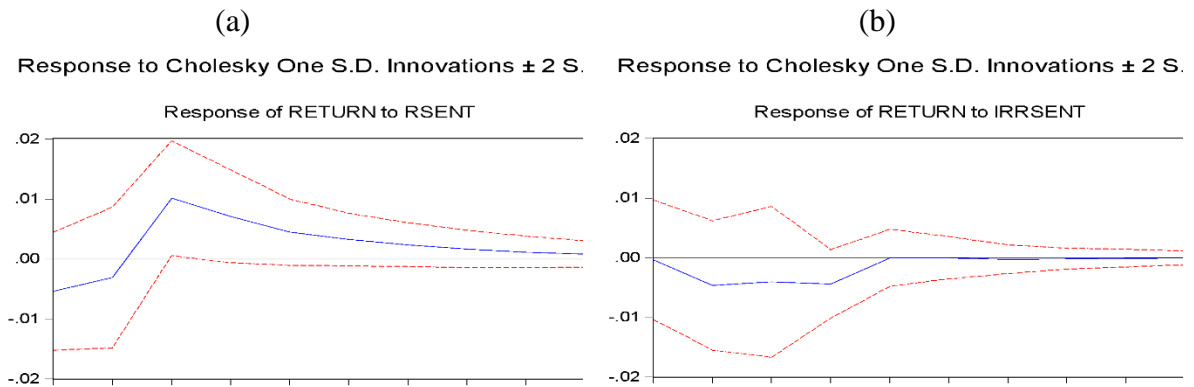


Figure 2: Graph (a) & (b), HSI returns response to Hong Kongers (a) rational & (b) irrational investor sentiment. Graph (c) & (d) HSI risk response to Hong Kongers (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 2 shows Impulse response of Hang Seng Index HSI returns and risk to Hong Kongers rational and irrational investor sentiment shock. From Figure 2 Graph (a) and (b) shows the responses of impulse of HSI returns to increase 1 time SD shock in a rational and irrational sentiment respectively. The results show in plot (a) at the second period negative individual investor sentiment tends to increase HSI returns and in plot (b) the results is insignificant as noise traders not applying the market fundamentals at the time of trading. The results reveal that there is negative relation between HSI return and investor sentiment as investors are rational and have an impact on HSI returns.

From figure 2, Graph (c) and (d) shows the response of HSI risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) there is positive relationship between rational investor sentiment and HSI risk. In graph (c) results reveals pessimistic of investor sentiment which increase risk and certainty of stock market returns. However, in plot (d) the results is insignificant as it doesn't find the impact of irrational investor on HSI risk. At the time of trading, noise traders not applying market fundamentals.

Figure 3 shows Impulse response of Jakarta Stock Exchange Index JKSE returns and risk to Indonesian rational and irrational investor sentiment shock. Figure 3, Graph (a) and (b) shows the responses of impulse of JKSE returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at the third period positive individual investor sentiment tends to increase JKSE returns and in plot (b) the results is insignificant as noise traders not applying the market fundamentals at the time of trading. The results reveal that there is positive relation between JKSE return and investor sentiment as investors are rational and have an impact of JKSE return.



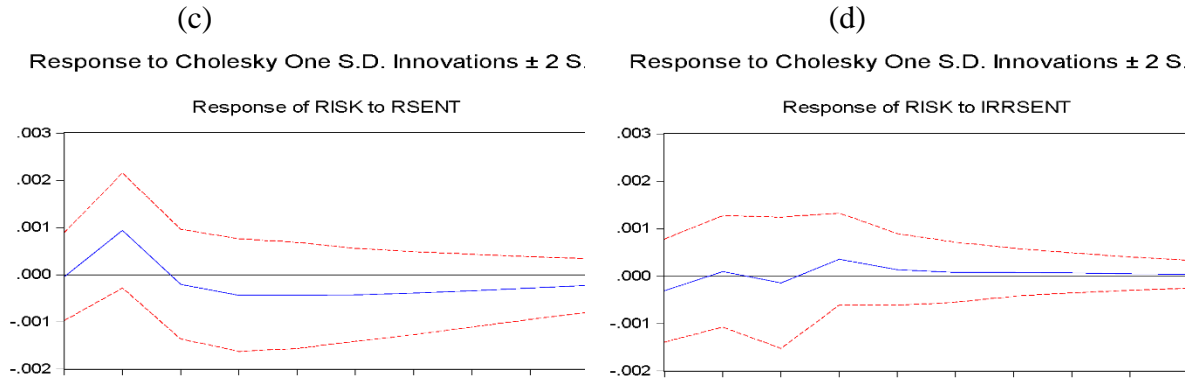
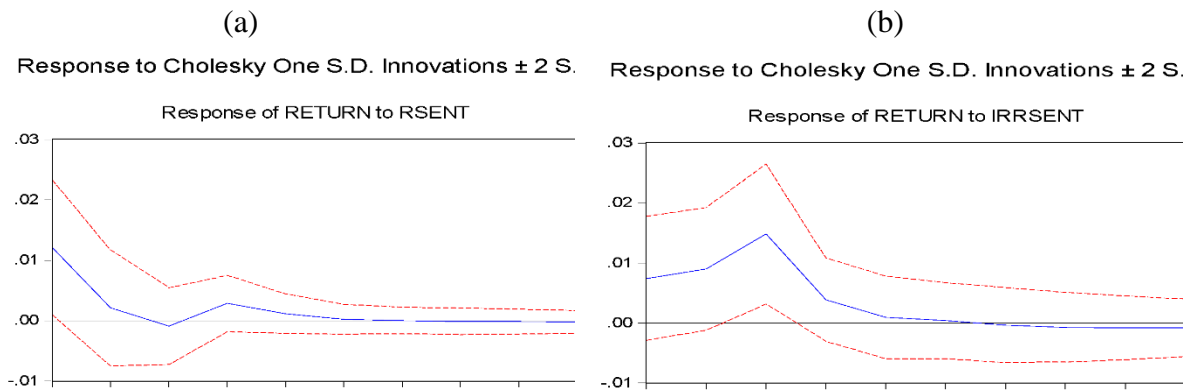


Figure 3: Graph (a) & (b), JKSE returns response to Indonesian (a) rational & (b) irrational investor sentiment. Graph (c) & (d) JKSE risk response to Indonesian (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 3, Graph (c) and (d) shows the response of JKSE risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) at the second period response increases in 1 time SD to rational investor sentiment. There is positive relationship between rational investor sentiment and JKSE risk. In graph (c) results reveals pessimistic of investor sentiment which increase risk and certainty of stock market returns. However, in plot (d) the results is insignificant as it doesn't find the impact of irrational investor on JKSE risk. At the time of trading, noise traders not applying market fundamentals.

Figure 4 shows Impulse response of Tokyo Stock Exchange named NI225 returns and risk to Japanese rational and irrational investor sentiment shock.



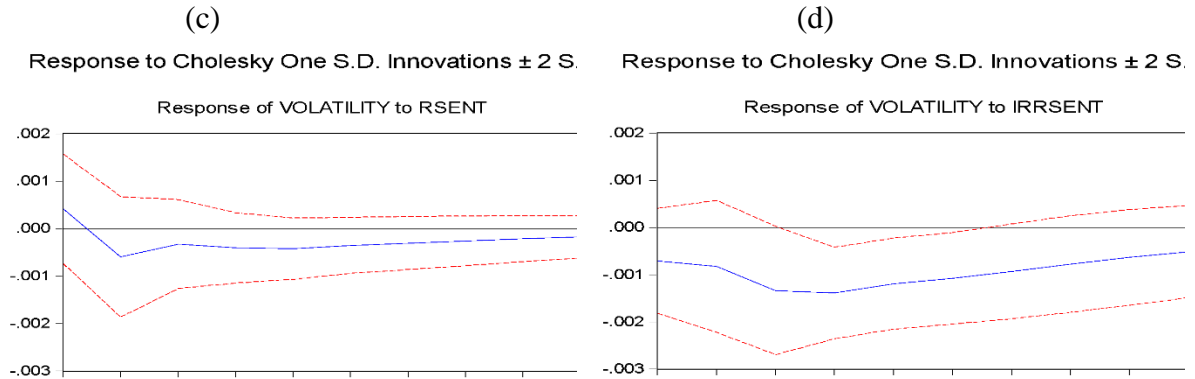


Figure 4: Graph (a) & (b), NI225 returns response to Japanese (a) rational & (b) irrational investor sentiment. Graph (c) & (d) NI225 risk response to Japanese (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 4, Graph (a) and (b) shows the responses of impulse of NI225 returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at the first period positive individual investor sentiment tends to increase NI225 returns and in plot (b) at the third period positive individual investor sentiment tends to increase NI225 returns. The results reveal that there is positive relation between NI225 return and investor sentiment as investors are rational and have strong of an impact of market fundamentals.

Figure 4, Graph (c) and (d) shows the response of NI225 risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) the results is insignificant as it doesn't find the impact of irrational investor on JKSE risk. At the time of trading, noise traders not applying market fundamentals. However, in plot (d) the responses show at third period significant negative impact of irrational investor sentiment on NI225 risk. In Graph (d) results reveals optimistic expectation of investor sentiment which reducing risk and uncertainty of stock market return. Figure 5 shows Impulse response of Kuala Lumpur Stock Exchange KLSE returns and risk to Malaysian rational and irrational investor sentiment shock.

Figure 5, Graph (a) and (b) shows the responses of impulse of KLSE returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at the first period positive individual investor sentiment tends to increase KLSE returns and in plot (b) the results is insignificant as noise traders not applying the market fundamentals at the time of trading. The results reveal that there is positive relation between KLSE return and investor sentiment as investors are rational and have an impact of market fundamentals.

Figure 5, Graph (c) and (d) shows the response of KLSE risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) and (d) the responses are insignificant as it doesn't find the impact of irrational investor on KLSE risk. At the time of trading, noise traders not applying market fundamentals. Moreover, the results is not supporting (De Long et.al., 1990) finding regarding increase in risk of stock markets return by noise traders and rational investors.

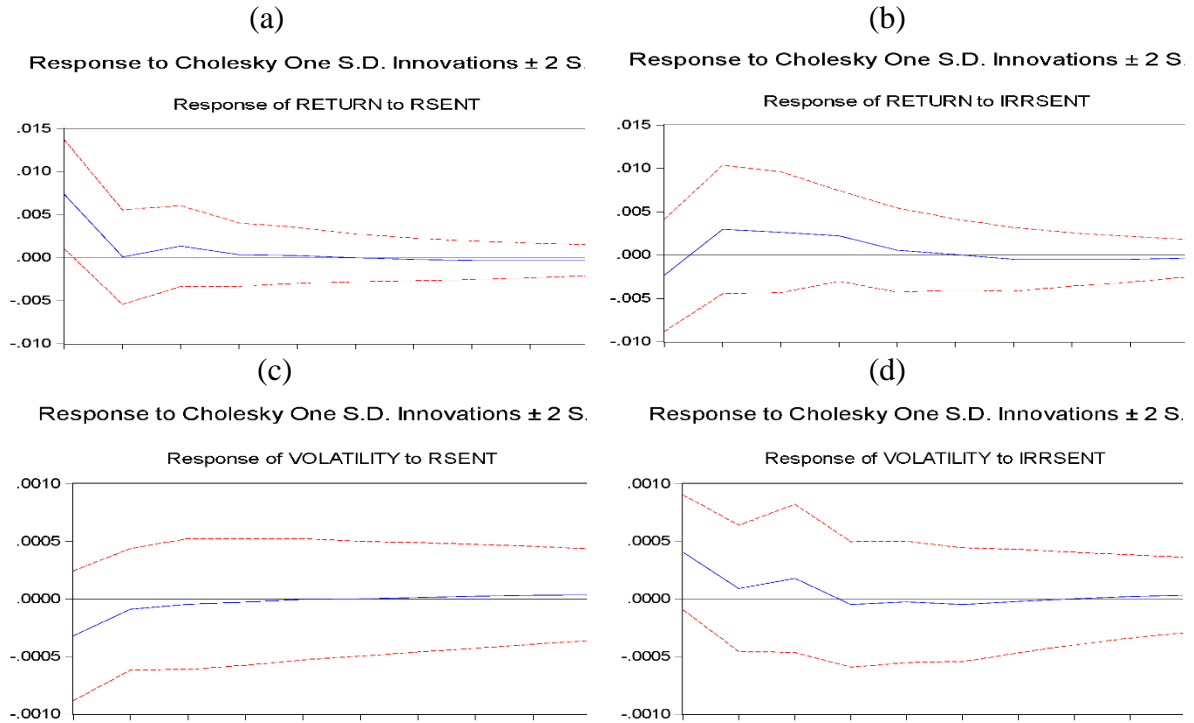


Figure 5: Graph (a) & (b), KLSE returns response to Malaysian (a) rational & (b) irrational investor sentiment. Graph (c) & (d) KLSE risk response to Malaysian (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 6 shows Impulse response of Seoul Stock Exchange KOSPI returns and risk to South Korean rational and irrational investor sentiment shock. Figure 6, Graph (a) and (b) shows the responses of impulse of KOSPI returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) the results is insignificant as noise traders not applying the market fundamentals at the time of trading and in plot (b) the responses are positive and significant at first period. The results reveal that there is positive relation between KOSPI return and investor sentiment as investors are irrational and have an impact of market fundamentals.

Figure 6, Graph (c) and (d) shows the response of KOSPI risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) the result shows insignificant responses thus study doesn't support the finding of (De Long et al., 1990) However in plot (d) the responses at first period have negative impact of irrational investor sentiment on KOSPI risk. In Graph (d) results reveals optimistic expectation of investor sentiment which reducing risk and uncertainty of stock market return.

Figure 7 shows Impulse response of Taiwan Weighted Stock Exchange TWSE returns and risk to Taiwanese rational and irrational investor sentiment shock. Figure 7, Graph (a) and (b) shows the responses of impulse of TWSE returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at the first period positive

response of TWSE returns to rational investor's sentiment and in plot (b) the responses of TWSE returns are significantly positive to irrational investor sentiment at the first period. The results reveal that Taiwanese investor's sentiment are rational and irrational also. Irrational investor's sentiment responses are delayed due to irrational herding. To mimic the action of rational investors it may take time for irrational investors. Investor sentiment have strong impact of returns.

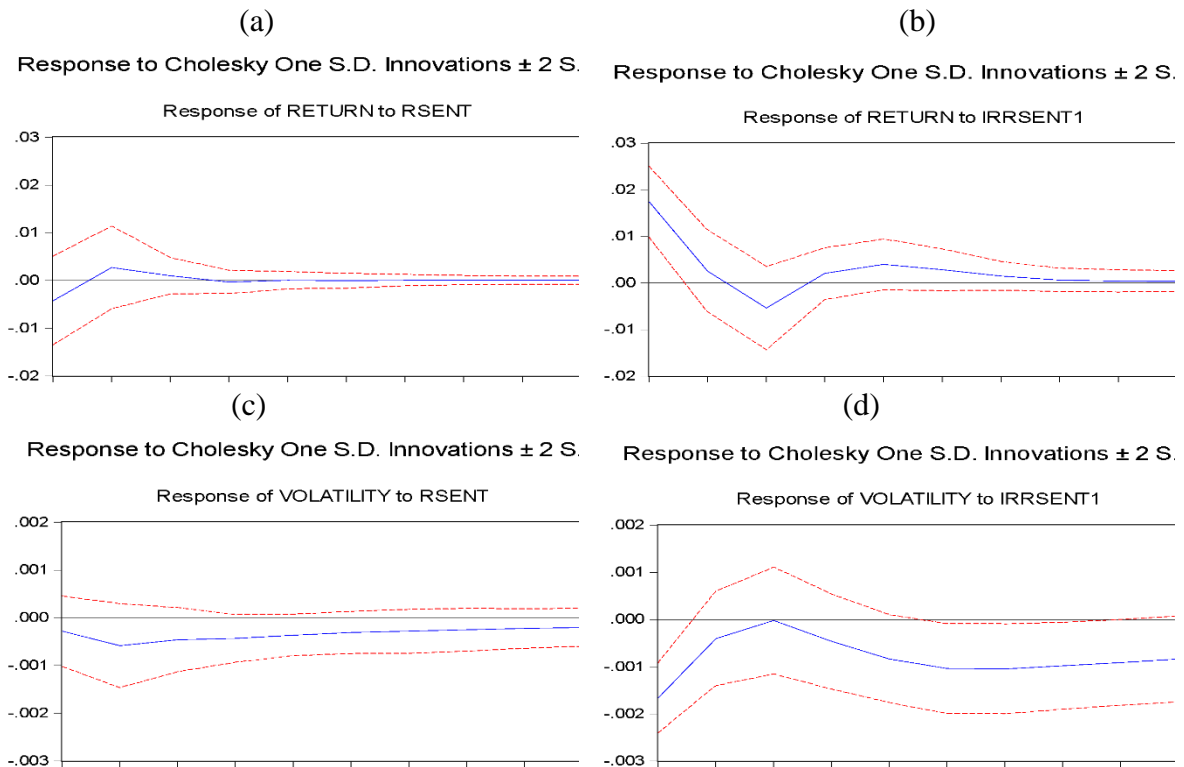


Figure 6: Graph (a) & (b), KOSPI returns response to South Korean (a) rational & (b) irrational investor sentiment. Graph (c) & (d) KOSPI risk response to South Korean (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 7, Graph (c) and (d) shows the response of TWSE risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) TWSE risk responses to rational investor sentiment are significantly negative from first period to tenth period. However, in plot (d) the results shows that TWSE risk responses irrational investor sentiment is significantly negative from second to tenth period respectively. In Graph (c) & (d) results reveals optimistic expectation of investor sentiment which reducing risk and uncertainty of stock market return

Figure 8 shows Impulse response of Thailand Stock Exchange Set Index SETI returns and risk to Thai rational and irrational investor sentiment shock. Figure 8, Graph (a) and (b) shows the responses of impulse of SETI returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) SETI returns responses to rational investors sentiment is significantly positive at first period and in plot (b) the results

are insignificant as noise traders not applying the market fundamentals at the time of trading. The results reveal that there is positive strong relation between SETI return and investor sentiment as investors are rational and have an impact of market fundamentals.

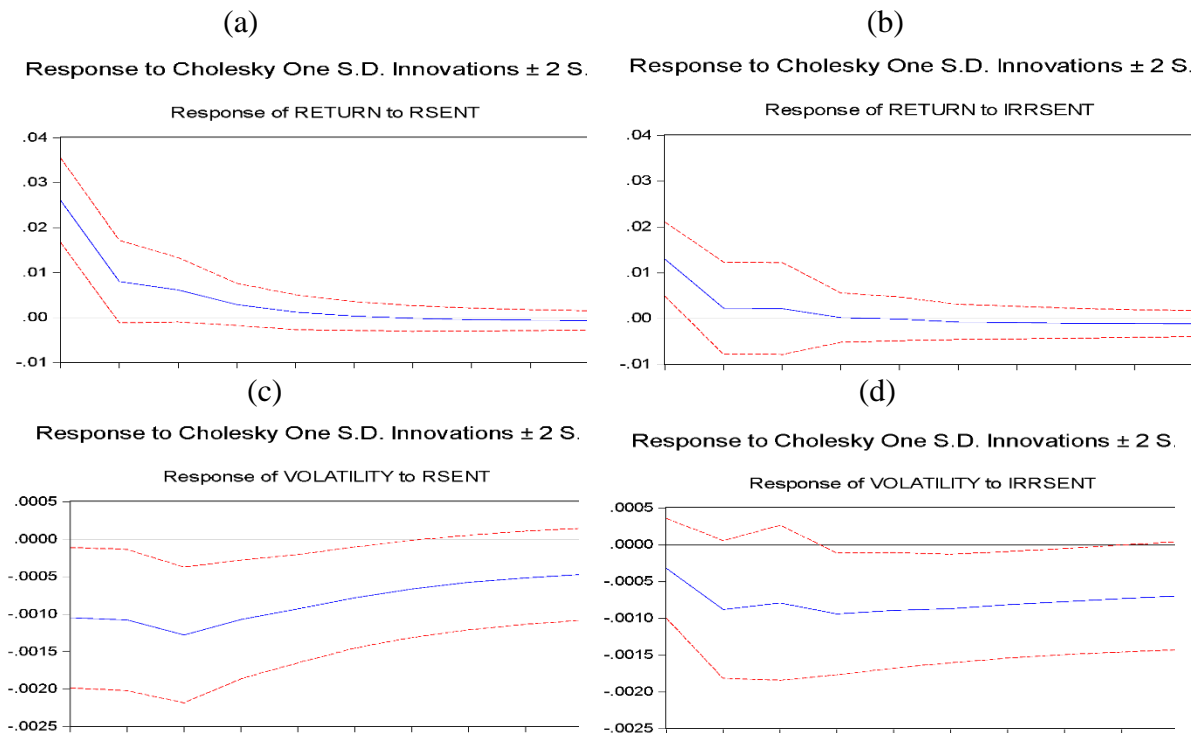


Figure 7: Graph (a) & (b), TWSE returns response to Taiwanese (a) rational & (b) irrational investor sentiment. Graph (c) & (d) TWSE risk response to Taiwanese (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 8, Graph (c) and (d) shows the response of SETI risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) responses of risk to rational investor sentiment are significantly negative at second period respectively. In graph (c) results reveals optimistic of investor sentiment which reduce risk and uncertainty of stock market returns. However, in plot (d) the results shows that responses don't have impact of investor sentiment on SETI risk.

Figure 9 shows Impulse response of Istanbul Stock Exchange BIST100 returns and risk to Turkish rational and irrational investor sentiment shock. Figure 9, Graph (a) and (b) shows the responses of impulse of BIST100 returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at first period return responses to rational sentiment are significant and positive and the results reveal that positive individual investor sentiment tends to increase BIST100 returns and in plot (b) the results is significant and returns responses to irrational investor sentiment is also positive. There is delayed response of return to irrational investor sentiment due to irrational herding. The results suggest that irrational and rational sentiment both have an impact on returns of stock market.

Figure 9, Graph (c) and (d) shows the response of BIST100 risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) there is negative relationship between rational investor sentiment and BIST100 risk. In graph (c) results reveals optimistic of investor sentiment which reduce risk and uncertainty of stock market returns. However, in plot (d) the results are insignificant which suggest that research does not have any support for the impact of irrational sentiment of investors on BIST100 risk.

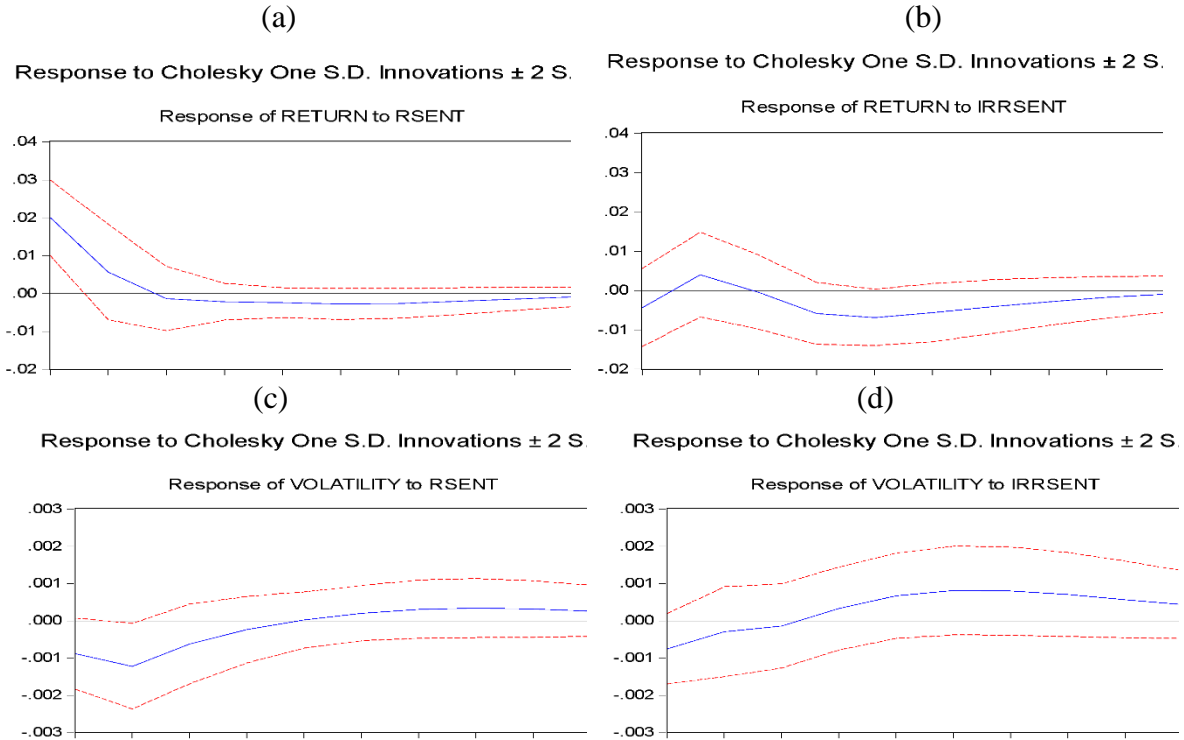


Figure 8: Graph (a) & (b), SETI returns response to Thai (a) rational & (b) irrational investor sentiment. Graph (c) & (d) SETI risk response to Thai (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

Figure 10 shows Impulse response of Asian Stock Market returns and risk to Asian rational and irrational investor sentiment shock. Figure 10, Graph (a) and (b) shows the responses of impulse of Asian Stock Markets returns to increase 1 time SD in a rational and irrational sentiment respectively. The results show in plot (a) at the first second period responses of returns to investor sentiment are significantly positive. The results reveal that rational investor sentiment tends to increase Asian Stock Market returns and in plot (b) response of return to irrational investor sentiment are significantly positive at first and third period. The results suggest that Asian positive rational and irrational investors tend to increase Asian Stock Market returns.

Figure 10, Graph (c) and (d) shows the response of Asian Stock Market risk to a rational and irrational sentiment in increases of 1-time standard deviation shock respectively. The results show in plot (c) & (d) insignificant responses of risk to rational and irrational

investors' sentiment over all periods respectively. The results implies that response of risk is unidentified at Asian countries together.

COMPARATIVE DISCUSSION

To investigate the impact of investor sentiment on return and risk of Asian Stock market. This study employs regression analysis on nine Asian countries individually (Sayim and Hamid, 2015; Bayram, 2017) and all nine Asian countries together. (Anusakumar et. al, 2017). For individual countries this study identified substantially changes in results from one to other country. Counties of Asia which includes China, Hong Kong Indonesia, Japan, Malaysia, South Korea, Taiwan, Thailand and Turkey.

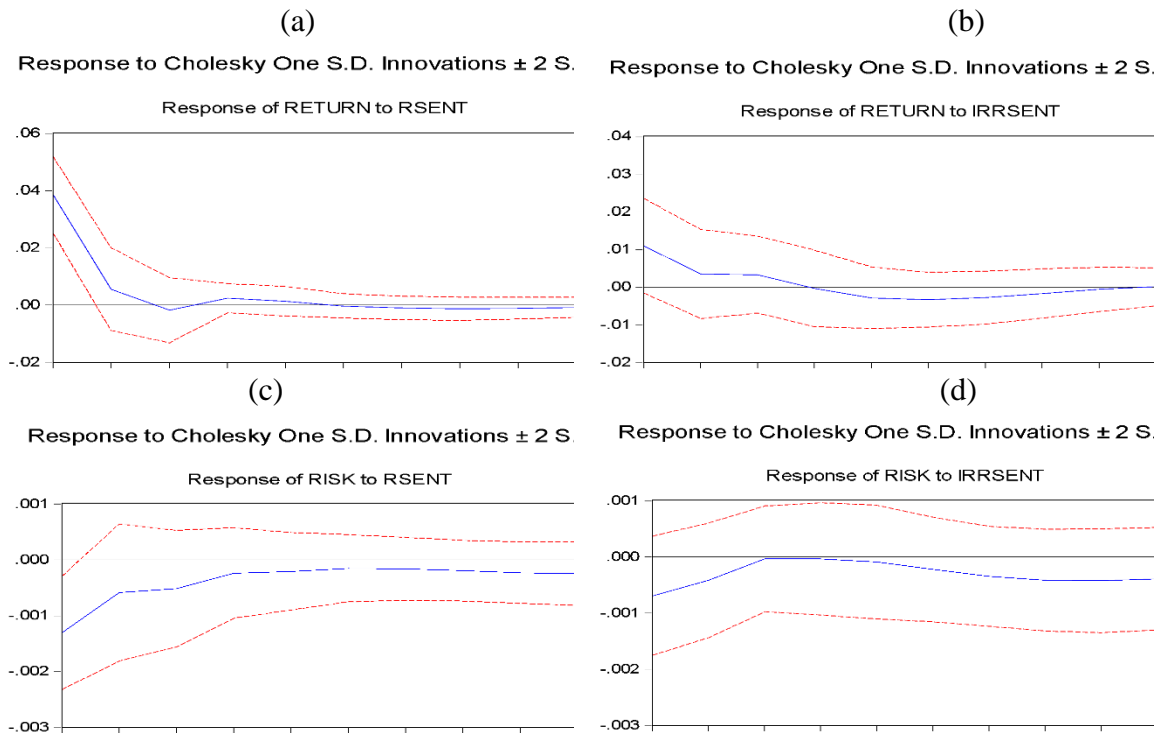


Figure 9: Graph (a) & (b), BIST100 returns response to Turkish (a) rational & (b) irrational investor sentiment. Graph (c) & (d) BIST100 risk response to Turkish (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

First, descriptive statistic is performed individually (Verma, 2008; Sayim and Hamid, 2015; Baryam, 2017). If the general value of consumer confidence index is above from 100 consumer confidence considered as optimistic, if the value is below 100 then it can be considered as pessimistic but if the value is equal to 100 the results reveal neutral opinion in consumer confidence (Sayim and Rehman, 2015) The results shows that China mean of sentiment (SENT) is 105% which is higher than other countries. The results indicates that china investors are more optimistic. South Korea mean of (SENT) is 102 percent, Hong Kong mean of (SENT) is 101 percent which indicates that those countries investors are optimistic. Indonesia mean of (SENT) is 100 percent which indicates that investors of

Indonesia are neutral. This is good condition for developed economy. However, the more pessimistic investors of Asian countries are Taiwanese. Taiwan mean of (SENT) is 75 percent. Thailand mean of (SENT) is 76 percent. Malaysia mean of (SENT) is 92 percent which indicates investors of those countries are also pessimistic as this condition is worst for economy development. On the other hand, Japan mean of (SENT) is 99 percent and Turkey (SENT) is 98.6 percent which are close to optimistic as in the future those countries investors become optimistic which is good for economy development. For all nine Asian countries the mean of (SENT) is 94.7 percent which indicates that most investors of Asia are pessimistic. The investors have more returns on share price are bullish due to the upward trend of stock prices on the other hand the investors have low return on share price are bearish due to the downward trend of stock prices (Verma et al, 2008). Asian countries average stock markets returns is .4 percent as this paper compared it to individual Asian countries than The mean of return of Turkey is .92 percent which is also high than other countries. The results reveal that Turkish investors are more bullish. Indonesia mean of return is .89 percent which is close to Turkey mean of return indicated that Indonesian investors are also bullish. Malaysian investors are bearish as the mean of return is only .21 percent which indicates that share price returns might be go down and it would be decline soon.

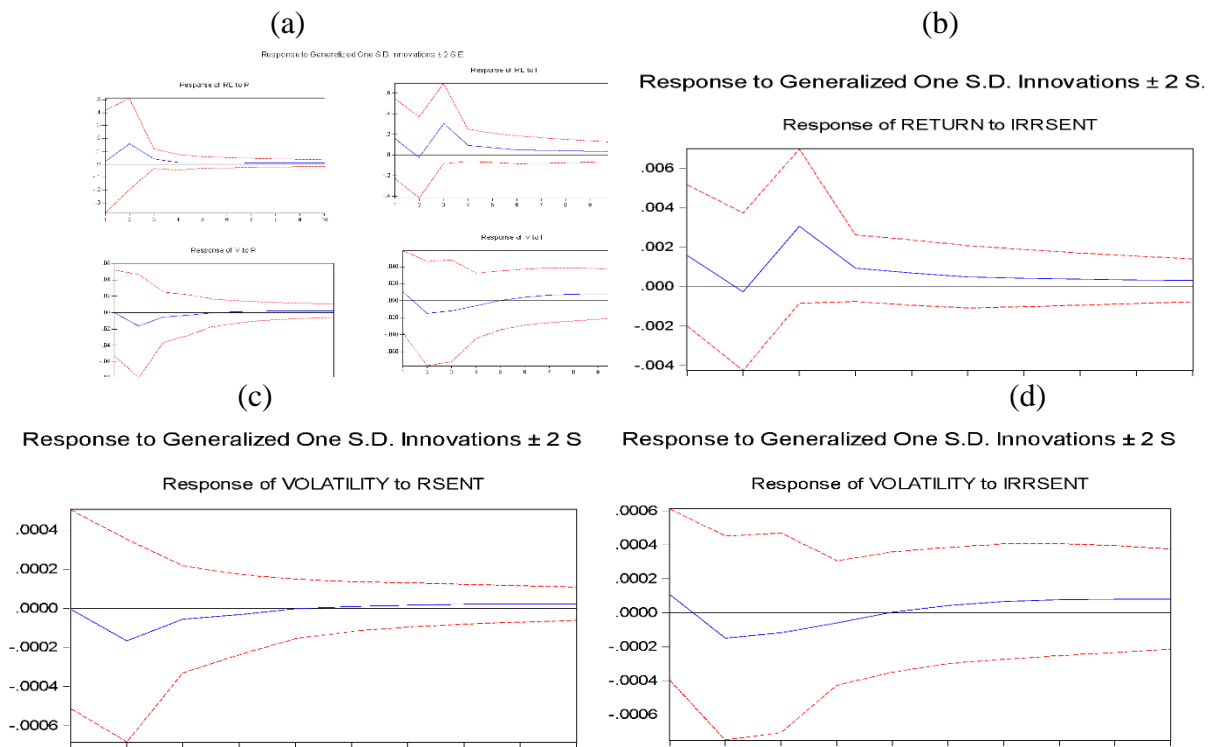


Figure 10: Graph (a) & (b), Asian Stock Markets returns response to Asian (a) rational & (b) irrational investor sentiment. Graph (c) & (d) Asian Stock Markets return's risks response to Asian (c) rational & (d) irrational investor sentiment. On each graph dashed lines shows the upper & lower 95% confidence band. The responses become significant statistically if both bands carry the same sign. Vertical axis represent return on (a) & (b) graph, volatility on (c) & (d) and time represent by horizontal axis.

The variable with high standard deviation than another variable is highly volatile (Verma et al, 2008; Sayim and Rehman, 2015; Anusakumar, 2017). Asian countries average (SD) of (SENT) is 13.9 percent as I compared it to the individual countries Malaysia standard deviation (SD) of (SENT) is very high than other countries as it is 22.06 percent which indicates that Malaysia sentiment (SENT) is highly volatile than other countries of Asia. As investor sentiment is change over the time from high to low or low to high. Indonesia SD of (SENT) is only 0.2 percent which is low than other countries sentiment's standard deviation. The results reveal that Indonesian (SENT) is less volatile.

Asian countries average (SD) of stock market return is 6.2 percent as this study compared it to the individual countries of Asia China standard deviation (SD) of stock market return is very high than other countries as it is 8.8 percent which is highly volatile. As return of share price is change over the time from high to low or low to high. Malaysia SD of stock market return is 3 percent which is low than other countries return's standard deviation. The results reveal that Malaysian stock market return is less volatile.

China SD of balance of trade is highly volatile as it is 8.6 percent. Japan SD of exchange rate is highly volatile as it is 13.8 percent during the most of the sample period. Taiwan SD of industrial production is highly volatile. For all nine Asian Countries of SD of exchange rate is highly volatile as it is 20.6 percent during the most of the sample period.

To estimate the impact of market fundamentals on sentiment this research performed ordinary least square (OLS) for individual countries (Sayim and Rehman; 2015; Bayram 2017). The results shows that balance of trade has significantly negative impact on sentiment of investor of Asian countries which includes china, Malaysia, South Korea and Turkey, however balance of trade has significantly positive impact on investor sentiment of Asian countries which include Indonesia, Taiwan and Thailand.

Exchange rate has significantly negative impact on investor sentiment of Asian countries which are Indonesia, Malaysia, Taiwan, and Thailand. However, exchange rate has significantly positive impact on investor's sentiment of Asian countries includes China, and Hong Kong. Industrial production has significantly negative impact on investor sentiment of Asian countries like China, and Hong Kong. On the other hand, industrial production has significantly positive impact on investor sentiment Asian countries which include Indonesia, japan, South Korea Taiwan, Thailand and Turkey.

Inflation rate has significantly negative impact on investor sentiment of Asian countries include Indonesia, Japan, South Korea and Taiwan and Hong Kong's inflation rate has significantly positive impact on investor sentiment. Interest rate has significantly negative effect on investor sentiment of Asian countries which are South Korea and turkey and interest rate has significantly positive impact on investor sentiment country named Thailand. From previous studies, market fundamentals have significant impact on investor sentiment as the results support previous studies results. (Brown amd Cliff, 2004; Verma et al, 2008; Sayim and Rehman; 2015; Bayram, 2017)

To estimate the impact of investor sentiment on stock market returns and risk this study employ Vector auto regression model (VAR) estimation to derive impulse response function (e.g Verma, 2006; Sayim and Rehman, 2015; Bayram, 2017). Impulse response function is used to detect rational and irrational investor's sentiment relationship with return and risk. Most of this study results support the behavioral theory of finance as

investors are both rational and irrational. The results vary from country to country. China, Japan, Taiwan and Turkey investors are both rational and irrational thus results of these countries support behavioral finance theory. The responses of Shenzhen Stock Exchange (SZSE) return to rational investor sentiment are significantly negative. The reason behind negative results is, China investor sentiment is too high and returns are low so increases in spending could decrease savings (Verma, 2008). The responses of SZSE risk to rational investor sentiment is positive which creates uncertainty and detect worst condition. Increases in investor sentiment tends to increase high price volatility in China (Hu & Wang 2012). On the other hand, the responses of SZSE risk to investor sentiment are significantly positive. As noise traders have minimum risk and reduce uncertainty of the stock market. However, the results related to irrational investor sentiment and return is insignificant and risk is significantly negative but results cannot be fully interpreted by systemic risk because it can be caused by unknown factor (Hu & Wang, 2012)

The Responses of NI225 return to rational and irrational investor's sentiment is significantly positive and NI225 risk to irrational sentiment is significantly negative. The responses of TWSE returns are positive to rational and irrational sentiment and responses of TWSE risk to rational and irrational investor sentiment are significantly negative. The results support the study as Taiwanese investors sentiment have positive relationship with returns and negative with volatility. (Chuang, 2010). The responses of ISE returns are significantly positive to rational and irrational investor sentiment and responses of ISE risk to investor sentiment is negative. The results reveal that investor sentiment have optimistic expectation to reduce risk and uncertainty. The results support the study as Turkish rational Investor sentiment have significant and positive impact on returns and negative on risk. (Sayim and Hamid, 2015; Bayram, 2017)

Hong Kong, Indonesia, Malaysia and Thailand investor's sentiment are only rational thus results support traditional theory of finance propose by (Fama, 1970) which stated that investors are rational and market is efficient. The responses of JKSE, KLSE, SETI returns to rational investor's sentiment is significantly positive. However, responses of Hang Seng return to rational investor's sentiment is significantly negative. Moreover, the responses of JKSE, and Seng risk is significantly positive as results indicates in the case of Indonesia that high sentiment of investor tends to increases return as well as risk. The responses of SETI risk to rational investor sentiment is significantly negative which indicates reducing risk and uncertainty of the market.

South Korean investors are irrational and results support behavioral theory of finance. The responses of KOSPI return is significantly positive to irrational investor sentiment and negative responses of KOSPI risk to irrational investor sentiment. The results reveal that most of successful investor which have high sentiment and high return with low risk and uncertainty are noise traders. Barber and Odean (2011) investor carry little information related to buy and sell decision and they are possibly affected by momentum and psychological biases. The results support the previous study as South Korean investor are irrational. (Karanasas et. al, 2017)

The responses of Asian stock markets return to rational and irrational investor sentiment is significantly positive. The results reveal that positive rational investor sentiment tends to increase Asian Stock Market returns. The response of Asian stock markets risk to rational and irrational sentiment is unidentified at Asia level because over all the period results are

insignificant. The results of Asian countries strongly support behavioral finance theory as in Asia there are investors are rational and irrational as well (e.g., Bayram, 2017; Soydemir et al, 2017)

CONCLUSION

This study examines the impact of investor sentiment on Asian stock market return and risk. (Anusakumar et. al., 2017) This study also examines the impact of investor sentiment on return and risk of Asian countries individually (Sayim and Hamid, 2015; Bayram, 2017; Soydemir, 2017) Countries of Asia which includes China, Hong Kong Indonesia, Japan, Malaysia, South Korea, Taiwan, Thailand and Turkey. The existing research paper has attempted to examine the relationship between investor sentiment and returns of stock markets. This study based on behavioral theory as investor are rational and irrational both (De Long et. al., 1990). This study following Verma and Soydemir (2006), Sayim and Hamid (2015), Bayram (2017)

Overall literature has revealed comparative studies between different countries of Asia as the results provide evidence that China mean of sentiment (SENT) is higher than other countries. However, the more pessimistic investors of Asian countries are Taiwanese. For all nine Asian countries the mean of (SENT) is 94.7 percent which indicates that most investors of Asia are pessimistic.

Asian countries average stock markets returns is .4 percent as I compared it to individual Asian countries than The mean of return of Turkey and Indonesia is high. As Turkish and Indonesia investors is more bullish. Malaysian investors are bearish as the mean of return is very low which indicates that share price returns might be go down and it would be decline soon.

The whole literature has revealed that investor sentiment significantly impacted by market fundamental. From previous studies, market fundamentals have significant impact on investor sentiment as the results support previous studies results. (Brown and Cliff, 2004; verma and soydermir, 2008; Sayim and Hamid; 2015; Bayram, 2017)

Most of this study results support the behavioral theory of finance as investors are both rational and irrational. There is noise traders exit in market or market is inefficient. The results vary from country to country. China, Japan, Taiwan and turkey investors are both rational and irrational. However, Hong Kong, Indonesia, Malaysia and Thailand investor's sentiment are only rational thus results support traditional theory of finance propose by (Fama, 1970) which stated that investors are rational and market is efficient.

South Korean investors are only irrational and results support behavioral theory of finance. In South Korea most of successful investor which have high sentiment and high return with low risk and uncertainty are noise traders. Barber and odean (2011) investor carry little information related to buy and sell decision and they are possibly affected by momentum and psychological biases.

The responses of Asian stock markets return to rational and irrational investor sentiment is significantly positive which tends to increase Asian Stock Market returns. The results support behavior theory of finance. (Brown and Cliff, 2004; Verma and Soydemir; 2008; Sayim and Hamid, 2015; Bayram, 2017) The response of Asian stock markets risk to rational investor sentiment and irrational sentiment is not identified or it might be ruined

by different responses of risk toward rational and irrational sentiment of investors from country to country. The results of Asian countries strongly support behavioral finance theory as in Asia there are investors are rational and irrational as well. Moreover, from country-to-country results are different.

This study will help policy makers to maintain the stability and to decrease financial market uncertainty and volatility. It is also helpful for individual investor to know about the irrational decision exit in certain countries and helpful for those countries Investors to take correct information about stock and take rational decision to invest in financial market rather than irrational decision which contain psychological biases and create uncertainty in the stocks market. This study is also helpful to know about optimistic and pessimistic investor's sentiment and have awareness about bullish and bearish investors. They can use certain strategies like contrarian strategy of investment for the hard to value stocks and to find out high risk in stock market. It is also helpful at downward trend follows by financial market in which investor can gain more return. This study will also helpful for international as well as domestic investors. The results of this research will add the body of existing knowledge for academics and industries researchers for control purpose. This paper will also helpful for the individual investor to improve their model of valuation of assets into the generating process of return. Investor can interpret factors of changes which occur in the stock volatility and return for different countries of Asia.

Notes: The results of VIF (Variance Inflation factor) and ADF unit root test will be available by author upon request.

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