ROLE OF INTEREST RATE IN ATTRACTING THE FDI: STUDY ON ASEAN 5 ECONOMY

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Abstract—**This paper is concerned with the foreign direct investment (FDI) inflow and its determinant in ASEAN 5. The analysis is based on the data over the years, 1986 to 2012 using Vector Auto regression (VAR) Technique. The objective is to analyze the relationship of (FDI) inflow and interest rates (IR). The finding suggests that interest rates of Thailand, Indonesia and Malaysia have negative relation with foreign**

Keywords **— Real Interest rates, Foreign direct investment inflow.**

I. INTRODUCTION

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

The increasing globalization of economic activity includes the huge increase of capital flow in the form of foreign direct investment and portfolio investment between countries.

If we talk about the foreign direct investment, it is conventionally defined as a "form of international inter-firm cooperation that involves a significant equity stake in, or effective management control of, foreign enterprises" (De Mello Jr, 1997). FDI is believed to contribute to economic growth as the latter may be supported by the enlargement of the volume of investments or by the increase of their efficiency. All countries are hence therefore trying to attract the FDI for greater benefits. Various studies reflect that economic growth can be influenced by FDI in majority of the countries (Chowdhury, 2006; Roy, 2012; STANCU, 2012). There is vast amount of literature and several researches to signify the importance of independent variables or determinants in determining the inflow of FDI in any country. The determinants and their relationship with FDI are:

1) GDP growth rate: (Anna, 2012; Chakrabarti, 2001; Singhania, 2011). There is a positive effect of GDP growth on FDI. FDI increases as GDP increases which results in increased economic activity. GDP growth brings increased opportunities of investment which attracts investors and FDI.

2) Inflation rate(Anna, 2012; Singhania, 2011).). Inflation rate effects capital preservation of FDI. Higher or lower inflation can effect on profitability as higher or lower prices can lead to increased cost or lower profits. So, stable inflation rate is desirable for FDI.

3) Real interest rate(Anna, 2012; Singhania, 2011) Interest rate is return on investment, investor will channel their investments from low interest rates to higher interest rate, because it provides incentive to foreign investors looking for higher returns therefore high interest rate can lead to increased FDI.

4) Openness of economy (Anna, 2012; Chakrabarti, 2001; Singhania, 2011). Openness means amount of exports and imports. More total international interaction means more investment opportunities for FDI.

5) International reserves (Anna, 2012) International reserves reflect health of economy. Higher international reserves increase confidence of investors which lead to increase in FDI.

6) External debt (Anna, 2012) Increased external debt/GDP ratio has a negative effect and lower debt/GDP ratio has a positive effect on FDI. Higher loans can be perceived as result of bad economic policies.

7) Taxes (Anna, 2012; Chakrabarti, 2001) Taxes influence business decisions. Lower tax means investors can take away higher amount of profits earned. Higher taxes are supposed to be a hurdle to FDI.

8) Political rights(Anna, 2012) Political stability is positive in business decisions. Political freedom portrays good image of country and attracts increased FDI.

9)Infrastructure (Anna, 2012). Countries with good infrastructure are expected to attract more FDI. Infrastructure as roads, airports etc provide facilities to industries and reduce cost which result in increased profitability.

10) *Natural resource availability* (Anna, 2012). Resources are essential in business. Countries with abundant natural resources will attract FDI for resources.

11) Market size (Chakrabarti, 2001). Market size is important determinant of FDI. Larger market size can utilize FDI efficiently. As market size grows so will FDI.

12) Labor cost Trade barrier(Chakrabarti, 2001) Trade barrier as government restrictions on foreign investments and other similar regulations can be negative for FDI.

13) Trade deficit(Chakrabarti, 2001). Trade deficit is often referred as important determinant of FDI. Trade surplus is positive for attracting FDI, as it is sign of high production levels and capability of exports.

14) Exchange rate(Chakrabarti, 2001) Stable exchange rate is positive for FDI. With highly volatile exchange rate it will be difficult to forecast costs and profits on FDI.

15) Money growth(Singhania, 2011). Money growth means increase in availability of money in financial market. It has improved effects on FDI.

FDI is mostly defined as capital flows resulting from the behavior of multinational companies (MNCs)(Agiomirgianakis, 2003). The Economic theory of international capital mobility suggests that Capital will move to the countries that generate higher rate of return compared to the world interest rates (Pholphirul, 2002). It reflects that investment is distributed among those countries who offered good returns and security in the form of interest rates. Therefore the amount of funds to be invested in a country in any time period moves from one country to another country.

The purpose of study is to examine the relationship of FDI inflows and interest rates in ASEAN 5 economy. We

plan to undertake regression analysis and determine if there is a way to predict how the countries compete to attract the FDI inflow using the real interest rate variable. This will help in testing whether a positive or a negative relationship holds true between the interest rates and FDI inflows.

II. LITERATURE REVIEW

There have been numerous studies which try to explain FDI theories on motivation of investors to invest in foreign countries, its effects on economy and its determinants. This literature review provides an overview of different theories on effects and determinants of FDI.

First, starting with the main FDI theories which try to determine motivation behind investing in foreign countries, we have found four main theories on FDI, "the production cycle theory" "theory of exchange market or imperfect capital" "the international theory" and "the eclectic (OLI) paradigm of Dunning"

According to "The production cycle theory"(Vernon, 1966) there are four stages in production cycle, innovation, growth, maturity and decline. Initially a company starts with a product/idea , it grows on it in home and host country, attains maturity stage where its growth slows before decline due to less innovation or competition from other countries. In order to sustain market share in host country companies engage in FDI by bringing production facilities near target market in host countries.

According to "theory of exchange market or imperfect capital"(Cushman, 1985) companies engage in FDI due to fluctuations in exchange rate. Appreciation or depreciation of exchange rate can affect profitability and costs of company operation. By FDI and by moving operations to a host country many uncertainties caused by exchange rate fluctuations can be reduced.

"The international theory"(Hymer, 1972). This is in some way is similar to production cycle theory. According to this theory MNC's in order to increase their market share in global market do FDI in foreign countries. They get two significant benefits from it, one is they remove emerging local competition with their global expertise and other is they develop their further expertise by acquiring local resources and management practices.

"The eclectic (OLI) paradigm"(Dunning, 1988). According to this theory company's investments in home or host country are influenced by in OLI, O for ownership, L for location and I internationalization. Ownership of intangible assets like patents, trademark brings recognition and trust in brand. Location brings benefits in cost of transportations, and easy access, and internationalization brings benefit of cross border activity of company, larger target markets and resource availability.

Above theories try to explain some reasons behind motivation for FDI. FDI can have different effects on host country's economy. It can be an important source of development, financing in infrastructure, technology, and management expertise. It can play important role in economic growth by increasing volume of investment and efficiency in markets. (STANCU, 2012) found that FDI influence economic growth in sustained way and growth level of infrastructure. (Sethi, 2003) found that other than inflow of foreign investment, technology transfer, development of skilled labor force, higher productivity and value addition are some other benefits of FDI. MNC's from developed world can improve competition with/amongst local entrepreneurs of host country(Masron, 2012). On other hand FDI can have some unintended negative effects as well. "The effect of FDI on economic growth depends on whether FDI compliments or substitutes DI" (De Mello, 1999), (Mohamed, 2013). FDI can effect negatively by crowding out domestic investment (Masron, 2012). (Mohamed, 2013) research on FDI and DI (domestic investment) found no relation between FDI and economic growth in Malaysia. It is argued that depending on nature of FDI it can be opportunity or competition for domestic businesses, therefore linkages between FDI and DI are important to be considered for maximum benefit of FDI(Mohamed, 2013). FDI doesn't always effect economic growth, but economic growth can also attract and stimulate FDI, due to increased economic activity which expands market size and opportunities for foreign investors to benefit from expanding economic size (Roy, 2012).

There are many factors that have been identified as FDI determinants from micro or macroeconomic, social and political perspective. Due to significant importance of FDI in economic development many researchers have tested different variables to understand their effects on FDI. (Aw, 2010) in research on determinants of FDI in case of Malaysia found relation exists in FDI and markets size, openness, infrastructure, interest rate, exchange rate, inflation and level of corruption. For FDI determinants in India it was found that GDP, inflation rate and scientific research are significant variables(Singhania, 2011). Openness or linearization of economy is an important determinant of FDI, and a more liberal economy is likely to have more positive benefits of FDI on host country(Singhania, 2011).(Chakrabarti, 2001) found robust relationship between FDI and market size in India, he also found relationship in FDI with other variables like openness real, exchange rate, tariff trade balance inflation etc. On relationship between FDI and GDP in research(Roy, 2012) it was found that for countries China, India, Pakistan, Sri Lanka, Indonesia, Philippines, and Singapore direction of causality run from economic growth to FDI, for Malaysia there was no causality in FDI and GDP.

Interest rate is another important determinant of FDI. Interest rate adjusted for inflation is good measure and important variable of FDI inflows (Singhania, 2011). Interest rate is cost of borrowing and return on savings. Investors will look for low cost funding sources or lower rates and will invest in higher return or higher interest rates. It means capital will move from low rate country to high rate country.(Chakrabarti, 2001) found positive relation between interest rate and FDI in India, while (Anna, 2012) did not found any significant impact on FDI in Zimbabwean economy. I want to study interest rate and FDI relation in (ASEAN5) Indonesia, Malaysia, Philippine, Singapore and Thailand to find out relation between FDI inflow and interest rate.

A. Conceptual Frame work and Hypothesis Development

The study is designed to focus on determinants influencing FDI in comparison to interest rates. The independent variables are IR (Interest rate), EXR (Exchange rate), GDP (Gross domestic product), INF (Inflation) and the dependent variable is FDI. Independent variables are IR (Interest rate), EXR (Exchange rate), GDP (Gross domestic product), INF (Inflation) and the dependent variable is FDI.

Fig. 1 Conceptual frame work

This conceptual model presents a framework of determinants that influence the FDI. These four factors are falling in to the one of the two categories of core drivers of FDI..(Anna, 2012)

1) Determinants of FDI:

Determinants of FDI are the underlying patterns identified to evaluate and understand the concept in a systematic manner of a host country for inward FDI by taking different combinations of determining factors in consideration. A number of method exist that calculate a potential of host country in attracting FDI inflow The table below shows empirical results obtained by different researchers on study of FDI and its determinants. It puts light on relationship between the factors of FDI
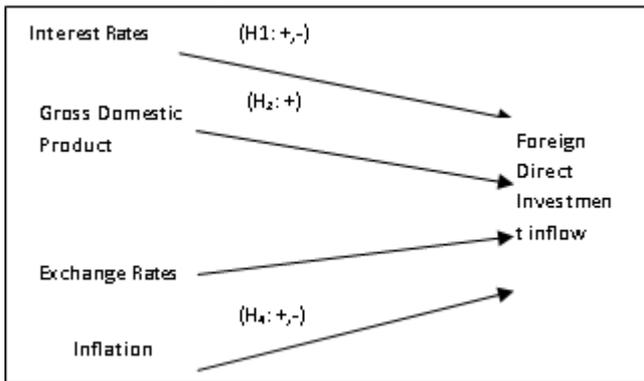
TABLE I. STUDIES BY VARIOUS RESEARCHERS

Determinants	Positive significant	Negative significant	Methodology
Interest rates	• (Cavallari, 2012) • (Aw, 2010) • (Arbatli, 2011)	• (Cavallari, 2012) • (Onyeiwu, 2004) • • (Onyeiwu, 2004)	• Baseline regression method • The fixed effects model, random effect mode • Two step procedure • Engle-granger test and OLS • dynamic panel regression and two-step system GMM estimator
GDP	• (Chakrabarti, 2001) • (Aw, 2010) • (Singhania, 2011) • (STANCU, 2012) • (Ozturk, 2007) • (Anna, 2012) • (Liu, 2005)		• EBA method • Engle-granger test and OLS method • (ARIMA) autoregressive integrated moving average • Granger causality test • Method Engle-granger co-integration and granger causality test. • CLRM ordinary least square (OLS) method • Simple and simultaneous equation.
Exchange rates	• (Arbatli, 2011)	• (Chakrabarti, 2001) • (Aw, 2010) • (shan, 2005) • (Benassy, 2001) • (Froot, 1991) • (Cushman, 1985) • (Goldberg, 1997) • (Grosse, 2005)	• EBA method • Engle-granger test and OLS method • VAR method • Dynamic panel regression and two-step system GMM estimator • Risk averse model • Townsend's costly-state-verification approach • Bilateral direct investment flows • Regression over a time series panel and Regression • Multiple regression
Inflation	• (Onyeiwu, 2004) • (Aw, 2010) • (Singhania, 2011)	• (Arbatli, 2011) • (Liu, 2005) • (Grosse, 2005)	• The fixed effects model, random effect model • Engle-granger test and OLS • (ARIMA).autoregressive integrated moving average • Dynamic panel regression and two-step system GMM estimator. • Simple and simultaneous equation system techniques. • Levin-lin unit test root.

The various studies reveal that there are controversial issues in relationship of Interest rate, and inflation with FDI inflows, whereas exchange rate has negative and GDP has positive relationship with FDI inflows.

According to (UNCTAD, 1998), "it is hard to derive any conclusion from these studies as to whether the list of determinants has changed over time or whether some have gained or lost importance".

The hypotheses describing the relationship between the variables for the study are presented below.

2) Null hypothesis:

H_0: Interest rates have no relationship with FDI

3) Alternative hypothesis:

H1a: IR has positive relation with FDI.

H1b: IR has negative relation with FDI.

H2: GDP has positive relation with FDI.

H3: EXR has a negative relation with FDI.

H4a: INF has positive relation with FDI.

H4b: INF has negative relation with FDI

III. METHODOLOGY AND ECONOMETRIC FRAMEWORK:

As mentioned in the previous sections, the focus of this paper is to investigate whether a positive or a negative relationship holds true between the real interest rates and FDI and how real interest rates have a part to play to attract the FDI in contrast to GDP, Inflation and Exchange Rate. The econometric methodology applied in this study is the Vector Autoregressive (VAR) technique along with unit test root that analyze the conditions of stationary by Augmented Dickey–Fuller test (ADF). It explains about the null hypothesis and the alternative hypothesis (Zivot, 2001).

- Null hypothesis: H_0: $\theta = 0$, (the series is non stationary)
- Alternative hypothesis: H_1: $\theta < 0$, (the series is stationary)

Impulse response function is also used to defines as the reaction of the system as a function of time

The variable FDI is the year to year foreign direct investment inflows. The expression IR is the real interest rate, EXR refers to the exchange rate against US dollar and INF is the inflation rate in percent (%) growth. Measures of these variables FDI inflows, GDP, EXR and INF were taken from the International Financial Statistics (IFS) published by International Monetary Fund (IMF) and data of IR were taken from World Bank site. The study employed annual data from 1987 to 2012. The above variables being expressed in US dollar million and interest rate in %

IV. EMPIRICAL RESULTS

Initiated with testing for stationary of the individual factors the empirical results of Augmented Dickey-Fuller (ADF) test for ASEAN 5 are shown one by one in Tables. The result of ADF test can not reject the null hypothesis (H0) for the existing unit root in the variables as indicated by the p-values.

In the contrary the differences shows that factors become stationary mostly at first difference and second difference but for Singapore and Philippine the third difference is also used for rejection of the null hypothesis. Hence, testing reveals that all analyzed series could be individually considered as being integrated of first order I (1) and second order I (2).

Table II. *UNIT TEST ROOT FOR INDONESIA*

Variables	DF (H$_0$)	p-value	DF((H$_1$) at respective Difference	p-value	Difference
FDI	-2.4627	0.3961	-4.0561	0.021 *	I(1)
IR	-2.2108	0.4921	-5.2305	0.01 **	I(2)
GDP	0.9239	0.99	-4.58	0.01 **	I(2)
EXR	-1.2232	0.8683	-4.7287	0.01 **	I(2)
INF	-4.7287	0.3332	-4.2202	0.015 **	I(1)

Note: significance level at 0.000 denotes by '***', 0.01 by '**', 0.05 by '*' and 0.1 by '.

Table III. *UNIT TEST ROOT FOR MALAYSIA*

Variables	DF (H$_0$)	p-values	DF (H$_1$) at respective difference	p-value	Difference
FDI	-1.4369	0.7869	-6.0228	0.01**	I(2)
IR	-2.3766	0.4289	-3.6307	0.042 *	I(1)
GDP	0.5348	0.99	-4.1756	0.017 **	1(1)
EXR	-1.1706	0.8883	-4.1	0.0197 **	I(2)
INF	-2.4253	0.4104	-5.2013	0.01 **	I(2)

Note: significance level at 0.000 denotes by '***', 0.01 by '**', 0.05 by '*' and 0.1 by '.'

Table IV. *UNIT TEST ROOT FOR SINGAPORE*

Variables	DF (H$_0$)	p-values	DF (H$_1$) at respective difference	p-value	Difference
FDI	-0.9647	0.9258	-3.9349	0.0260*	I(1)
IR	-1.8549	0.6277	-5.1539	0.01 **	I(2)
GDP	0.4091	0.99	-5.1743	0.01 **	I(3)
EXR	-2.1798	0.5039	-4.9426	0.01 **	I(2)
INF	-0.814	0.9479	-4.7515	0.01 **	I(1)

Note: significance level at 0.000 denotes by '***', 0.01 by '**', 0.05 by '*' and 0.1 by '.'

TABLE V. *UNIT TEST ROOT FOR PHILIPPINE*

Variables	DF (H$_0$)	p-value	DF (H$_1$) at respective Difference	p-value	Difference
FDI	-3.4477	0.07115	-3.3114	0.0127 **	I(1)
IR	-3.3117	0.09008	-5.3516	0.01**	I(1)
GDP	-0.3658	0.99	-3.6839	0.0441 *	I(2)
EXR	-0.8917	0.9365	-4.78	0.01**	I(3)
INF	-2.7069	0.3031	-4.3657	0.0105 **	I(1)

Note: significance level at 0.000 denotes by '***', 0.01 by '**', 0.05 by '*' and 0.1 by '.'

Table VI. *UNIT TEST ROOT FOR THAILAND*

variables	DF(H$_0$)	p-value	DF (H$_1$) at respective Difference	p-value	Difference (H$_1$)
FDI	-2.4776	0.3904	-3.5432	0.057 *	I(2)
IR	-2.2748	0.4677	-6.0875	0.01 **	I(2)
GDP	-0.7157	0.957	-3.6661	0.0452 *	I(2)
EXR	-0.8045	0.9493	-3.9376	0.02589 *	I(2)
INF	-2.52	0.3743	-3.8222	0.03413*	I(2)

Note: significance level at 0.000 denotes by '***', 0.01 by '**', 0.05 by '*' and 0.1 by '.'

The result of Vector Auto Regression is summarized in tables below, shows the relation and direction of each

variable with each other. The table 7 is for Thailand which suggests that the lag 1 IR, GDP, have a negative influence on the FDI inflow and lag 1 EXR have negative and lag 2 has a positive influence on FDI inflow. We also find that in Thailand there is bi-directional relationship between the FDI inflow and IR, where only FDI inflow influenced the INF. GDP and EXR lag 1 has negative relation to FDI inflow but lag2 shows a positive relation with it .Table 8 is about Philippine in which IR and other variables have no significant relationship with FDI inflow but EXR are influenced by FDI inflow. Table9 represent the Singapore economy information in which IR, GDP and EXR has no significant relationship but lag 2 INF has a positive relationship with the FDI inflow and GDP are negatively influenced by FDI inflow. Table 10 delivers results for the Malaysia in which all the depended variables has no significant relationship with FDI inflow but it has positive significant relationship with IR and EXR and negative significant influence on GDP. The table 11 is for Indonesia in which their economic variable IR has a negative bi-directional relationship with FDI inflow. Other determinants GDP lag1 and EXR lag1 are negative correlated and lag2 are positive correlated with the FDI inflow and INF is impacted by the FDI inflow.

TABLE VII. VECTOR AUTO REGRESSION TEST FOR THAILAND FDI AND ITS DETERMINANTS

Variable:	Significance	Relationship	Direction
IR	Lag 1 "."	Negative	Bi-direction[*1]
GDP	Lag1 "."	Negative	One-direction[*2]
EXR	Lag 1 "." &Lag2 " * "	Negative &Positive	One-direction
INF	-	-	One-direction

Signify codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
*1 Bi Direction: It means FDI inflow and its determinants both have influence on each other.
*2 One Direction: It means that only FDI inflow influenced the variable

Table VIII. Vector Auto Regression Tests for Philippine FDI and its Determinants

Variable	Significance	Relationship	Direction
IR	-	-	-
GDP	-	-	-
EXR	-	-	-
INF	-	-	-

Signify codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

TABLE IX. VECTOR AUTO REGRESSION TEST FOR SINGAPORE FDI AND ITS DETERMINANTS

Variable:	Significance	Relationship	Direction
IR	-	-	-
GDP		-	One direction[*1]
EXR		-	-
INF	Lag2 "."	positive	One –direction

Signify codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
*1 Bi Direction: It means FDI inflow and its determinants both have influence on each other.

*2 One Direction: It means that only FDI inflow influenced the variable

Table X. VECTOR AUTO REGRESSION TEST FOR MALAYSIA FDI AND ITS DETERMINANTS

Variable	Significance	Relationship	Direction
IR	-	-	One-direction
GDP	-	-	One -direction
EXR	-	-	One direction
INF	-	-	-

Signify codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
*1 Bi Direction: It means FDI inflow and its determinants both have influence on each other.
*2 One Direction: It means that only FDI inflow influenced the variable

Table XI. VECTOR AUTO REGRESSION TEST FOR INDONESIA FDI AND ITS DETERMINANTS

Variable:	Significance	Relationship	Direction
IR	Lag1 "."	Negative	Bi -direction
GDP	Lag"." & Lag2 "*"	Negative & Positive	One- direction
EXR	Lag1 "." & Lag2 "*"	Negative & Positive	One- direction
INF	-	-	One- direction

Signify codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1
*1 Bi Direction: It means FDI inflow and its determinants both have influence on each other.
*2 One Direction: It means that only FDI inflow influenced the variable

In this study we also focus on the result of responses of all the variables FDI inflow, IR GDP, EXR and INF which shock to each other in the system. In figure 2 the Indonesia results of impulse responses from FDI inflow, we found that positive shock to the FDI inflow has only short term positive effect to FDI, where other variables don't get any effect. The unit shock to IR, EXR and INF has temporary positive effect on FDI inflow in the early periods after that it fluctuates. The impulse response from GDP has negative impact on FDI inflow but in the early period it has positive effect. Figure 3 shows impulse responses for Malaysia. Response from FDI inflow has only positive effect to its self and GDP. Shock to IR has negative effect on FDI inflow and GDP. FDI inflow it moves around the zero line and GDP receives the positive effect. Response from EXR and INF on FDI inflow negative effect but it almost fluctuates around line zero, whereas effects on GDP are temporary negative in the early periods in response from EXR and in response from INF its effect wise versa. Figure 4 is about the Singapore economy impulse Response. FDI inflow response to itself and GDP effects positive and Response from IR to FDI inflow and GDP is in negative trend, where as response from GDP and EXR has a positive effect on FDI inflow and GDP and if we talk about the INF, it has negative effect on both FDI inflow and GDP. Figure 5 for Philippine Impulse response Functions from FDI inflow is positive to FDI inflow and GDP. Shock to IR has negative effect on FDI inflow and positive to GDP. Unit shock to GDP EXR INF has effect on FDI inflow which fluctuates around the neutral line and it shows positive effects towards GDP. Figure 6 is for Thailand Response from FDI inflow IR, GDP EXR and INF for FDI inflow is stable around

the zero line, effect on GDP from FDI inflow in early periods is negative. From IR, EXR, INF is in negative trend in early periods but going towards in positive direction in later periods.
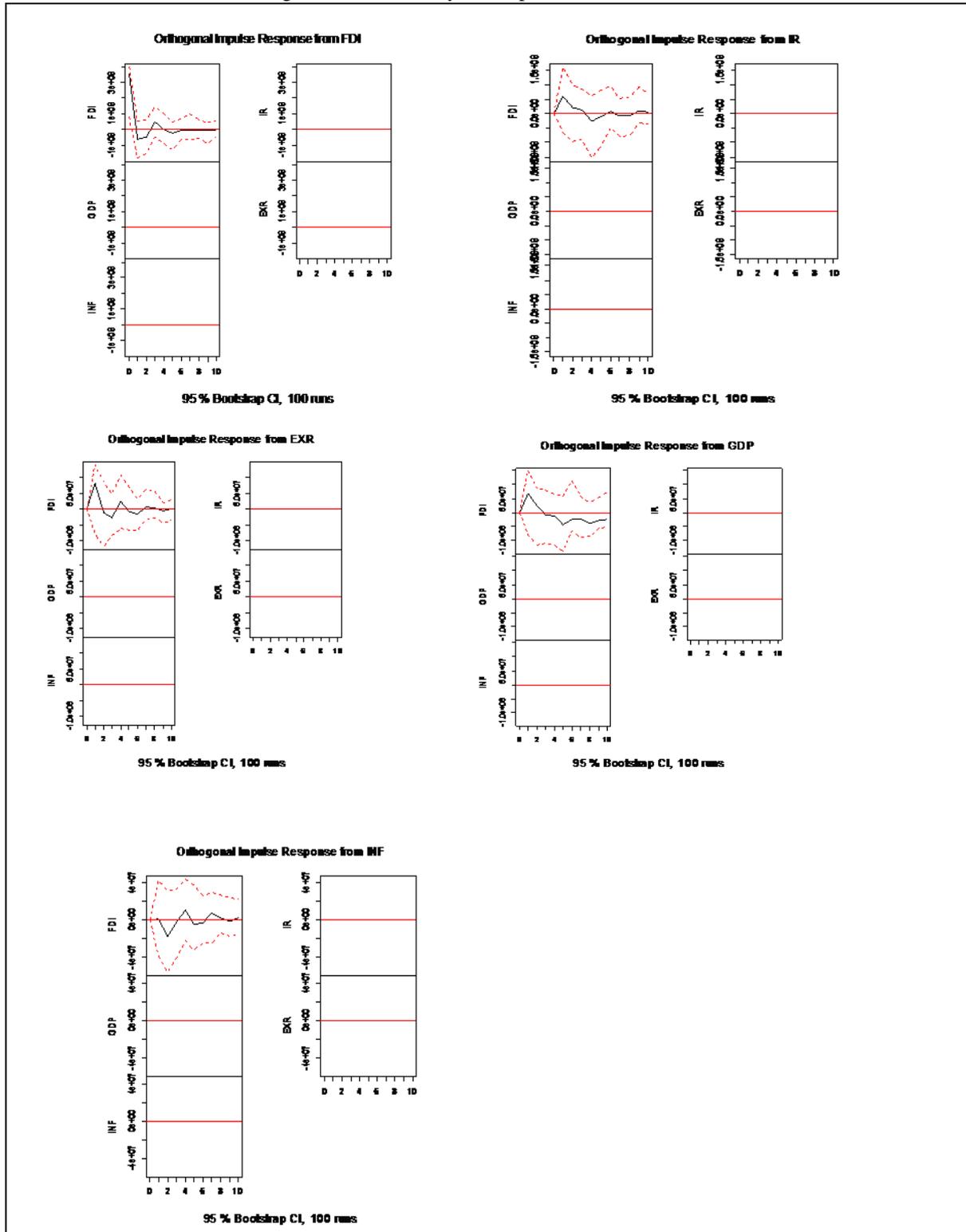
Fig 2: Impulse response for Indonesia
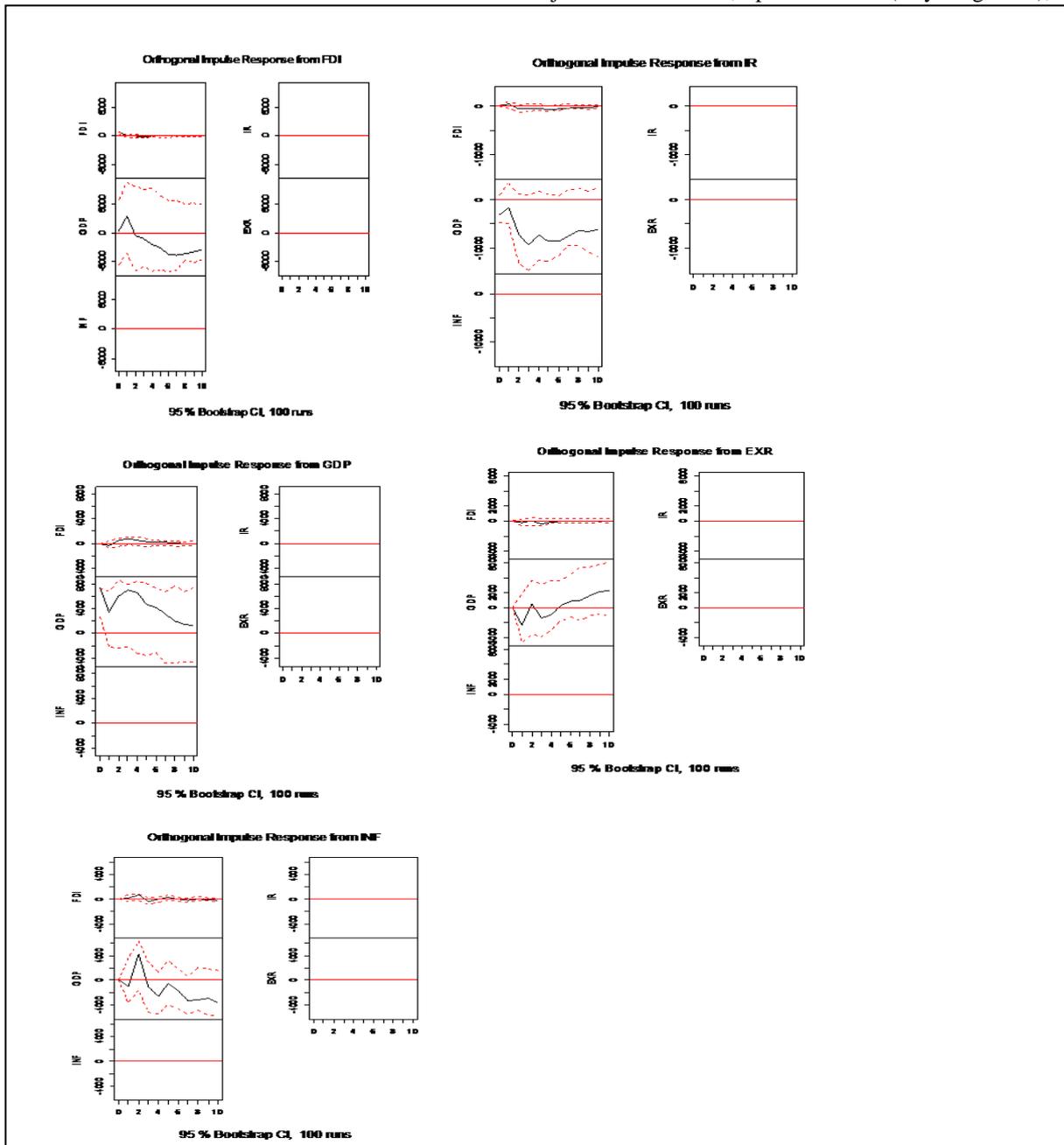
Fig. 3 Impulse response function for Malaysia
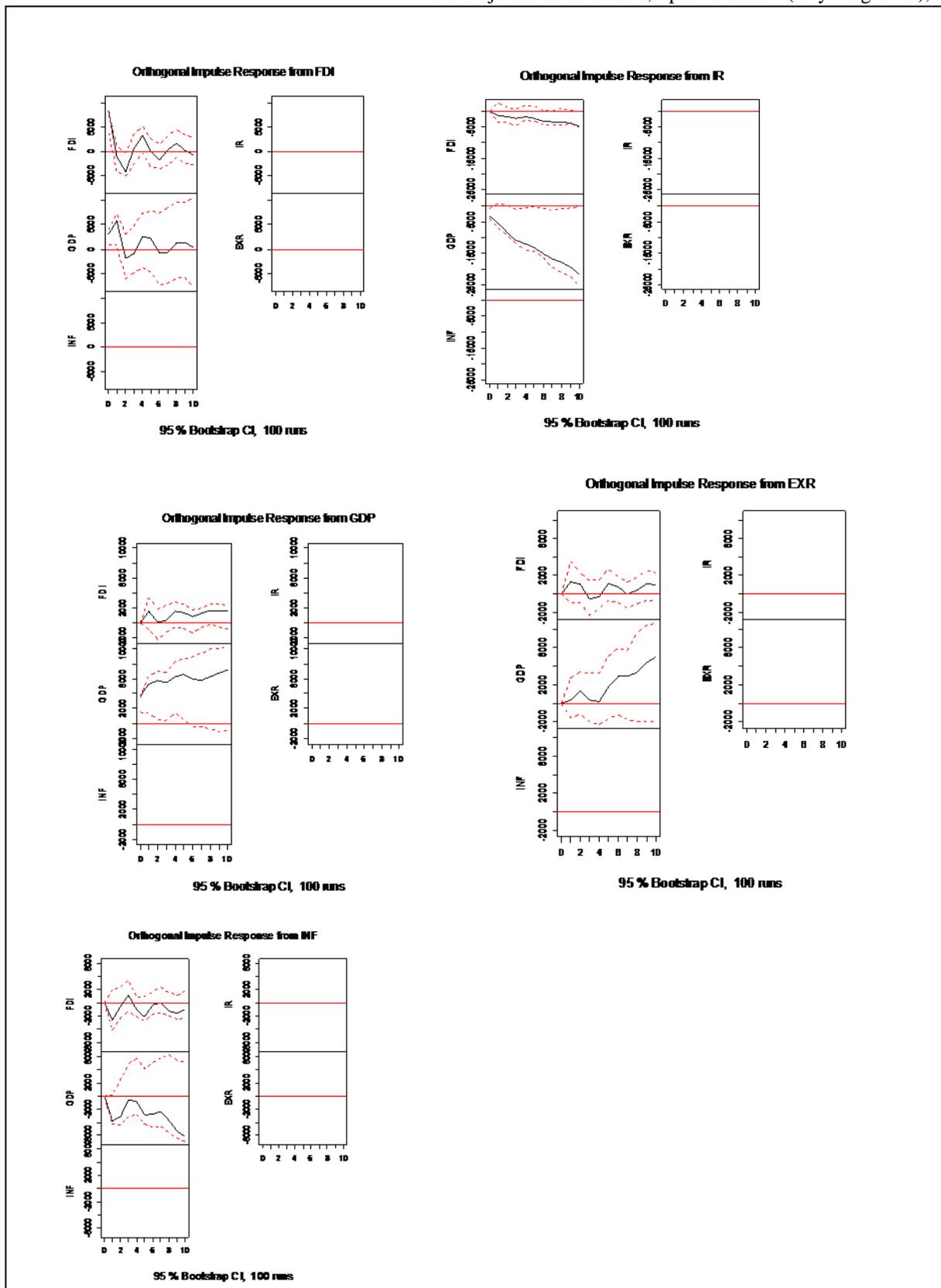
Fig. 4 *Impulse response function for Singapore*
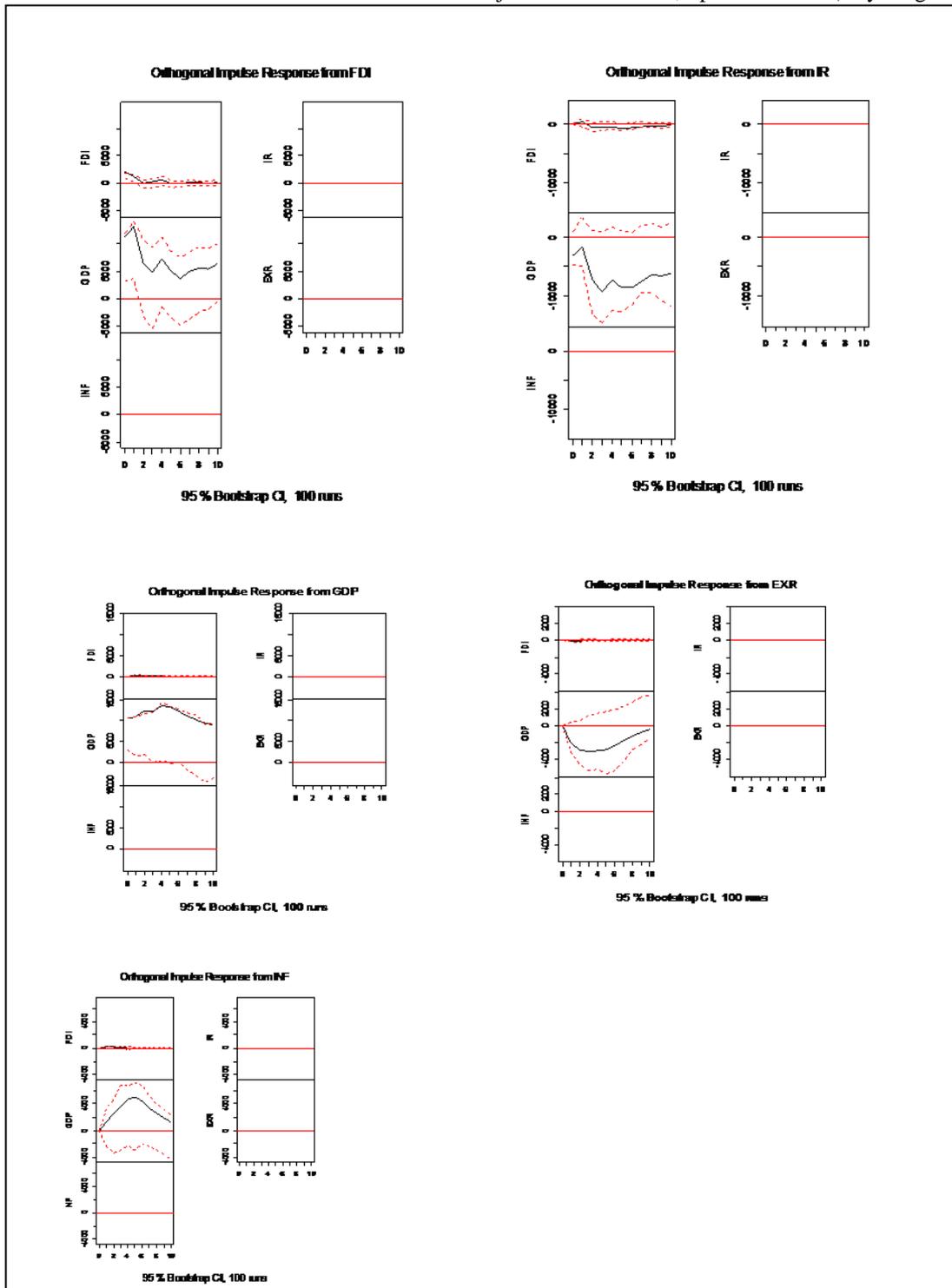
Fig. 5 Impulse response function for Philippine
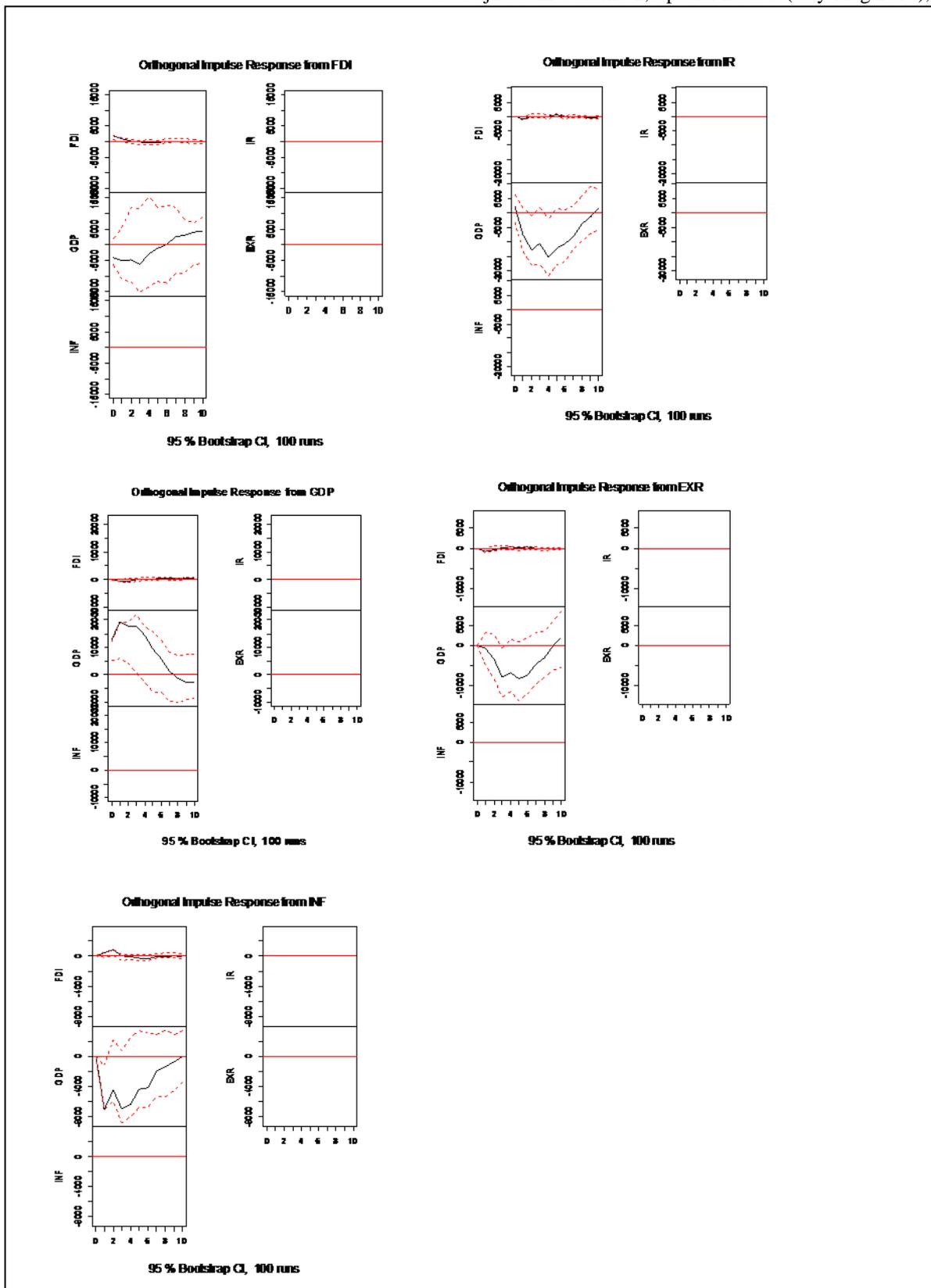
Fig. 6 Impulse response function for Thailand

V. CONCLUSION

We establish the empirical linkage between FDI inflow and interest rates for economy of Thailand, Philippine and Indonesia. Our finding for Singapore and Malaysia does not support the ideas that low interest rates attract the FDI inflow. Its seems surprising that result for most countries GDP doesn't have any positive role as pull factor and EXR varies as lags are changing. We further analyze that there is one directional relationship between FDI inflow and INF in Thailand, Singapore and Indonesia. According to this finding we can say that due to increase in FDI inflow inflation decreases and interest rate decreases this implies the price stability target
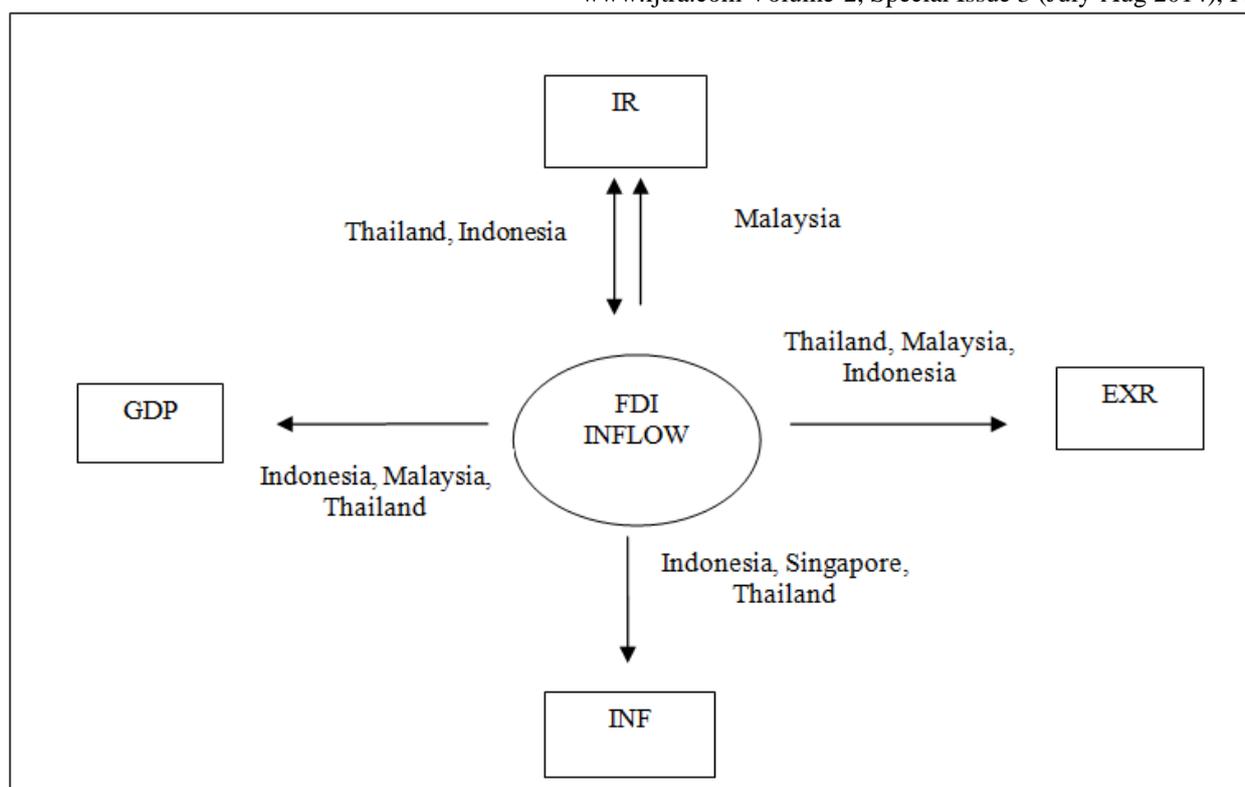
Fig.7 Conclusion model

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