ANALYSIS OF THE UNANTICIPATED FACTORS IN PORTFOLIO INFLOWS TO INDONESIA: A SCVAR APPROACH, 2000: Q1 - 2012: Q4[1]

by

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Abstract

After the 2008 global economic crisis, as one of the emerging markets, Indonesia has experienced a lot of capital inflows. The increase in capital inflows has stimulated economic activities and caused macroeconomic fluctuations. This study focuses on the analysis of pull and push factors that affect the portfolio capital inflows to Indonesia. The study utilizes structural cointegrating vector autoregressive (SCVAR), impulse responses function (IRF), and variance decomposition (VD) methods. The method of SCVAR is used to analyze the shocks to factors relatively affecting the variation of incoming portfolio inflows (equity and bond inflows) to Indonesia, as well as the responses of the portfolio inflows to shocks to these factors.

The findings indicate that there is a long-run relationship between the variables under investigation, so SCVAR approach can be employed in this study. The results of the impulse responses functions show that the portfolio inflows in the form of bonds generate positive response to the unexpected changes of budget deficit and domestic output growth, while the portfolio inflows in the form of stocks generate positive response to the unexpected changes in foreign output growth, domestic output growth, stock price index, and budget deficit. Furthermore, the results of variance decomposition analysis indicate that domestic interest rate and current account balance are the main determinants that explained the variation of portfolio inflows in the form of bonds, while the domestic interest rate and stock price index are the most dominant variables that explained the variation of portfolio inflows in the form of stocks.

Keywords: Capital inflows, SCVAR, push and pull factors.

JEL Classification: F31, F34, G3

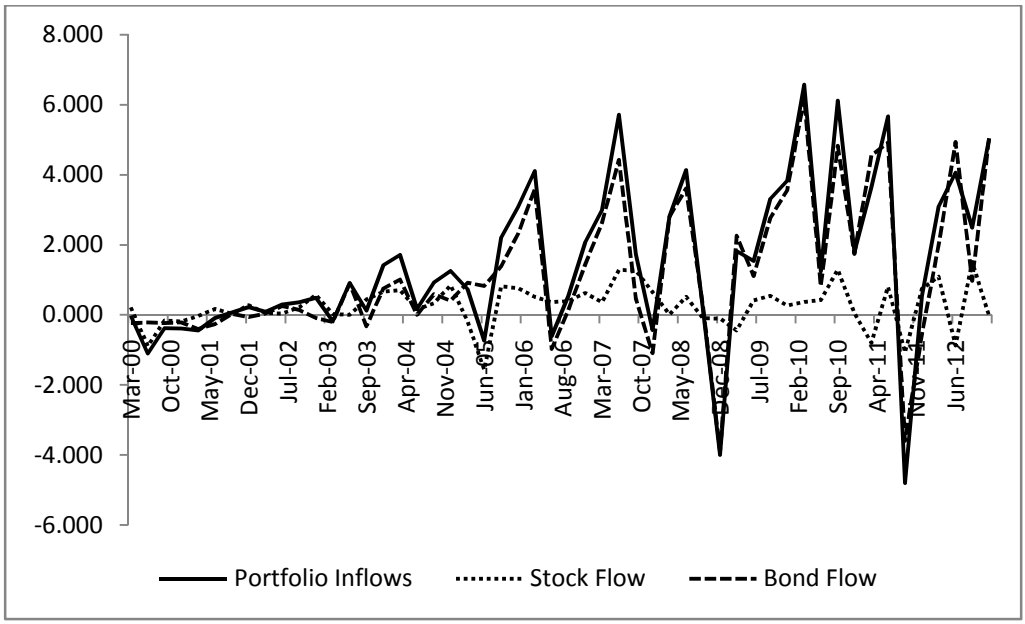
I. Introduction

The rapid capital inflows to developing countries since the early 1990s have sparked a debate among researchers over the benefits and the determinants that affect the movement of capital inflows (De Vita and Kyaw, 2008). The inflows of foreign capital are considered able to finance investment and stimulate economic growth, thereby increasing people's living standards (Calvo *et al*, 1996). In addition, the capital inflows to a country can uplift the supply of foreign exchange so the exchange rate increases and inflation declines. Nevertheless, the history shows that capital inflows are also accompanied by risks such as asset bubbles and exchange rate overshooting, reduced competitiveness, and increased vulnerability to crisis if there is no control on the funds utilization (Abimanyu, 2010). Studies on the flow of foreign capital are usually associated with the factors that affect the flow of foreign capital, its role in the economy and how to manage these capital inflows.

After the 2008 global crisis, capital inflows to developing countries have increased rapidly (Abimanyu, 2010). As with other Asian developing countries, Indonesia also gets the "fresh breeze". Figure 1 reveals that the portfolio capital inflows in the form of stocks and bonds to Indonesia increased rapidly from US$ 734 million in the first quarter of 2005 to US$ 6.5 billion in the first quarter of 2010, in which most of the portfolio capital inflows were in the form of bonds[2].

Various studies have shown that the phenomena of foreign capital inflows were caused by both pull-factors and push-factors. Sound economic fundamentals such as high economic growth, relatively low inflation rate, low fiscal deficits, and relatively higher and more competitive interest rates compared to other neighboring countries were believed as the main pull-factors for capital inflows to Indonesia. The other pull-factors that made Indonesia became a prominent investment destination was due to its rising sovereign credit rating assessed by several international rating agencies such as Fitch that uplifted Indonesia's rating of non-investment grade (BB+) to investment grade (BBB-) (Bank Indonesia, 2012). Meanwhile, in terms of push-factors, the large capital inflows to Indonesia was due to the excess of global liquidity, relatively

[2] Portfolio includes the whole equity and debt transactions that can be classified as bonds and money market instruments as well as the entire financial derivative products that result in claims and financial liabilities (Amaya and Rowland, 2005). Portfolio capital inflows can also be classified into short-term capital inflows (hot money) aside from direct capital inflows in the long run.



Source: Bank Indonesia (2012)

Figure 1. Portfolio inflows to Indonesia, 2000-2012

low interest rates and larger ratio of debt to GDP in developed countries, and the slow post-crisis recovery (Darsono and Agung, 2011).

Most of the existing literature on capital inflows usually focuses on the role of pull and push factors on the inflows (Agenor, 1998). From the point of view of pull-factors, Dua and Garg (2013) found that pull-factors such as exchange rates, performance of the domestic capital market, and domestic output growth served as important determinants in explaining the portfolio capital inflows in India. Likewise, Culha (2006) concluded that in general, shocks to pull-factors were more dominant than those on the push-factors in influencing portfolio inflows to Turkey.

From the point of push-factors, Calvo *et al* (1996) observed that in the late 1990s, low economic growth and interest rates in the U.S. had encouraged portfolio capital inflows to Asia and Latin America. Korap (2010) indicated that shocks to push-factors were dominant in explaining the behavior of portfolio inflows to Turkey.

Furthermore, Chuhan *et al* (1993) studied that portfolio capital inflows to Latin America and Asia turned out to have the same sensitivity of the pull and push factors. They also found that flow of capital in the form of stocks (equity flows) was more responsive to the push-factors, while the flow of capital in the form of bonds (bond flows) was more responsive to the pull-factors of a country's credit rating. Similarly, De Vita and Kyaw (2008) noted that shocks to

foreign output and domestic productivity were the most important factors in explaining the variation in capital inflows to developing countries.

The drawbacks of the above studies have inspired this paper to focus on the analysis of pull and push factors that affect the portfolio capital inflows to Indonesia. The method of SCVAR has been used to analyze the shocks to factors relatively affecting the variation of incoming portfolio inflows (equity and bond inflows) to Indonesia, as well as the responses of the portfolio inflows to shocks to these factors[3].

This paper consists of six sections; the first section discusses the problem statements associated with this study, the second part explores the theoretical review which is also applied to establish the research model in the third section. The forth section deals with the data and methodology, while the fifth section discusses the results. Lastly, the sixth section presents the conclusions and policy implications.

II. Theoretical Review

In the macroeconomic theory, the phenomena of capital inflows are explained by the theory of open-economy macroeconomics. As it is known, open-economy theory was first proposed by Mundell-Fleming in 1968 that added component of the balance of payments within the output balance equation. Mankiw (2007:117-118) then made a modified Mundell-Fleming model in which he explained the relation between capital inflows and net exports with the assumption of perfect capital mobility and small-open economy.

Hubbard *et al* (2012: 580-584) explained how fiscal and monetary policy under a flexible exchange rate system could affect the flows of capital in and out of a country. In their analysis, they introduced the component of monetary policy which revealed the monetary policy curve. They argued that an expansionary fiscal policy causes pressure on inflation, so the central bank responds it by increasing the real interest rate. Then, it makes domestic investment more attractive, so that more foreign investors buy domestic assets and capital outflows decrease. Furthermore, they also suggested that an expansionary monetary policy undertaken by Central Bank decrease the real interest rate. Then, the declining interest rate causes domestic investments less attractive, so that the capital outflows and net exports increase.

[3] SCVAR model is the development of SVAR model aimed at examining a long-term relationship between variables derived from macroeconomic theories and arguments (Garratt *et al*, 1999).

The above illustration explains the essential difference between the effects of fiscal and monetary policy on capital flows. The expansion of monetary policy lowers the real interest rate, depreciates the exchange rate, and improves net exports and capital outflows. In contrast, the expansion of fiscal policy increases the interest rate, appreciates the exchange rate, and reduces net exports and capital outflows. In relation to the theory of asset demand, Hubbard and O'Brien (2012: 88-89) suggested that there are five main determinants that influence the demand for a portfolio of assets, i.e. investor's wealth, expected rate of return, risk, liquidity of assets and cost of information acquisition.

III. Research Methodology and Data

Over the last two decades, economists have developed a macroeconomic model that has a strong theoretical foundation and flexible with time series data (Garratt *et al*., 2003). The development of this model has underpinned various researches associated with the macro-econometrics, including those on capital flows related to the model of economic growth, arbitrage conditions (PPP, FIP, IRP), export-import and demand for money in a small open-economy that eventually form a core econometric model[4].

Therefore, this research uses the method of SCVAR developed from the SVAR model. The less use of theories in the models of unrestricted VAR, BVAR, as well as the weakness of SVAR to determine a long-term relation are claimed to be the main reason for the further development of this model. Thus, the aim of SCVAR model is to establish macro-econometric models which have theoretical basis of behavioral relationships underlying macroeconomic function (Garratt *et al*., 1999).

Unlike previous studies that utilized the aggregation of capital flows, this study aims to distinguish the response of portfolio capital inflows in the form of stocks (EPI) and the portfolio in the form of bonds (BPI), so there are two main equations of SCVAR model set up in this study (see also: Culha, 2006; De Vita and Kyaw (2008):

$$BPI_t = f_1 (u_t^{USi}, u_t^{USg}, u_t^{INAi}, u_t^{BD}, u_t^{CA}, u_t^{IHSG}, u_t^{INAg}, u_t^{BPI}, u_t^{EPI}) \quad (1)$$

$$EPI_t = f_2 (u_t^{USi}, u_t^{USg}, u_t^{INAi}, u_t^{BD}, u_t^{CA}, u_t^{IHSG}, u_t^{INAg}, u_t^{BPI}, u_t^{EPI}) \quad (2)$$

Equations (1) and (2) reveal that the portfolio inflows in the form of bonds and stocks to Indonesia are the functions of shocks (u_t) at the variable of foreign interest rate (US^i) and foreign

[4] For the details of the formation of macro-econometric modeling, see Garratt *et al* (2003).

economic growth (US^g) as the proxy of push-factors, while the proxy of pull-factors are domestic interest rate (INA^i), budget deficit (*BD*), current account (*CA*), Composite Stock Price Index (*IHSG*) and domestic economy growth (INA^g) which cover the quarterly data of the years 2000-2012. For the variables that are not in the form of quarterly data, an adjustment is made by taking the average per three months[5].

Since the structural shocks in equation (1) and (2) are unobservable, additional identifying assumptions are necessary to uncover the underlying structural shock from the observed data. In this study, we use a nine-variable VAR model to capture nine structural shocks (u_t) which affected the portfolio inflows as follows:

$$Y_t = A_0 + \sum_{i=0}^{\infty} \mathrm{A_t U_{t-i}} = A_0 + \mathrm{A(L)U_t} \qquad (3)$$

where, A_0 is the matrix of intercept, $Y_t = (US^i_t, US^g_t, INA^i_t, BD_t, CA_t, IHSG_t, INA_t, BPI, EPI)$; $Ut = (u_t^{USi}, u_t^{USg}, u_t^{INAi}, u_t^{BD}, u_t^{CA}, u_t^{IHSG}, u_t^{INAg}, u_t^{BPI}, u_t^{EPI})$ and $A(L) = \sum_{i=0}^{\infty} \mathrm{A_i L^i} = \{\mathrm{a_{ij}}\ (\mathrm{L})\}$ where *L* is lag operator, and *Ai* is the matrix of impulse responses from the endogenous variables to structural shocks.

To investigate a long-term relationship between variables, a number of assumptions derived from economic theories and arguments are applied in this study (see: such as Culha, 2006, De Vita and Kyaw, 2008):

1. Domestic variables (pull-factor) are affected by both external shocks (push-factors) and internal shocks, while domestic variables are assumed to have no long-term impact on foreign variables.
2. Shocks to other variables in the system do not have a long term effect on the U.S. interest rates. Changes in the U.S. interest rates are caused by exogenous shocks from the outside of equation system.
3. The U.S. economic growth is assumed to have a long-term relationship and only influenced by the U.S. interest rates.
4. Interest rates in Indonesia are influenced by the level of the U.S. interest rates and the U.S. economic growth. In the theory of interest rate parity, there is a long-term relationship between domestic interest rates and foreign interest rates.

[5] See Appendix 1 for the explanation and data sources.

5. Effects of shocks to portfolio inflows are assumed only temporary for the current account and stock price index. Conversely, stock price index and current account have a long-term relationship with portfolio inflows.
6. Shocks to interest rates, foreign economic growth, government budget deficit, and current account have a long-term relationship with stock price index.
7. Shocks to all variables are assumed to have a long term impact on portfolio inflows to Indonesia.

Based on the economic theories and arguments presented above, then a long-term structure of SCVAR equation system can be set up. The system of equation arising out from these assumptions can be written as follows[6]:

$$US^{i} = a_{11}u_t^{USi} \quad (4a)$$

$$US^{g} = a_{21}u_t^{USi} + a_{22}u_t^{USg} \quad (4b)$$

$$INA^{i} = a_{31}u_t^{USi} + a_{32}u_t^{USg} + a_{33}u_t^{INAi} \quad (4c)$$

$$BD = a_{41}u_t^{USi} + a_{42}u_t^{Usg} + a_{43}u_t^{INAi} + a_{44}u_t^{BD} \quad (4d)$$

$$CA = a_{51}u_t^{USi} + a_{52}u_t^{USg} + a_{53}u_t^{INAi} + a_{54}u_t^{BD} + a_{55}u_t^{CA} \quad (4e)$$

$$IHSG = a_{61}u_t^{USi} + a_{62}u_t^{USg} + a_{63}u_t^{INAi} + a_{64}u_t^{BD} + a_{65}u_t^{CA} + a_{66}u_t^{IHSG} \quad (4f)$$

$$INA^{g} = a_{71}u_t^{USi} + a_{72}u_t^{USg} + a_{73}u_t^{INAi} + a_{74}u_t^{BD} + a_{75}u_t^{CA} + a_{76}u_t^{IHSG} + a_{77}u_t^{INAg} \quad (4g)$$

$$BPI = a_{81}u_t^{USi} + a_{82}u_t^{USg} + a_{83}u_t^{INAi} + a_{84}u_t^{BD} + a_{85}u_t^{CA} + a_{86}u_t^{IHSG} + a_{87}u_t^{INAg} + a_{88}u_t^{BPI} \quad (4h)$$

$$EPI = a_{91}u_t^{USi} + a_{92}u_t^{USg} + a_{93}u_t^{INAi} + a_{94}u_t^{BD} + a_{95}u_t^{CA} + a_{96}u_t^{IHSG} + a_{97}u_t^{INAg} + a_{98}u_t^{BPI} + a_{99}u_t^{EPI} \quad (4i)$$

Equations (4a) and (4b) are the equations of pull-factors, while equations (4c) to (4g) are the equations of push-factors or if written in matrix form, the long-term restriction becomes:

$$\begin{bmatrix} US^{i}t \\ US^{g}t \\ INA^{i}t \\ BDt \\ CAt \\ IHSGt \\ INA^{g}t \\ BPIt \\ EPIt \end{bmatrix} = \begin{bmatrix} * & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ * & * & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ * & * & * & 0 & 0 & 0 & 0 & 0 & 0 \\ * & * & * & * & 0 & 0 & 0 & 0 & 0 \\ * & * & * & * & * & 0 & 0 & 0 & 0 \\ * & * & * & * & * & * & 0 & 0 & 0 \\ * & * & * & * & * & * & * & 0 & 0 \\ * & * & * & * & * & * & * & * & 0 \\ * & * & * & * & * & * & * & * & * \end{bmatrix} \begin{bmatrix} u_t^{USi} \\ u_t^{USg} \\ u_t^{INAi} \\ u_t^{BD} \\ u_t^{CA} \\ u_t^{IHSG} \\ u_t^{INAg} \\ u_t^{BPI} \\ ut^{EPI} \end{bmatrix} \quad (5)$$

[6] To identify the structural VAR models, the theory of exactly-identified restriction derived from the formula $[(n^2-n)/2]$ (Enders, 1995) is usually used. This study employed 36 exactly-identified restrictions.

IV. Empirical Results

Prior to estimating on the VAR model, the unit roots are first tested to determine whether the data are stationary at the degree level. Table 1 presents the results of unit root test using the ADF-Test. The results show that all variables are stationary at the degree level by using trend and intercept.

Table 1: Unit Root Test Results

No	Variables	ADF-Test (in level)		
		None	Intercept	Trend & Intercept
1	USi	-2,78***	-3,61***	-3,95**
2	USg	-3,04***	-3,76***	-3,75**
3	INAi	-1,06	-2,30	-3,87**
4	BD	-2,17*	-2,19	-3,41**
5	CA	-2,01**	-2,00	-3,85**
6	IHSG	1,47	-0,56	-3,46*
7	INAg	-0,39	-3,55**	-4,52***
8	BPI	-4,40***	-5,58***	-6,14***
9	EPI	-5,73***	-6,09***	-5.59***

Note: Symbol (*) denotes that the variable has been stationary at the critical value of 10%, (**) at the critical value of 5%, and (***) at the critical value of 1%.

The next stage of the SCVAR model estimation is a cointegration test to analyze the long-term relationship between the variables. Table 2 reports the results of residual unit root test from model 1 to 9, which points to the stationary residual at degree level. The results indicate that there is a long-term relationship between the variables under consideration, so SCVAR approach can be employed in this study.

Table 2: Results of Residual Unit Root Test

No	Model	ADF-Test (in level)		
		None	Intercept	Trend & Intercept
1	USi	-5,42***	-5,36***	-5,31***
2	USg	-5.50***	-5.45***	-5,40***
3	INAi	-7,34***	-7,26***	-7,18***
4	BD	-3,91***	-3,94***	-3,82**
5	CA	-7,19***	-7,12***	-7,02***
6	IHSG	-6,33***	-6,25***	-6,20***
7	INAg	-8,14***	-8,06***	-7,97***
8	BPI	-5,80***	-5,74***	-5,72***
9	EPI	-7,72***	-7,67***	-7,57***

Note: Symbol (*) denotes that the variable has been stationary at the critical value of 10%, (**) at the critical value of 5%, and (***) at the critical value of 1%.

The next section explains the analysis of impulse responses function (IRF) and variance decomposition (VD) to derive conclusions from the results of this study.

A. Analysis of the IRF Bond Portfolio

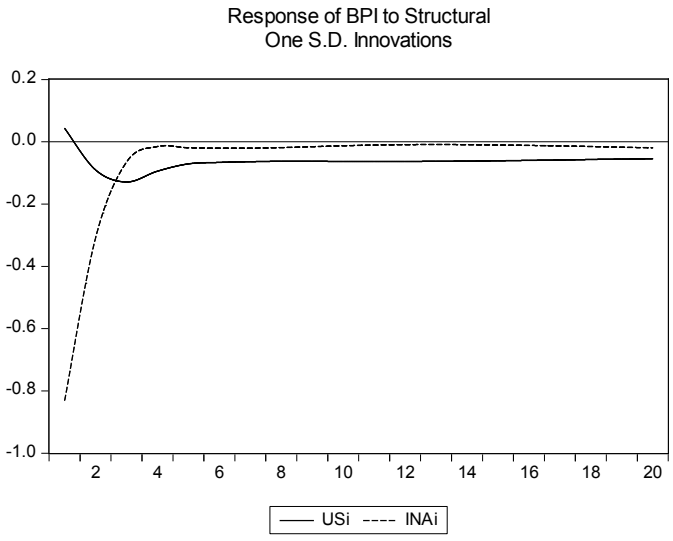


Figure 2. The Response of Bond Portfolio Inflows to the Shocks to Domestic and Foreign Interest Rates

Figure 2 illustrates the response of the portfolio bond inflows to one standard deviation change in foreign interest rate (*USi*) and domestic interest rate (*INAi*). The figure reveals that in the first period[7], the shock to the variable of foreign interest rate is positively responded by the portfolio inflows, but in the second period, the shock to foreign interest rate leads to a decrease in the ratio of portfolio bond inflows per nominal GDP (BPI) of 0.1 percent[8]. These results are consistent with the theory of capital flows between countries whereby increase in foreign interest rate has increased investor returns expectations that encourage investors to invest abroad.

Subsequently, the shock to domestic interest rate in the first period is responded negatively by the bond portfolio inflows whereby one standard deviation change in domestic interest rate decreases the BPI ratios by 0.8 percent. The shock to domestic interest rate which is responded by BPI has the highest peak in the fourth period, but it is never a positive number to the end of the period. These results are assumed to occur because investors expect that the higher interest rate of bonds in developing countries also implies higher risk (Mankiw, 2007:351; Culha, 2006). Moreover, these results also indicate the consistency of interest rate parity theory. Although there are deviations (drift) at both domestic and foreign interest rates until the end of the period, the gap between them has narrowed (Garratt *et al*., 1999).

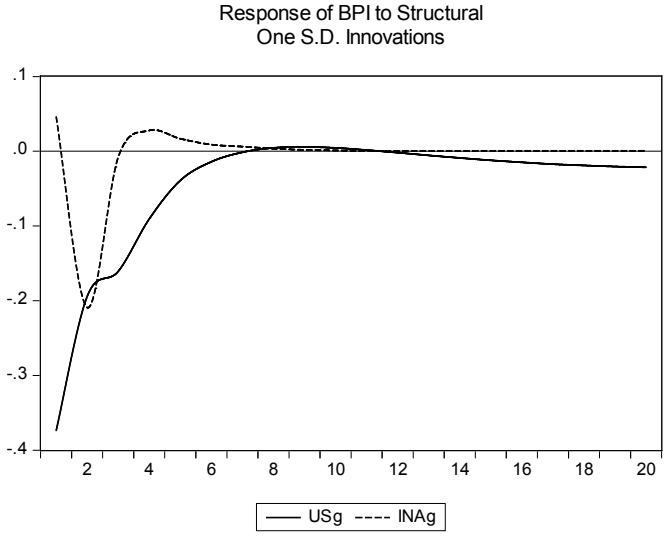


Figure 3. The Response of Bond Portfolio Inflows to the Shocks to Domestic and Foreign Economic Growth

[7] Periods used in this study are the quarterly, meaning the first period is the same as the first quarter and so on.

[8] To shorten the phrases and ease the understanding, in next section, portfolio inflows in the form of bonds per nominal pdb will be abbreviated to (BPI) and those in the form of stock per nominal pdb (EPI).will be abbreviated to per nominal pdb (EPI) as well.

Figure 3 depicts the response of bond portfolio inflows to one standard deviation change in domestic economic growth (INAg) and foreign economic growth (USg). The figure shows that in the first period, the shock to domestic economic growth is responded positively by BPI which causes an increase in the BPI ratio of 0.4 percent. Nevertheless, in the second and third periods, the shock to domestic economic growth has the highest decrease in the BPI ratio of 0.2 percent. Meanwhile, in the next period, the shock to domestic economic growth is responded positively again and reaches the equilibrium in the ninth period. These results are assumed to occur because the domestic economic growth is affected by global economic condition in which during this study it was unstable. Thus, the unstable condition also influences the domestic economy.

Furthermore, the shock to foreign economic growth is responded negatively in the first period by the portfolio inflow that causes a decrease in the BPI ratio of 0.38 percent, but in the next period, the shock to foreign economic growth keeps on improving the ratio of BPI, and up to the sixth period, it reaches the positive number though never returns to the equilibrium. These results are consistent with the theory of capital flows from which when the economic condition in industrialized countries grows, investors will tend to invest in the those countries because they are considered to provide better returns.

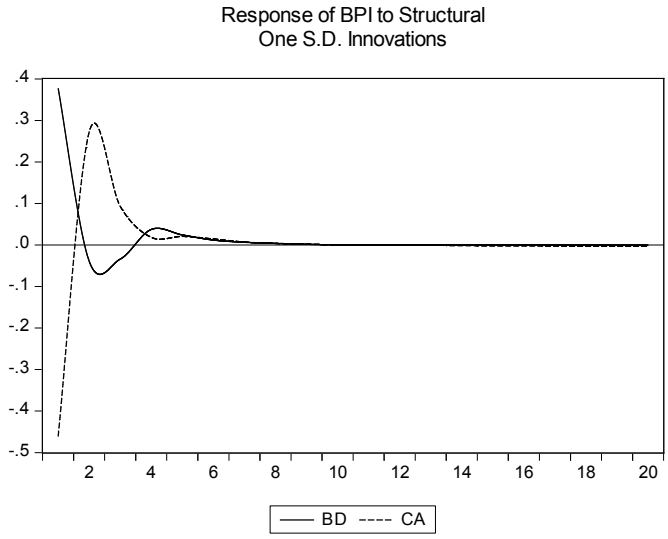


Figure 4. The Response of Portfolio Bond Inflows to the Shocks to Budget Deficit and Current Account

Figure 4 presents the response of portfolio inflows in the form bonds to one standard deviation change in budget deficit (BD) and current account (CA). The figure illustrates that the shock to budget deficit in the first period is positively responded by the bond portfolio with an increase in the BPI ratios of 0.38 percent and returns to the equilibrium in the eight period. These results are consistent with the theory of capital flows from which fiscal expansion will lead to increased interest rate and make domestic investments more attractive.

The shock to current account is responded negatively by the portfolio in the form of bonds with a decrease in the BPI ratio of 0.47 percent in the first period. However, in the subsequent period, the shock to current account is positively responded by the bond portfolio and displays the highest peak in the third period with an increase in the BPI ratio of 0.3 percent and returns to equilibrium in the eight period. These results are allegedly occurred because the first period of the increase in current account deficit reflects an external fragility and expectation of exchange rate depreciation. Nevertheless, in the next period, to cover this deficit, foreign financing in the form of portfolio investment is required so that the portfolio inflows increase (Culha, 2006).

B. Analysis of the IRF Stock Portfolio

Figure 5 illustrates the responses of bond portfolio inflows to one standard deviation change in domestic and foreign interest rates. The figure indicates that in the first period, the shock to domestic interest rate is responded negatively by the portfolio stock inflows of 0.33 percent. However, in the third and fourth periods, the shock to domestic interest rate is responded positively with an increase in the EPI ratios of 0.2 percent and returns to the equilibrium in the fourteenth period. Subsequently, the shock to foreign interest rate in the first period is also responded negatively by the portfolio in the form of stock of 0.2 percent and returns to the equilibrium in the tenth period. These results are allegedly occurred because the increase in interest rates leads the investors to invest in bonds which are considered to provide higher returns with lower risk.

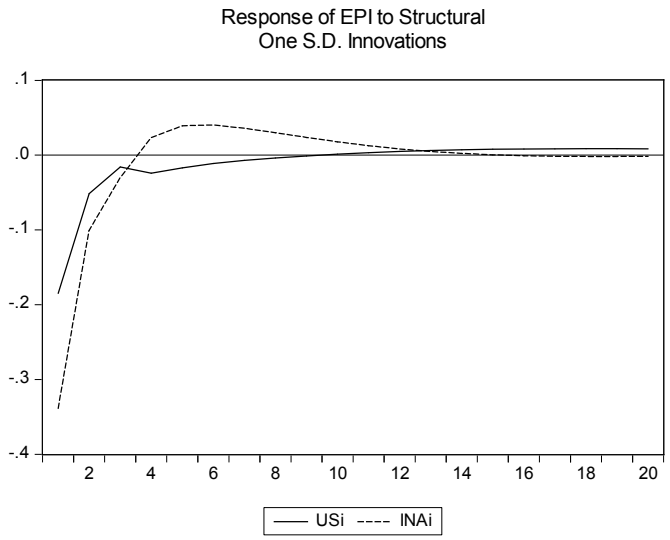


Figure 5. The Response of Stock Portfolio Inflows to the Shocks to Domestic and Foreign Interest Rates

Figure 6 reveals the responses of bond portfolio inflows to one standard deviation change in domestic and foreign economic growth. The figure shows that the shock to domestic economic growth in the first period is responded positively by the stock portfolio inflow of 0.2 percent and experience the highest peak in the second period. Nevertheless, in the fourth period, the shock to domestic economic growth is responded negatively by the portfolio stock inflow of 0.18 percent and returns to the equilibrium in the sixteenth period. These results may occur for an increase in domestic economic activity is usually accompanied by an increase in stock prices.

Subsequently, the shock to foreign economic growth is responded negatively in the first period by 0.13 percent, experience the highest peak in the fourth period which is responded positively by EPI by 0.4 percent, and return to the equilibrium in the twentieth period. This may happen because the early period of increased foreign economic growth reflects promising returns, but in the next period, the foreign economic growth also indicates an increase in foreign business and economic activities, so that the investors and the companies seeks to invest in other countries (Culha, 2006).

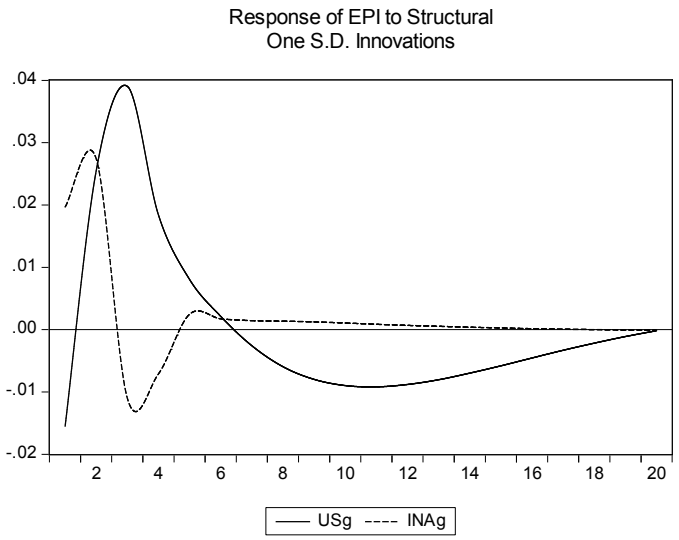


Figure 6. The Response of Stock Portfolio Inflows to the Shocks to Domestic and Foreign Economic Growth

Figure 7 illustrates the responses of bond portfolio inflows to one standard deviation change in the budget deficit and current account. The shock to budget deficit in the first period is responded positively by the stock portfolio. Nevertheless, in the second period, the increase in budget deficit is negatively responded by the stock portfolio of 0.05 percent and returns to the equilibrium in the twelfth period. These results are allegedly caused by a below full-employment equilibrium whereby an increase in government spending can improve the economic capacity so as to raise the stock price (Roley and Schall, 1988).

Subsequently, the shock to current account in the first period is responded negatively by the stock portfolio inflow of 0.25%, but in the next period (the fourth period), the shock to current account is positively responded by the stock portfolio with an EPI increase of 0.04 percent and returns to the condition of equilibrium in the fifth period. These results are in line with the bond portfolio whereby an increase in the current account deficit reflects the expectation of exchange rate depreciation that can reduces the investors' returns.

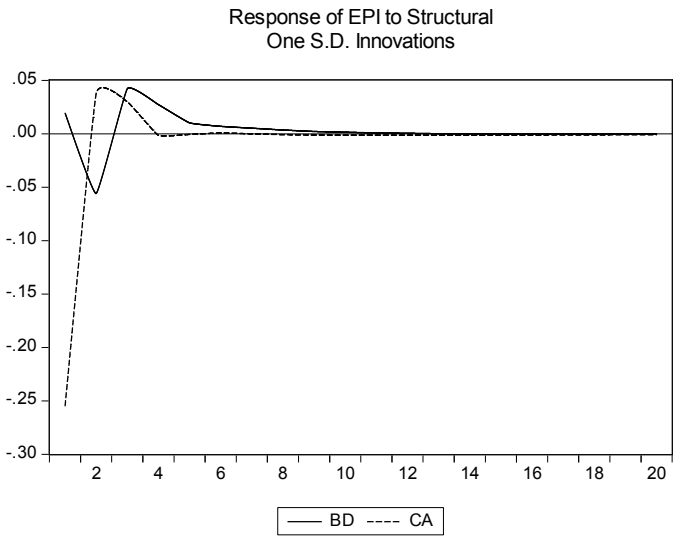


Figure 7. The Response of Bond Portfolio Inflows to the Shocks to Budget Deficit and Current Account

Figure 8 shows the responses of bond portfolio inflows to one standard deviation change in the Jakarta Composite Index (IHSG). The figure reveals that the shock to IHSG is positively responded by stock portfolio inflows in the first period by 0.2 percent and experience the highest peak in the second period with an increase of 0.27 percent. Nevertheless, in the third and fourth periods, the shock to CSPI is responded negatively by the stock portfolio by 0.13 percent and returns to the equilibrium in the fifteenth period. These results are consistent with the theory of portfolio investment, from which an increase in stock price reflects the possibility of an increase in investors' returns (capital gains).

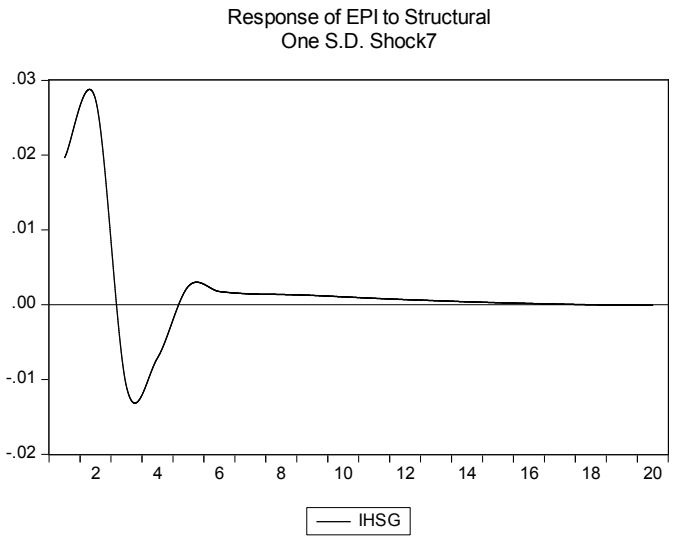


Figure 8. The Response of Bond Portfolio Inflows to the Shocks to Composite Stock Price Index

In general, the results of impulse response analysis in this study are consistent with the theory and returns to steady state. However, the instability of global economic condition that occurred in the study period also affects the behavior of investors in the investment portfolio so that some parts of the results of this study are quite difficult to analyze. Moreover, the results of cointegration test which states that there is a long-term relationship between the variables in question can be proved, whereby the gap of all variables starts disappearing in the twentieth period. [9]

C. Analysis of the Forecast Error Variance Decomposition

In the VAR method, analysis of variance decomposition (VD) is used to examine the shocks to variables that most influence the variation of other variables studied. Table 3 presents the VD result which is responded by bond portfolio flows in the first 10 periods. This result shows that the variation of portfolio inflows in the form of bond is dominated by shock itself (BPI) with 41.6 percent in the first period, followed by domestic interest rate (INAi) with 32.24 percent, and current account condition (CA) with 9.91 percent. Meanwhile, the shock to push factors, i.e. foreign interest rate and foreign economic growth only explain less than 8 percent variation in bond portfolio inflows in the first period. These results indicate that the shock to pull

[9] See Appendix 2.1 and 2.2 to study the further long term relation between variables and period

factors plays a more dominant role than that to push factors in explaining bond portfolio inflows to Indonesia.

Table 4 demonstrates the VD result which is responded by stock portfolio in the first 10 periods. This result shows that in the first period, variation in stock portfolio inflows to Indonesia is dominated by the shock itself (EPI) with 40.61 percent, domestic interest rate (INAi) with 22.63 percent, and performance of composite stock price index (CSPI) with 12.80 percent.

Table 3. Results of FEVD Analysis on Bond Portfolio

Period	S.E.	Push Factors		Pull Factors				
		USi	USg	INAi	BD	CA	IHSG	INAg
1	0,0010	0,0858	6,5304	32,2433	6,6455	9,9116	2,3601	0,0992
2	0,0015	0,4120	7,3373	32,4594	5,9376	11,8155	2,7920	1,8958
3	0,0020	1,0560	8,0529	31,2749	5,7360	11,6636	4,2666	1,8192
4	0,0024	1,3906	8,2791	30,9106	5,7220	11,5380	4,5889	1,8274
5	0,0027	1,5812	8,3048	30,7989	5,7210	11,5076	4,6574	1,8307
6	0,0029	1,7477	8,2926	30,7412	5,7126	11,4882	4,6758	1,8294
7	0,0031	1,9015	8,2772	30,7002	5,7038	11,4688	4,6742	1,8274
8	0,0033	2,0506	8,2641	30,6616	5,6947	11,4499	4,6671	1,8248
9	0,0034	2,1997	8,2519	30,6208	5,6855	11,4312	4,6595	1,8219
10	0,0035	2,3503	8,2393	30,5777	5,6763	11,4127	4,6523	1,8190

Table 2. Result of FEVD Analysis on Stock Portfolio

Period	S.E.	Push Factors		Pull Factors				
		Usi	USg	INAi	BD	CA	IHSG	INAg
1	0,0010	6,7524	0,0476	22,6347	9,3033	0,0735	12,8065	0,0763
2	0,0015	6,6819	0,1610	22,6249	10,2812	0,6350	12,0138	0,2066
3	0,0020	6,6479	0,4323	22,5227	10,1917	0,9467	12,0325	0,2258
4	0,0024	6,7231	0,4910	22,5221	10,1473	1,0749	11,9805	0,2339
5	0,0027	6,7492	0,5007	22,7133	10,1124	1,0893	11,9363	0,2341
6	0,0029	6,7496	0,4999	22,9256	10,0832	1,0942	11,8982	0,2339
7	0,0031	6,7421	0,4998	23,0964	10,0597	1,0964	11,8692	0,2337
8	0,0033	6,7332	0,5053	23,2148	10,0432	1,0966	11,8491	0,2337
9	0,0034	6,7259	0,5159	23,2867	10,0324	1,0962	11,8360	0,2337
10	0,0035	6,7214	0,5297	23,3251	10,0255	1,0958	11,8278	0,2337

Meanwhile, the shock to push factors, i.e. foreign interest rate and foreign economic growth only explains less than 7 percent variation in portfolio capital inflows into the form of stock. These results indicate that the portfolio investment to Indonesia in the form of stock is also more affected by the shock to pull factors rather than push factors.

Both of these results indicate that portfolio capital inflows to Indonesia in the form of bonds and stocks are more dominated by shocks to pull factors compared to push factors. Results of the portfolio capital inflows in the form of bonds are in line with the theory of capital flows which suggests that interest rate is the main determinant influencing investors' decision to invest (Mankiw, 2007: 149), while the current account condition indicates external vulnerability (Culha, 2006) and expectation of in exchange rate changes which may also affect the behavior of investors. Furthermore, the results of portfolio capital inflows are also consistent with the theory of portfolio capital flows which states that interest rate is the main factor (in the form of opportunity costs) in affecting investors' decision to purchase stocks. Likewise, the performance CSPI is also one of the main factors that can affect the expectation of investors' returns results in the form of capital gains.

The findings are consistent with the result of the study by Culha (2006), but contrary to the result of the study by Ying and Kim (2000). Culha (2006) showed that the shock to pull factor, which is the stock price index, plays the most dominant role in explaining the net portfolio investments in Turkey in the period 2002:1-2005:12, while Ying and Kim (2000) claimed that the shock to push factors, which are foreign output and foreign interest rate, plays a dominant role in explaining portfolio investments to South Korea and Mexico.

V. Conclusion

Following the 2008 global crisis, Indonesia as one of the developing countries has received large capital inflows. Pull and push factors have led the investors to seek for better investment opportunities in Indonesia that possess a strong economic fundamental and interest more competitive interest rates (Darsono and Agung, 2012). The increase in capital inflows can stimulate economic activities on one hand and macroeconomic fluctuations on the other hand. Therefore, understanding of the major determinants that affect the movement of capital between countries, especially in the form of portfolios that are considered 'hotter', needs to be improved through this study.

This study analyzes the determinants that affect the portfolio capital inflows to Indonesia in the framework of 'push and pull factors' by applying an SCVAR approach. Furthermore, the analysis of impulse responses and variance decomposition function is also conducted to investigate the effects of shocks to push and pull factors on the portfolio capital inflows and the most dominant factor in explaining the variation of portfolio capital inflows to Indonesia.

The results of this study can be summarized into four main points. First, the results of cointegration test reveal a long-term relationship between variables that are consistent with the theory. Second, the results of impulse response analysis indicate that the portfolio flows in the form of bond respond positively to the unanticipated changes in variables of budget deficit and domestic economic growth, but respond negatively to the unanticipated changes in variables of domestic interest rate, foreign interest rate, foreign economic growth, and current account condition. Third, the portfolio inflows in the form of stock respond positively to the unanticipated changes in variables of foreign economic growth, domestic economic growth, stock price index, and budget deficit, but response to the variables of domestic interest rate, and current account condition is negative. Fourth, the results of variance decomposition analysis show that pull factors, which are domestic interest rate and current account condition, serve as the most dominant variables in explaining the variation of bond portfolio inflows, while domestic interest rate and performance of the composite stock price index are most dominant variables in explaining the variation of stock portfolio inflows.

Based on the study results, some suggestions for policy makers are then proposed. First, the results of the study reveal that domestic interest rate is the most dominant variable in explaining the variation of portfolio inflows to Indonesia. Nevertheless, the impacts of unanticipated changes in these variables are responded negatively by portfolio inflows, meaning that the policy makers should create a more stable macroeconomic condition so that the investors' expectation of risk to the interest rate is not too high, for example by reducing budget deficit and raising current account deficit. Second, although the push factor variables are not too dominant in explaining the variation of portfolio inflows to Indonesia, Indonesia's economy remains exposed to the impacts of changes in global economic condition. It means that a good capital flow management must be maintained so that the risk to capital reversal can be avoided, for example, Bank Indonesia may conduct monetary and macro-prudential policy mix more effectively and mitigate possible risks to asset bubbles early (Culha, 2006; Darsono and Agung,

2012). In addition, coordination between the government and the central bank must also stay in touch to keep the positive perception of investors.

The complexity of the problems associated with portfolio capital flows is expected to be clarified in further studies, for example by adding variables of push and pull factors as well as establishing a model that can capture the shocks to 2008 global crisis and 2010 European crisis. In the case of Indonesia, the establishment of a model that can capture the shocks to the 1998 crisis and the enhancement of Indonesia's sovereign rating into investment grade in 2011 are also interesting to inquire.

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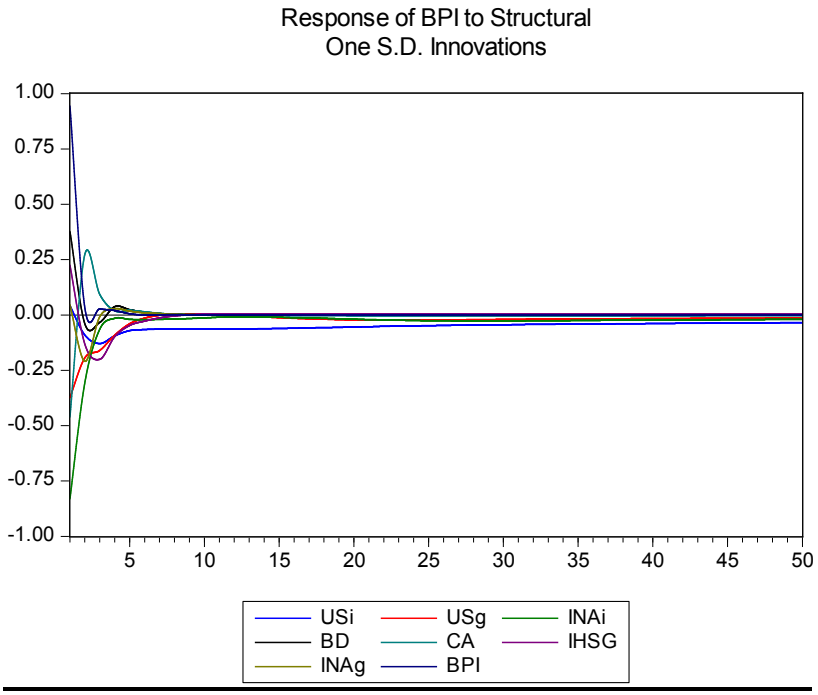
APPENDICES

Appendix 1. Data Sources

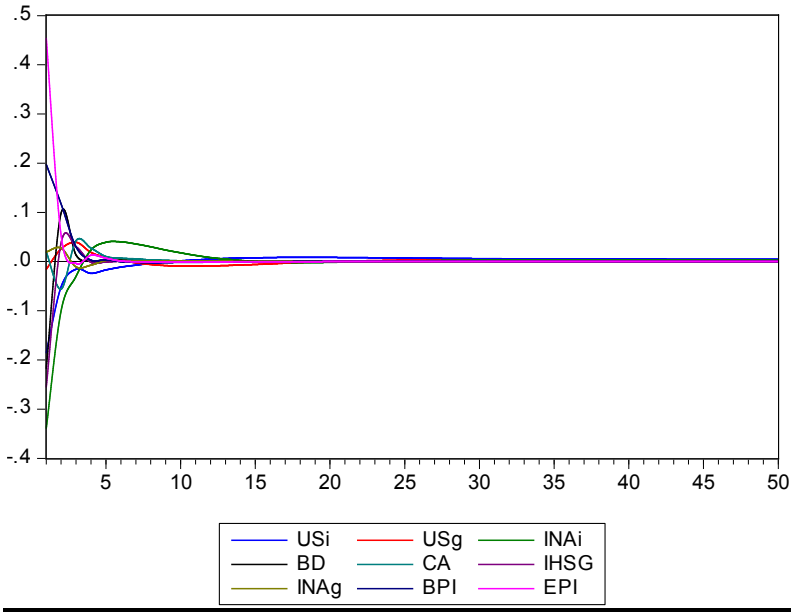
Variables	Data Sources
Research Focus:	
Portfolio Capital Inflows, in the form of stocks and bonds per nominal GDP	Table 5.4. Financial Transactions: Portfolio Investment (million USD), SEKI, Bank Indonesia
Pull-Factors:	
Real Interest Rate (*Discount Rate-CPI:2005)*	CEIC Database
Indonesia's Economic Growth (y-o-y)	CEIC Database
Current Account per nominal GDP	Table 5.1 Indonesia's Balance of Payments: Summary, SEKI, Bank Indonesia
Budget Deficit per nominal GDP	CEIC Database
Composite Stock Price Index	CEIC Database
Push-Factors:	
The US Interest Rate (T-Bills)	CEIC Database
The US Economic Growth (y-o-y)	CEIC Database

Appendix 2. Results of Impulse Responses Function

2.1 Bond Portfolio Response



2.2 Stock Portfolio Response



Appendix 3. Estimation Result SVAR

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I
Restriction Type: long-run pattern matrix
Long-run response pattern:

C(1)	0	0	0	0	0	0	0	0
C(2)	C(10)	0	0	0	0	0	0	0
C(3)	C(11)	C(18)	0	0	0	0	0	0
C(4)	C(12)	C(19)	C(25)	0	0	0	0	0
C(5)	C(13)	C(20)	C(26)	C(31)	0	0	0	0
C(6)	C(14)	C(21)	C(27)	C(32)	C(36)	0	0	0
C(7)	C(15)	C(22)	C(28)	C(33)	C(37)	C(40)	0	0
C(8)	C(16)	C(23)	C(29)	C(34)	C(38)	C(41)	C(43)	0
C(9)	C(17)	C(24)	C(30)	C(35)	C(39)	C(42)	C(44)	C(45)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.021002	0.002079	10.09950	0.0000
C(2)	0.019334	0.002515	7.687181	0.0000
C(3)	0.053487	0.007252	7.376007	0.0000
C(4)	-0.003810	0.001021	-3.730258	0.0002
C(5)	0.042804	0.005571	7.683885	0.0000
C(6)	-2.145070	0.303978	-7.056667	0.0000
C(7)	-0.017064	0.002706	-6.306951	0.0000
C(8)	-5.150202	0.830120	-6.204162	0.0000
C(9)	0.265447	0.103297	2.569731	0.0102
C(10)	0.011650	0.001153	10.09950	0.0000
C(11)	0.017734	0.004632	3.828715	0.0001
C(12)	-0.003023	0.000901	-3.356480	0.0008
C(13)	0.014129	0.003333	4.238517	0.0000
C(14)	-0.830376	0.201324	-4.124573	0.0000
C(15)	-0.006799	0.002003	-3.394163	0.0007
C(16)	-2.630637	0.601007	-4.377048	0.0000
C(17)	0.213510	0.097635	2.186818	0.0288
C(18)	0.030608	0.003031	10.09950	0.0000
C(19)	-0.003334	0.000783	-4.258296	0.0000
C(20)	0.021032	0.002195	9.581154	0.0000
C(21)	-1.281403	0.132941	-9.638862	0.0000
C(22)	-0.013184	0.001362	-9.679213	0.0000
C(23)	-3.692956	0.399573	-9.242255	0.0000
C(24)	0.027023	0.095281	0.283608	0.7767
C(25)	-0.005069	0.000502	-10.09950	0.0000
C(26)	-0.001271	0.000683	-1.861255	0.0627
C(27)	0.045470	0.039435	1.153016	0.2489
C(28)	-0.000748	0.000382	-1.959597	0.0500
C(29)	-0.332788	0.157695	-2.110329	0.0348
C(30)	0.080838	0.094907	0.851764	0.3943
C(31)	0.004792	0.000474	10.09950	0.0000
C(32)	-0.186436	0.034556	-5.395188	0.0000
C(33)	-0.000700	0.000368	-1.902423	0.0571
C(34)	-0.349657	0.150278	-2.326741	0.0200
C(35)	0.098882	0.094061	1.051260	0.2931
C(36)	0.208616	0.020656	10.09950	0.0000
C(37)	0.001790	0.000315	5.684536	0.0000
C(38)	0.098000	0.145913	0.671636	0.5018
C(39)	-0.246838	0.090301	-2.733517	0.0063
C(40)	0.001859	0.000184	10.09950	0.0000

C(41)	-0.095096	0.145285	-0.654548	0.5128
C(42)	0.039634	0.086841	0.456391	0.6481
C(43)	1.035361	0.102516	10.09950	0.0000
C(44)	0.339435	0.079978	4.244109	0.0000
C(45)	0.518278	0.051317	10.09950	0.0000

Log likelihood	1391.065

Estimated A matrix:

1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000

Estimated B matrix:

6.75E-05	-0.000643	-0.000359	-2.05E-05	7.25E-05	0.000619	0.000269	-0.000118	8.41E-05
0.001171	1.85E-05	-0.001591	0.000293	-0.000385	7.89E-05	0.000401	-0.000635	-8.80E-05
-1.06E-05	0.001614	0.002142	-0.000161	-0.002152	0.001351	0.000660	0.000323	0.001024
-0.001870	-0.001362	5.69E-05	0.004967	-0.001381	0.000142	-0.000529	-0.000788	7.67E-05
-5.95E-05	0.001821	-0.000831	0.000509	0.001465	0.001878	0.000198	0.000156	-0.000247
-0.012354	-0.003723	-0.020791	-0.006043	-0.010403	0.006230	0.003202	-0.004954	-0.005549
-8.00E-05	-0.000246	-0.000130	0.000359	0.000510	-0.000235	0.001619	0.000137	-6.61E-05
0.042849	-0.373808	-0.830611	0.377086	-0.460521	0.224718	0.046067	0.943931	-0.101652
-0.184978	-0.015537	-0.338671	-0.217125	0.019296	-0.254746	0.019665	0.197380	0.453679