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The Volatility of Indonesia Shari'ah Capital Market Stock Price Toward Macro Economics Variable

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INDONESIAN
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The Volatility of Indonesia Shari'ah Capital Market Stock Price Toward Macro Economics Variable

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Shari'ah stock market is also affected by many highly interrelated economic, social, political and other factor, same as the conventional stock market, the interaction between macroeconomic variables and Shari'ah stock market creating volatility in the stock price as a response towards several shocks. The sensitivity of Shari'ah stock market towards shocks happened related with the future expectation of micro and macro factor in one country which can be predict or unpredictable.

There are six macroeconomic variables that used in this research; inflation, exchange rate, interest rate, dow jones index, crude oil palm price, and FED rate. Using vector error correction model (VECM), the result shows that domestic macroeconomic variables that significantly affect Indonesia Shari'ah compliance for long term, while for international macroeconomic variables the selected variable such as FED rate and Dow Jones Index are not significantly affected Indonesia Shari'ah compliance both in short term and long term.

Keywords: *Indonesia Shari'ah compliance, Macro Economic Indicators, Impulse Response Function, Stock Price Volatility*

Introduction

Stock market is an economic and industrial institution that has major contribution for fund transfering and *Shari'ah* capital market as the part of the whole capital market system also contributes particularly in providing alternative investment and finacing channels through the movement and mobilization of economic resources. As a comparison with the conventional stock market, *Shari'ah* capital market is believed to be more stronger than the conventional stock market towards crisis, fundamental changes and exogenous financial shocks. The shocks are formed by the future expectation of micro and macro factor in one country either rationally or adaptively on economic fundamentals which can be predict or unpredictable. The relation between selected macroeconomic variables and *Shari'ah* stock price will be dicussed further below:

The relationship between inflation and stock price can exist either positively or negatively by looking at the inflation rate. The increasing inflation rate resulting into strict economy policy, thus making the free risk nominal rate

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will increase and at the same time, the discount rate will increase and creating the same result to *Shari'ah* stock price. In Indonesia, inflation rate based on the observation period were at the highest peak at February 2006 around 17.92 % and on the lowest rate on July 2009 at 2.71%. The relation between *Shari'ah* stock market can be described on whether *Shari'ah* stock market can be acted as inflation hedging. In Malaysia, although, inflation rate showed stability whereas the only increasing rate happened in 2008 because of global crisis, same as in Indonesia, *Shari'ah* stock market in Malaysia also acted as an alternative investment for inflation hedging.

The relation between *Shari'ah* stock price and exchange rate were lay on how much multinational companies classified in the *Shari'ah* stock market both in Indonesia and Malaysia. Currently, from 221 companies that classified in Indonesia *Shari'ah* compliance, 60% of them are categorized as multinational company, mainly coming from food and beverages industry. The relation between interest rate and *Shari'ah* stock price related to the capabilities of *Shari'ah* stock market as an alternative investment, although in *Shari'ah* compliance interest or riba is prohibited, but in the operationalization *Shari'ah* stock market can not separated from the conventional stock market. The influence of interest rate to *Shari'ah* stock market can be describe in individual decision towards the choice of spending more money or saving money in form of saving portfolio or to other portfolio such as *Shari'ah* stock market.

The relation between Dow Jones Index and *Shari'ah* stock price also can be described as the capabilities of *Shari'ah* stock market as alternative investment for foreign investor, since foreign investor will choose countries with high liquidation level. In Indonesia and Malaysia, currently the number of foreign investor were small compared to the domestic investor, which makes the increasing and decreasing of dow jones index influence them to move their fund into a more profitable portfolio.

The relation between FED rate and *Shari'ah* stock market were describe in the capability of US economy to influence other countries economy. FED rate will give affect to international trading and investor behaviour, because FED rate will increase discount rate and eventually influence the dividend expectation globally. More relation between FED rate and *Shari'ah* stock market also describe on how many companies that classified as *Shari'ah* both in Indonesia and Malaysia conducted international trading with US in form of export and import.

The relation between Crude Palm Oil and *Shari'ah* stock price is related to the pattern of CPO consumption and production in one country. The pattern of production depends on how many company that classified as *Shari'ah* stock market using CPO as their main material of production. In Indonesia *Shari'ah* compliance most of the companies are coming from food and beverages industries, thus making the increasing and decreasing of CPO proce bring many influences to the *Shari'ah* stock price movement.

Literature Review

General assumption is that *Shari'ah* capital market influence by domestic economic fundamental, but in the integrated economy, global economic fundamental also plays as a major factor that contributed to the movement of stock price. The common macro economic factor that influence the stock price movement is exchange rate and interest rate, although the operationalization of *Shari'ah* capital market is not considering interest rate as the determining factor. The significant interest on the performance of *Shari'ah* capital markets has been contributed to the conduct of macroeconomic policies impact and stock market in recent years.

The relationship between inflation and stock price can exist either positively or negatively. The indication that inflation will increase the cost of production and at the same time it will also decrease the expected valued cash flow and profit of the company. Shabri et al (2001), Ibrahim and Aziz (2003) specified this relationship through the concept of protection value. Equities serve as a hedge againts inflation as they represent claims on real assets.

Spyrou (2001) studied the relationship between stock returns and inflation for the emerg-

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ing economy of Greece during the 1990s. The results of the study suggested a negative and significant relationship between stock returns and inflation for the period up to 1995, whereas the relationship was insignificant for the remaining period. Choudry (2001) carried out a study to find the relationship between rates of inflation and current stock returns. The results showed a positive relationship between rates of inflation and current stock returns. The result showed a positive relationship between inflation and stock prices in high inflation economies of Argentina, Chile, Mexico, and Venezuela. The findings of the study were in contrast to evidence of a negative relationship stated by previous researchers.

The relation between interest rate and stock price are in the negative form. The increase in interest rate will increase the free risk nominal rate and at the same time will increase the discount rate. The same statement also came from Hamrita and Abdelkader (2011); the rise in interest rate reduces the present value of future dividen income which will depressed stock price conversely. Low interest rate result in lower opportunity cost of borrowing. Lower interest rate stimulate investment and economic.

Chutang and Kumara (2010) attempts to identify the impact of short term interest rate which are measured by 91 days, 182 days and 364 days treasury bill rates on stock prices of Srilanka. Using multiple regression analysis and augmented dickey fuller unit root test, autocorrelation and Multicolinearity support the regression result. The study found that there are weak relationship between short term interest rate and stock price of Sri lanka and correlation between 364 treasury bill rate and the stock price indicates a negative relationship.

The other macroeconomics variables that influence to the stock price is oil price. Academic and practitioners has been trying to explore the relationship between oil price shock and the macro economic variables after oil price shock at the end of 1980. Several papers have been examined the influence of oil price and stock price ranging from major European, Asian, and Latin American emerging markets. Their results indicate a significant short-run linkage between oil price changes and emerging stock markets. For instance, using a VAR model, Papapetrou (2001) finds a significant relationship in Greece while Basher and Sadorsky (2006) reach the same conclusion for the other emerging stock markets using an international multifactor model.

Gogineni (2007) and Yurtsever et al (2007) also provide statistical support for a number of hypotheses, such as oil prices positively associate with stock prices, if oil price shocks reflect changes in aggregate demand, but negatively associate with stock price, if they reflect changes in supply. In addition, stock prices respond asymmetrically to changes in oil prices, in a sense that higher oil prices are associated with lower stock prices, while lower oil prices are not associated with higher stock prices.

The other macroeconomy variables that empiricaly showed relation the stock price movement is exchange rate. The interaction between capital market and exchange rates or currency has been a discussion over the last 25 years. Portfolio balanced approaches or 'stock oriented' models developed by Branson et al (1977) postulates the opposite to the flow models, that is, that movements in stock prices can cause changes in exchange rate via capital account transaction of buying and selling of domestic securities in foreign currency, in response to domestic stock market movements has a flow through effect into curency market.

Study conducted in developed countries and the new EU member establish by Stavarek (2004) they examine the intensity nor direction of causal relationship in the same developed economies and the new EU member countries. Obben et al (2006) imply that there is bidirectional causality in the foreign exhange and New Zealand stock market both in the short run and in the long run. As to emerging market, the result of Abugri (2008) reveal that the response of Brazilian and Mexican stock returns to an exchange rate shock are negative and signifcant, while neither in Argentina nor chile stock return respon significantly to exchange rates. Adam and Tweneboah (2008) show that there is negative relationshipo between Ghana stock market and exchange rate. Tabak (2006) indicates that

Table 1. Indonesia *Shari'ah* Compliance Data Collection

Notations	Index	Sample Period	Observations
ISC	Indonesia *Shari'ah* Compliance	2000 : 1 to 2010 : 12	214 Companies

Table 2. Macro Economic Variables

Variable	Period
Indonesia *Shari'ah* Compliance (ISC)	Yearly Data From 2000-2010
Crude Palm Oil Price	Yearly Data From 2000-2010
Fed Rate	Yearly Data From 2000-2010
Dow Jones Index	Yearly Data From 2000-2010
Interest Rate in Indonesia	Yearly Data From 2000-2010
Exchange Rate of IDR	Yearly Data From 2000-2010
Inflation Rate in Indonesia	Yearly Data From 2000-2010

there is no long run relationship, but there is linear granger causaliti from stock prices to exchange rates with a negative correlation.

Karamustafa and Kucukkale (2003) point out that the relations between stock returns and exchange rate is uncertain. Indicating that the LSE (London Stock Exchange) is neither the result variable nor the cause variable of exchange rate variables. The same statement also came from Ozturk (2008) that indicated the non causality between stock return and exchange rate. The empirical result of Aydemir and Demirhan (2009) indicate that there is bidirectional causal relationship between exchange rate and all stock market indices. Yildirtan (2007) shows that there is no relation between the deviations of real exchange rate variables and the LSE-100. Analysis of Kandir (2008) point out that exchange rate seems to affect all of the portfolio returns, while the regression results of Tursoy et al (2008) point out that there is no significant pricing relation between stock return and exchange rate.

Fang and Miller (2002) investigated empirically the effects of daily currency depreciation on the stock market returns by applying a bivariate GARCH-M model during the Asian financial crisis for five newly emerging East Asian stock markets. The results revealed that the conditional variance of returns and depreciaton rates exhibited time-varying disposition across all countries. Domestic currency depreciation and its uncertainty negatively affected the stock returns for all the countries. The significant impact of foreign exchange markets events on the stock market returns suggested that international portfolio managers who invested in the newly emerging East Asian Stock Market should assess the worth and strength of the domestic currency as a constituent of their stock market investment decisions.

Research Method

Data

A total of six macroeconomic variables used in the analysis. The variable, time-series transformation and collection of data are described in Table 1 and 2.

Methodology

In this research there are two model of equation which is the *Shari'ah* compliance in Indonesia which is presented in Indonesia *Shari'ah* compliance and Kuala Lunpur *Shari'ah* compliance. Variable for Indonesia *Shari'ah* Compliance were using seven variable, and in VAR/VECM Model there are seven equation, in form of :

$$\boldsymbol{ISC_t} = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (1)$$

$$\boldsymbol{OIL_t} = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (2)$$

$$\boldsymbol{FED_t} = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (3)$$

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$$DOW_t = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (4)$$

$$CPII_t = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (5)$$

$$BIR_t = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 FED_{t-k} + A_4 DOW_{t-1} + A_5 CPIIt\text{-}m + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (6)$$

$$ERI_t = A_0 + A_1 JII_{t-i} + A_2 OIL_{t-j} + A_3 Gold_{t-k} + A_4 DOW_{t-1} + A_5 CPII_{t-m} + A_6 BIR_{t-n} + A_7 ERI_{t-o} + \varepsilon_t \quad (7)$$

Impulse Response Function Analysis

Impulse response function (IRF) of a dynamic system is output when resented with a brief input signal, called an impulse. More generally, an impulse response refers to the reaction of any dynamic system in response to some external change. Impulse response functions show the effects of shocks on the adjustment path of the variables. Forecast error variance decompositions measure the contribution of each type of shock to the forecast error variance. Both computations are useful in assessing how shocks to economic variables reverberate through a system. To compute the impulse response functions the disturbances from the moving average (reduced form) representation of the model are then orthogonalised using the Choleski decomposition.

Result and Discussion

Indonesia *Shari'ah* Compliance *Impulse Responses Function* (IRF)

Impulse Response Function of Indonesia *Shari'ah* compliance (appendix 1) showed the responses of Indonesia *Shari'ah* Compliance through the shock on macroeconomic indicator in Indonesia for periods of 11 years. Towards this analysis we can see how much period that needed by Indonesia *Shari'ah* Compliance to return to long term even point if there is a shock on macroeconomic indicator.

A. Response of Indonesia *Shari'ah* Compliance Stock Price Movement Towards Crude Palm Oil Price

The response of Indonesia *Shari'ah* compliance stock price towards crude palm oil price (CPO) were negative. The response showed that every shock that happened in CPO in form of the increasing of the price, will be response negatively by stock price, although 40% of companies that classified in the *Shari'ah* compliance in Indonesia were coming from oil and mining industry. The response also changing through the period of observation, the volatility of the response also showing that Indonesia *Shari'ah* compliance stock price were very influence to the changing that happened in CPO price, particularly before and after period of crisis, although the characteristics of *Shari'ah* compliance were different from conventional stock market but the number of local and foreign investor that invest in *Shari'ah* compliance in Indonesia were huge and most of them choose the oil and mining industries.

B. **Response Indonesia *Shari'ah* Compliance Stock Price Movement Toward the Shock of Fed Rate**

The response of *Shari'ah* stock price towards the changing of FED rate were showing volatility. In short term the response were showing positive response but change very rapid to negative response were the negative response tend to happened before and after period of crisis, although the response could be understand as the action to make speculative action toward the differences that happened in the rate between domestic interest rate and FED rate. The volatility of the response from foreign investor in Indonesia *Shari'ah* compliance in Indonesia that reached 40% from domestic investor

in Indonesia, since Indonesia capital market is categorized as one of the most liquidate capital market in the world, the more liquidated the more profitable the capital market to move from one capital market locally and internationally.

C. Response of Indonesia *Shari'ah* Compliance stock price movement towards the shock in Dow Jones Index (DOW)

The response of Indonesia *Shari'ah* compliance stock price toward the Dow Jones Index (DOW) were showing volatility. The volatility showed that if there is a changing or shock in the DOW, the response of Indonesia *Shari'ah* compliance stock price showed negatively or positively that changed rapidly. The relation between Dow Jones Index and Indonesia *Shari'ah* compliance happened because of the relation of capital market in Indonesia and Malaysia, not only from the number of foreign investor that invest in both countries but also from the integration of economy between US and Indonesia.

D. Response of the Indonesia *Shari'ah* compliance Stock Price movement Toward Indonesian Bank Rate

Indonesia interest rate that determined by Indonesia central bank, since Indonesia interest rate were based on market, thus making the supply and demand from market influencing government through Indonesia central bank to determined the interest rate. From 2000-2010, the influence of interest rate towards the movement of Indonesia *Shari'ah* compliance stock price were showing volatility, whereas in the beginning of observation period, there is a tendency of positive response while in the middle and in the end of the observation period the response tend to showed negative. The volatility of the response related with the response from investor, although Indonesia *Shari'ah* compliance were not considered companies that using interest as one of classified companies since interest as prohibited in the operationalization but in the trading implementation, Indonesia *Shari'ah* compliance and conventional stock market could not separated from each other, thus making interest rate as one of determinant factor for *Shari'ah* compliance.

E. Response of Indonesia *Shari'ah* compliance price movement towards the Shock of Rupiah Exchange Rate

In the beginning of period analysis, Indonesia *Shari'ah* compliance were response positively towards the shock that happened in Rupiah Exchange rate. The positive response is the accumulation of short term depreciation and positive sentiment in capital market. The result of the analysis are in line with the theory of market efficiency whereas Rupiah depreciation is valued as good news since the depreciation will improve Indonesia product competitivenes in domestic and international trade. If the value of American Dollar decrease towards Rupiah currency or any other currency in the world it will affect the value of their export in domestic countries.

F. Response of Indonesia *Shari'ah* Compliance stock price movements towards The shock in Inflation

The response of Indonesia *Shari'ah* compliance stock price through the observation period are showing negative response, although at the beginning of the period there is a tendency of positive response. The negative response were happened since most sector in Indonesia bussines were influenced by the level of inflation in Indonesia, including most of the companies that classified in the Indonesia *Shari'ah* compliance.

On the contrary, the relation between interest rate towards capital market particularly *Shari'ah* compliance is independent, while the relation of composite index particularly composite index towards interest rate is relatively independent. Which resulting into the volatility of interest rate will influence Indonesia *Shari'ah* Compliance stock price movement. If the exante real rate of interest is assumed constant, then economic agents will require a nominal return that will compensate for the marginal utility of forgone current consumption (measured

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by the real interest rate) and the decline in the purchasing power of money. The decline in the purchasing power of money is commonly proxied by the price inflation that is expected to occur over the life of the loan. This relation were implement vice versa whereas inflation rate will influence the Indonesia *Shar'iah* compliance stock price movement but the increasing and decreasing of Indonesia *Shari'ah* Compliance does not have any influence towards inflation.

Conclusion

This study examines the relationship between the *Shari'ah* stock market price and macroeconomic variables (inflation, CPO price, FED rate, Dow Jones Index and SBI rate) in Indonesia. The data were set up for eleven years from 2000-2010, in order to get more detail and deep analysis. Using vector error correction model (VECM). From the VECM analysis shows that there are two macroeconomic variables (CPO price and inflation) that are the most significant influential variables to cause the movements of Indonesia *Shari'ah* compliance. CPO price and inflation are both domestic macroeconomic variables which influences the volatility of *Shari'ah* compliance stock price in Indonesia, compared to the international macroeconomic variables such as FED rate or Dow Jones. The result also explained that the volatility of Indonesia *Shari'ah* compliance were more influence to the policy that taken by government domestically, therefore, it is suggested to the government particularly the policy maker to carefully implementing countries policies. Furthermore, since number of foreign in investor in Indonesia stock exchange is high compared to domestic investor, it is also recommended for regulator in Indonesia *Shari'ah* compliance to carefully watched the fund movement from domestic to foreign countries and vice versa to avoid profit speculation that against the concept of market efficiency.

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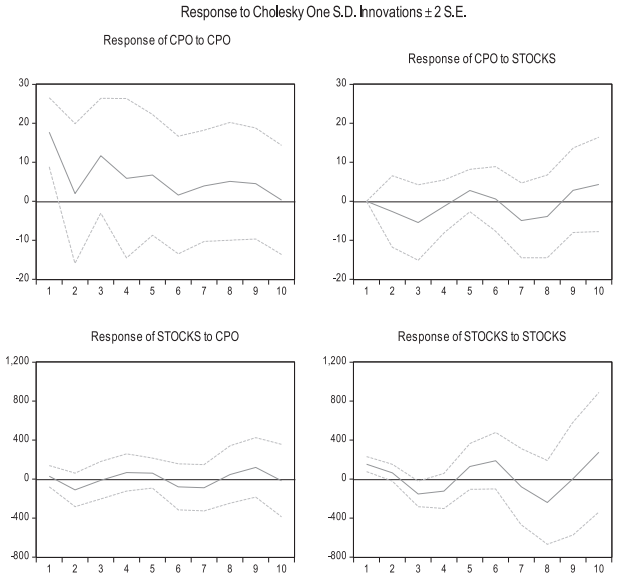
Appendix

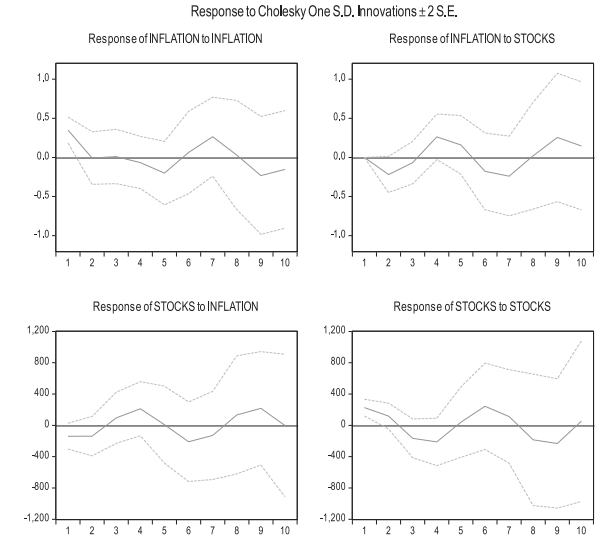
Vector Autoregression Estimates
Date: 05/08/14 Time: 09:16
Sample (adjusted): 2002 2009
Included observations: 8 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	CPO	STOCKS
CPO(-1)	0.140881	-6.973510
	(0.52487)	(4.62293)
	[0.26841]	[-1.50846]
CPO(-2)	0.578951	4.904205
	(0.48364)	(4.25975)
	[1.19708]	[1.15129]
STOCKS(-1)	-0.017199	0.420473
	(0.02959)	(0.26066)
	[-0.58117]	[1.61314]
STOCKS(-2)	-0.026022	-1.297307
	(0.03207)	(0.28246)
	[-0.81141]	[-4.59289]



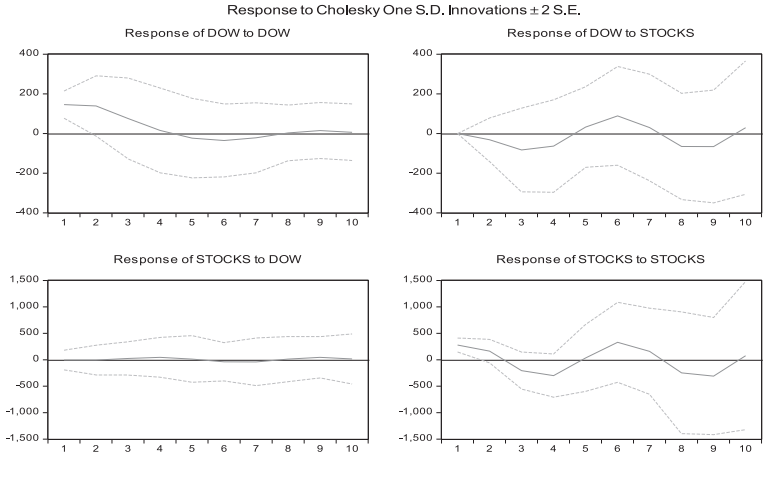
Vector Autoregression Estimates
Date: 05/08/14 Time: 09:22
Sample (adjusted): 2002 2010
Included observations: 9 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	INFLATION	STOCKS
INFLATION(-1)	-0.412493	-188.4326
	(0.40492)	(307.546)
	[-1.01871]	[-0.61270]
INFLATION(-2)	-0.439250	-2.484921
	(0.34378)	(261.114)
	[-1.27769]	[-0.00952]
STOCKS(-1)	-0.000967	0.517385
	(0.00046)	(0.34596)
	[-2.12194]	[1.49552]
STOCKS(-2)	-0.000194	-1.190551
	(0.00063)	(0.47656)



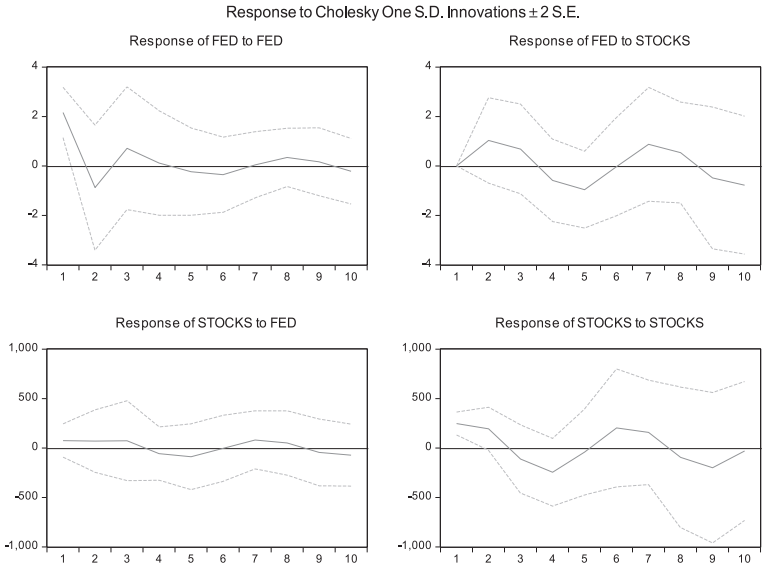
Vector Autoregression Estimates
Date: 05/08/14 Time: 09:18
Sample (adjusted): 2002 2010
Included observations: 9 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DOW	STOCKS
DOW(-1)	0.948073	-0.026477
	(0.46233)	(0.88526)
	[2.05062]	[-0.02991]
DOW(-2)	-0.392568	0.186750
	(0.42759)	(0.81873)
	[-0.91810]	[0.22810]
STOCKS(-1)	-0.113702	0.582929
	(0.19534)	(0.37404)
	[-0.58206]	[1.55849]
STOCKS(-2)	-0.124756	-1.079820
	(0.22413)	(0.42916)
	[-0.55661]	[-2.51611]



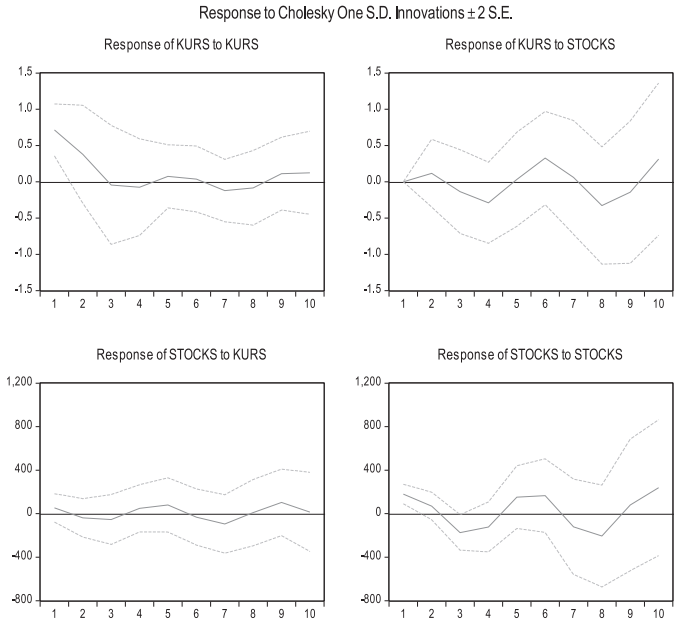
Date: 05/08/14 Time: 09:21
Sample (adjusted): 2002 2010
Included observations: 9 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	FED	STOCKS
FED(-1)	-0.549441	4.791695
	(0.51461)	(61.4608)
	[-1.06769]	[0.07796]
FED(-2)	-0.088857	48.28762
	(0.54774)	(65.4174)
	[-0.16223]	[0.73815]
STOCKS(-1)	0.004167	0.784834
	(0.00336)	(0.40097)
	[1.24123]	[1.95733]
STOCKS(-2)	0.001784	-1.088504
	(0.00378)	(0.45089)
	[0.47244]	[-2.41412]



Vector Autoregression Estimates
Date: 05/08/14 Time: 09:25
Sample (adjusted): 2002 2009
Included observations: 8 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	KURS	STOCKS
KURS(-1)	0.482186	-82.58916
	(0.48573)	(127.630)
	[0.99271]	[-0.64710]
KURS(-2)	-0.184326	66.55970
	(0.43892)	(115.330)
	[-0.41996]	[0.57712]
STOCKS(-1)	0.000647	0.386651
	(0.00129)	(0.33881)
	[0.50190]	[1.14120]
STOCKS(-2)	-0.001312	-1.059047
	(0.00129)	(0.33973)
	[-1.01464]	[-3.11728]



Vector Autoregression Estimates
Date: 05/08/14 Time: 09:26
Sample (adjusted): 2002 2009
Included observations: 8 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	SBI	STOCKS
SBI(-1)	-0.132138	-5.664817
	(0.48767)	(29.7817)
	[-0.27096]	[-0.19021]
SBI(-2)	-0.268705	20.77357
	(0.35727)	(21.8184)
	[-0.75211]	[0.95211]
STOCKS(-1)	-0.001773	0.270958
	(0.00450)	(0.27473)
	[-0.39402]	[0.98625]
STOCKS(-2)	-0.002412	-1.015764
	(0.00460)	(0.28067)
	[-0.52474]	[-3.61903]