Sudden Stop and Trade Balance Reversal after Asian Crisis:

Investment Drought Impact versus Exchange Rate Depreciation

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Abstract

After the Asian crisis in 1997, the respective trade balances of Indonesia, Korea, Malaysia, and Thailand reversed suddenly from deficit to surplus. By particularly addressing the sudden cessation of investment caused by the financial crisis, it is demonstrated that the IS balance adjustment dominates real exchange rate depreciation, indicating that to reform the large external imbalance of Asian countries, which is a major component of global imbalance, policymakers should target domestic absorption. Furthermore, it can be demonstrated that the large trade balance surplus of Asian countries will decrease along with recovery. Finally, policy implications related to the recent Euro crisis are provided.

JEL classification: F3, F31, F32, F44

Keywords: IS balance Adjustment; Financial Crisis; Financial Accelerator; Sign Restriction VAR

1. Introduction

After the Asian crisis in 1997, the respective trade balances of Indonesia, Korea, Malaysia, and Thailand reversed suddenly from deficit to surplus[1)].

Generally, a nation's trade balance is determined both by the Investment–Saving (IS) balance and exchange rate adjustment, although a controversy exists related to which factor plays a more important role. According to Obstfeld and Rogoff (2005), the necessary exchange rate depreciation to correct a trade balance deficit might be large. However, according to Engel and Rogers (2006), the necessary exchange rate depreciation might be smaller. Comparing both factors, Fratzscher et al. (2010) empirically quantify the more dominant role of IS balance adjustment. Furthermore, a notable feature of the study is the consideration of wealth and financial accelerator effects from the boom–bust cycle of asset prices.

However, in the case of the trade balance reversal of the four Asian countries listed above, because of the great declines in the real exchange rate, the impact of exchange rate adjustment might be greater than in the case described by Fratzscher et al. (2010). Joyce and Nabar (2009) report that investment dropped suddenly and stagnated because of the financial crisis: a phenomenon called *investment drought*. As reported by the IMF (2005), this balance adjustment is an important cause of the trade balance reversal of the four Asian countries. This study assesses the trade balance reversal of the four Asian countries with comparison of IS balance adjustment versus expenditure-switching effects of exchange rate adjustment.

Some preceding studies of the reversal of external balance after Asian crisis are explained hereinafter. Based on theoretical investigation, Cook and Devereux (2006) specifically examined the risk premium and negative financial accelerator effect and explained the trade balance reversal. Moreover, by particularly addressing the sudden drop of productivity, Otsu (2008, 2010) explains the behavior of macroeconomic

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[1)] In general, this is designated as *current account reversal* in the literature. We are interested in IS balance adjustment. Therefore, we specifically address the trade balance. See Milesi-Ferretti and Razin (1998) for further details.

variables, including the trade balance, theoretically. Noteworthy empirical studies include those of Joyce and Nabar (2009), which specifically examines *investment drought*, and of Kinkyo (2007), explaining the decline of investment of Korea empirically by deterioration of the terms of trade. However, these empirical studies did not consider the response of external balances.

Different from theoretical studies, empirical studies related to the reversal of external balance after the Asian crisis are scarce. This study was conducted to fill this gap. Moreover, few studies have quantified the sizes of IS balance adjustment versus exchange rate adjustment in the reversal of external balance after the Asian crisis. Therefore, because this topic is very much an empirical question, as described by Fratzscher et al. (2010), the methodology of sign restriction VAR of Uhlig (2005) is applied.

The remainder of the paper is organized as follows. Section 2 presents a description of the features of the Asian crisis by particularly addressing the financial crisis and *investment drought*. Section 3 presents a description of the econometric method of sign restriction VAR. Section 4 explains the empirical results. Lessons from the Asian crisis can provide a good education for many countries, especially for Eurozone countries. Therefore, policy implications are explained in section 5. Finally, concluding remarks are presented in section 6.

2. Investment Drought after the Asian Crisis

After the eruption of the Asian crisis in 1997, according to Figure 1, investment dropped suddenly and stagnated in all four Asian countries. However, as the same figure shows, consumption and government expenditure remain stable throughout the period. Furthermore, investment is confirmed to have a negative co-movement with trade balance. Therefore, the sudden drop of investment, designated as *investment drought*, is regarded as a main cause of IS balance adjustment.

As described in this paper, two reasons for *investment drought* can be inferred. The first is deterioration of the balance sheet and bankruptcy of the private sector by the financial crisis. As

presented in Table 1, the ratio of nonperforming loans rose markedly after the Asian crisis. As a consequence, the risk premium rose and negative financial acceleration came to prevail. This shock induced trade-balance reversal, which occurred through *investment drought*.

<< insert Figure 1 >>

<< insert Table 1 >>

The second reason is the sudden drop in productivity. Usually, financial crises in emerging economies are said to have a strong negative impact on the real sector. According to Meza and Quintin (2007), because of the decline of capital utilization ratio and because of labor hoarding, productivity decreases suddenly during financial crises. Furthermore, by particularly addressing the sudden drop of productivity, Otsu (2008, 2010) explained the behavior of macroeconomic parameters, including the trade balance, after the Asian crisis.

Therefore, the negative financial accelerator effect and the sudden drop of productivity can be regarded as major causes of *investment drought* subsequent to the Asian crisis.

3. Estimation Procedure

3.1 Sign Restriction Approach

As described herein, four-variable Bayesian VAR was used to identify three structural shocks by sign restriction of Uhlig (2005). A VAR model can be expressed in reduced form as presented below.

$$Y_t = B(L)Y_{t-1} + u_t \tag{1}$$

In that equation, vector Y_t includes the vector of endogenous variables, $B(L)$ is a lag polynomial of order

p, and u_t is the vector of error terms with variance–covariance matrix Σ. Having estimated the parameters of this reduced form model, the responses of variables in Y_t to various structural shocks must be considered. To this end, the vector of prediction errors u_t of the reduced-form VAR must be translated into a vector of economically meaningful structural innovations. The more important assumption is that these structural innovations are mutually orthogonal. Consequently, identification amounts to providing sufficient restrictions to solve (up to an orthonormal transformation) uniquely for the following decomposition of the $n \times n$ estimated covariance matrix of the VAR given in (1).

$$\Sigma = A_0 A_0' \tag{2}$$

This defines a one-to-one mapping from the vector of orthogonal structural shocks v_t to the reduced-form residuals, $u_t = A_0 v_t$. Because of the orthogonality assumption, and because of the symmetry of Σ, only $n(n-1)/2$ restrictions on A_0 must be imposed.

This paper uses an approach that was proposed recently by Uhlig (2005), which achieves identification of the VAR by imposing sign restrictions on the impulse responses of a set of variables. Uhlig (2005) shows that, given an arbitrary decomposition A_0 of matrix Σ, a structural impulse vector a can be represented as $a = A_0 q$ for some n-dimensional vector q of unit length. Thereby, the arbitrary decomposition A_0 represents a lower triangular Cholesky factor of Σ. To identify one structural shock, the coefficients of the $B(L)$ matrix are estimated first. For a given structural impulse vector a, the impulse responses of n variables up to horizon S are calculable as

$$r_s = [I - B(L)]^{-1} a \quad , \tag{3}$$

where r_s denotes the vector of impulse response functions (IRF) at horizon s. Sign-restrictions can be

imposed on $m \leq n$ variables over the horizon 0, . . ., S. It is noteworthy that this implies that the structural VAR is identifiable by potentially imposing restrictions only on a smaller subset of variables. However, no restriction is imposed on the variable of interest. Instead, we are free to let the results show the effects of shocks on the variables. Identification of the model is then achieved by simulation. The general idea of the simulation algorithm can be summarized briefly as follows. First, for each draw, a Normal–Wishart prior is used for $(B(L), \Sigma)$. Second, possible vectors q are drawn repeatedly from a flat prior distribution[2], with computation of the corresponding IRFs up to horizon S. Third, for each draw we ascertain whether the sign-restrictions imposed for the identification of a particular shock is satisfied. If the restrictions on all variables are satisfied, then this draw is regarded as successful. It is retained. Finally, after completion of the simulation, the set of successful draws is useful to compute the median IRFs and corresponding confidence bands[3]. In this case, the simulation ceases after having accepted a total of 10,000 draws.

3.2 Identifying Assumptions

A four-variable VAR model is estimated. The variables are *relative real investment* (INV), *relative real stock price* (STOCK), *real exchange rate* (REX), and the *trade balance to GDP* (TB/Y)[4]. The variables were measured with respect to the United States, and thereby represent three structural shocks. The first shock is the decline of investment caused by deterioration of the balance sheet. This is defined as a negative finance (NF) shock. The second, the impact of positive productivity shock on investment, is defined as a technology (TECH) shock. The last shock is the impact of real exchange rate depreciation on the trade balance. It is defined as an expenditure-switching (DEP_REX) shock. The important point

[2] We sample each of the n elements of q from a normal distribution and rescale the elements in such a way that q becomes a vector of unit length.
[3] For specific information related to this Bayesian estimation strategy, we refer the reader to Appendix B.1 in Uhlig (2005).
[4] In four Asian countries, since the data series begins in the 1990s, the sample size is not large. Therefore, to limit the degrees of freedom, we minimize the number of the variables, limiting them to four.

related to a TECH shock is that among productivity shocks of many types, an *investment-specific technology shock* is identified, which has an intimate relation with investment. Especially, Fisher (2006) and Letendre and Luo (2007) show that the productivity shock arising from the capital goods sector explains a large share of domestic and foreign macroeconomic variables.

Table 2 presents the procedure for identification. The exogenous components of structural shocks are analyzed specifically rather than their endogenous component. Assuming that a sudden drop of investment results from negative financial shock, the NF shock has a negative impact on both INV and STOCK. Here, STOCK represents the financial condition, which is roughly consistent with the characterization presented by Fratzscher et al. (2010), which emphasizes consumption instead of investment as a wealth effect. In addition, because NF shocks pass through the balance sheet of the private sector, they take some time to affect investment. Therefore, an NF shock is defined as a medium-term shock (eight quarters). To consider the NF shock exogenously, no restriction was imposed on the real exchange rate. The positive TECH shock is assumed to have a long run positive impact only on INV (16 quarters), which is based on the basic macroeconomic assumption that the long-run growth of investment is driven mainly by a productivity shock. According to Gali (1999), a shock related to productivity is assumed to be a long-run shock; consequently, this assumption is used for analyses. Finally, considered exogenously, DEP_REX shock has negative impacts only on REX[5]. Furthermore, DEP_REX shock is defined as a long-term shock (16 quarters) because, as a result of sluggish adjustment in price and quantity, namely incomplete exchange rate pass-through and incomplete Marshall–Lerner condition, a long time is necessary for the impact of exchange rate shock to propagate to exports and imports.

<< insert Table 2 >>

[5] We distinguish the exchange rate from asset prices throughout the paper to emphasize that it affects the trade balance through fundamentally different channels than, for example, stock prices.

In all cases, because the response of TB/Y is sought, no restriction was imposed on this variable. Estimation of a four-variable VAR model includes the constant term. The lag length is fixed to 2. According to the Akaike Information Criterion (AIC), the optimal lag lengths of the four Asian countries mutually differ. For estimations related to the four Asian countries in the same conditions and considering the small sample size, the lag length was fixed to 2. However, different lag lengths of 1–4 will not alter the main results.

3.3 Data

As described earlier, a four-variable VAR model is estimated: *relative real investment* (INV), *relative real stock price* (STOCK), *real exchange rate* (REX), and *trade balance to GDP* (TB/Y). The variables are quarterly data. The respective starting periods of the four Asian countries mutually differ depending on data availability. Indonesia begins at the third quarter of 1990, Korea in the first quarter of 1990, Malaysia in the first quarter of 1991, and Thailand in the first quarter of 1993. Examination of the data for all countries ended in the fourth quarter of 2008. The respective economies and financial sectors of the four Asian countries have an intimate relation with the United States. Therefore, the variables INV, STOCK and REX were measured with respect to the United States. To calculate real investment, *gross fixed capital formation* is divided by the *producer price index*. The *stock price index* represents the balance sheet of the private sector. This variable is divided by the *consumer price index* to calculate real terms. REX is the bilateral *nominal exchange rate* against the US dollar, which is adjusted by the *consumer price index* of home and the United States. Here, TB/Y is subtracting *exports of goods and services* from *imports of goods and service* and then divided by the *gross domestic product* (GDP). Except for the *stock price index*, all data are taken from *International Finance Statistics* of the International Monetary Fund. Furthermore, the stock price index is taken from *Data Stream* of Thomson Reuters.

4. Empirical Results

4.1 Impulse Response

The impulse response functions for a horizon are calculated up to 12 quarters after the shock. From Figures 2–5, the respective responses of INV, STOCK, REX, TB/Y against NF, TECH, DEP_REX shocks of Indonesia, Korea, Malaysia, and Thailand are shown. In the columns of the figure, from the left, NF, TECH, and DEP_REX shock are lined up in order. In the rows of the figure, from the top, INV, STOCK, REX, and TB/Y are lined up in order. Following Uhlig (2005), each figure shows the median as well as the 16% and 84% quantiles to indicate the significance of our results.

The response of TB/Y is sought in this study. Therefore, this variable is examined specifically. At the bottom of the figures, the responses of TB/Y are shown. In all countries, it is confirmed that the responses of TB/Y are all positive against the NF shock, which indicates that, because of the balance sheet deterioration, the financial intermediation channel deteriorated. Then through a sudden drop of investment, the trade balance improved suddenly. In addition, the variables are in relative terms, which indicate that the decline of investment is greater than the decline of production. Consequently, an NF shock can be regarded as one shock that improves the trade balance after the crisis. This result is consistent with that reported by Fratzscher et al. (2010).

Next, the responses of TB/Y against positive TECH shock are shown to be all negative. These results are consistent with the implication of Letendre and Luo (2007). As described previously, because productivity of these four Asian countries drops suddenly after the crisis, the salient implication is that a sudden drop of TECH shock is also one shock that improved the trade balance after the crisis. Finally, we confirm empirically that DEP_REX shock improves the trade balance by an expenditure switching effect. Therefore, the empirical results presented herein indicate that all three structural shocks cause the sudden reversal of the respective trade balances of these four Asian countries.

<< insert Figures 2–5 >>

4.2 Historical Decomposition

From the preceding section, we show that the three structural shocks described above contributed to the trade balance reversal. However, we did not reveal their relative importance or ascertain which structural shock played the most important role. Consequently, by conducting variance decomposition analysis, the variance of TB/Y by NF, TECH, and DEP_REX shock is explained over the entire sample period. According to the estimation, at the fourth-quarter horizons, the sum of three structural shocks explained nearly 75% of the variance of TB/Y in all countries similarly. In addition, the sizes of the three structural shocks are similar; each explains nearly 25% of the variance of TB/Y[6].

Nevertheless, it can be expected that the impacts of the structural shocks, especially crisis-related shocks, are time-variant and that they depend strongly on financial conditions. Usually, financial conditions are not stable throughout the period. They are expected to deteriorate greatly after the eruption of a crisis. Particularly, because the NF shock depends strongly on damage to the financial sector, it can be deduced that the recovery from financial crisis will gradually decrease in magnitude. Therefore, assessment of the relative importance among the structural shocks and how this evolved over time necessitates the use of historical decomposition analysis[7]. The trade balance reversal after the Asian crisis is the target of interest here. Therefore, the historical decomposition is computed from the first quarter of 1995 through the fourth quarter of 2008. Figures 6–9 portray results for Indonesia, Korea, Malaysia, and Thailand[8].

First, Figure 6 presents the results for Indonesia, which confirm that the NF shock is the most influential shock during the adjustment process and that DEP_REX shock plays only a minor role.

[6] More detailed results are available upon request.
[7] See Doan (2009) for details.
[8] The Trade Balance to GDP (TB/Y) is detrended using a Hodrick–Prescott (HP) filter. In addition, we assume zero as the starting value of the vector of endogenous variables to abstract from initial conditions.

Consequently, in the case of Indonesia, the reversal of TB/Y to surplus is driven mainly by the NF shock. That is to say, the IS balance adjustment dominates the expenditure switching effect. Furthermore, the impact of the IS balance adjustment, especially the NF shock, is a long-lasting shock that persists until late 2004. Secondly, Figure 7 shows results for Korea, from which DEP_REX shock is confirmed as playing only a minor role. Furthermore, it is apparent that both NF and TECH shock, namely the IS balance adjustment, are both of similar size. It seems clear that each is larger than the DEP_REX shock. Furthermore, in Korea, the IS balance adjustment is a short-lived shock: it persists only until 2001. Thirdly, from Figure 8 of Malaysia, different from other countries, the DEP_REX shock is the largest shock and the IS balance adjustment plays only a minor role. In addition, as in Korea, the IS balance adjustment is short-lived and continues until 2001. Furthermore, the DEP_REX shock is a long-lasting shock and explains a large share of the TB/Y surplus, especially after 2003[9]. Finally, from Figure 9 of Thailand, the impact of both NF and TECH shocks, namely the IS balance adjustment, explained most of the TB/Y surplus after the crisis. However, the DEP_REX shock is short-lived: it contributed to the surplus only until 2000. Additionally, as in Indonesia, the NF shock and the IS balance adjustment are long-lasting shocks and sustain a large share of the TB/Y surplus until 2005.

<< insert Figures 6–9 >>

To summarize this section, except for Malaysia, IS balance adjustment plays the most important role during the sudden reversal of the trade balance to surplus. Furthermore, this empirical result is in line with those reported by Fratzscher et al. (2010), which indicates that the large exchange rate movements might not be the key element of an adjustment of the current account. That is to say, even though

[9] Malaysia is a petroleum-exporting country. Therefore, the large rise of petroleum prices that occurred after 2000 will increase the marginal revenue of exports against one unit og depreciation of the exchange rate. Therefore, with the large rise of petroleum prices after the 2000s, DEP_REX shock explains a large share of the trade balance surplus.

exchange rate depreciation was greater than in an ordinary case, exchange rate adjustment plays only a minor role. Furthermore, in Indonesia and Thailand, NF and TECH shocks are long-lasting shocks that affected the trade balance until 2004–2005. However, for Korea and Malaysia, these shocks were only short lived and affected the trade balance only until 2001, which indicates that the impact of IS balance adjustment is weak in Korea and Malaysia. The next section presents discussion of this issue with consideration of actual financial conditions in the four Asian countries.

4.3 Financial Condition after the Asian Crisis

During the Asian crisis, many private sector organizations were bankrupted. The ratio of nonperforming loans rose, as shown in Table 1. Although the four Asian countries suffered from common currency depreciation and the sudden capital outflow in 1997, the damage in the respective countries differed. From the same table, it is apparent that the four Asian countries are classifiable into two groups: countries with high nonperforming loan ratios such as Indonesia and Thailand, and countries with low ratios such as Korea and Malaysia. Especially, the nonperforming loan ratios of Indonesia and Thailand in 1998 were 48.6% and 42.9%, whereas those of Korea and Malaysia were only 7.4% and 18.6%. Furthermore, Indonesia and Thailand experienced a precipitous bursting of the bubble economy. That is to say, the damage to the financial sector of Indonesia and Thailand was severe, but the damage was mild in Korea and Malaysia.

The NF and negative TECH shocks began and rippled through the financial crises. Therefore, one can infer that the shock size is proportional to the crisis magnitude. The impact of IS balance adjustment, namely the NF and TECH shocks, in less-damaged Korea and Malaysia might have been weak and short-lived. However, the impact of IS balance adjustment in heavily damaged Indonesia and Thailand might have been large and long-lasting. The results of the historical decomposition analysis confirm the hypothesis presented above. The results of historical decomposition are consistent with the actual

financial conditions of these four Asian countries. If the damage of the financial sector becomes greater, then the IS balance adjustment becomes larger.

It is noteworthy that NF and negative TECH shocks are not stable and long-lasting shocks. Rather, they decrease gradually along with economic recovery. Furthermore, recovery policies instituted by governments hasten recovery. Except for Malaysia, because a large share of the trade balance surplus is explained by the IS balance adjustment of *investment drought*, this surplus decreases along with economic recovery. Actually, except for Malaysia[10], the decreasing trend of the trade balance surplus can be confirmed from Figure 1. Furthermore, soon thereafter, most of the trade balance surplus disappeared. Therefore, these Asian countries can be excluded from discussion of the global imbalance of eastern Asia.

5. Lessons from the Asian Crisis

Given the financial crises looming around the world today, the experience of the four Asian countries might serve as a good lesson for many countries. Especially, from late 2009, the economic crisis in European countries has become a major concern for the world economy[11]. In the Eurozone, regional external imbalance is an important concern. Because the Eurozone is a currency union, these countries have no alternative means of adjusting their own currency. However, along with deterioration of the economic circumstances, the previously unthinkable break-up of the Eurozone is now a looming risk in debt-burdened peripheral countries such as Greece.

Therefore, whether to remain within or to exit the Euro has grown into a heated controversy. According to Eichengreen (2007), exiting the currency union will engender a political and economic catastrophe. Contrary to this opinion, the study by Rose (2007) reported against conventional wisdom that exits from monetary unions are accompanied by surprisingly little economic volatility. The ensuing severe

[10] A large portion of the trade balance surplus of Malaysia is explained by real exchange rate depreciation. Therefore, the trend of surplus will continue despite the economic recovery.
[11] See Issing (2011) for additional details.

financial crisis is overwhelming but, although output would initially fall steeply, recovery can be surprisingly swift. Consequently, although it might be overly optimistic to say so, one can expect that the costs of exiting the Eurozone are not as great as might be expected.

The benefits from exiting the Euro are expected to restore the exchange rate adjustment to correct external imbalance and international competitiveness. According to the experience of these four Asian countries from our studies, although exchange rates roundly plummeted, the expenditure-switching effect was ineffective. Therefore, one can expect that the benefits from exiting the Euro are not great. Overall, even if the cost of exiting the Euro is not as great as might be expected, the benefit from exiting is slight. Consequently, the optimal policy is to remain in the Eurozone and to correct the external imbalance through IS balance adjustment. Especially, as suggested by Salvatore (2006), because the government deficit engenders an external balance deficit, Eurozone-periphery countries with large amounts of sovereign debt should dissolve their twin deficits through strict fiscal discipline, which will improve the IS balance.

6. Concluding Remarks

After the Asian crisis in 1997, the respective trade balances of Indonesia, Korea, Malaysia, and Thailand reversed suddenly from deficit to surplus. This paper presents an investigation of this cause with consideration of a sudden drop of investment by financial crisis. The IS balance adjustment (negative finance shock and productivity shock) and depreciation of the real exchange rate shock were identified by sign restriction VAR of Uhlig (2005). Using impulse response analysis, the three shocks above were found to have contributed to the sudden trade balance reversal. Subsequently, using historical decomposition analysis, the importance of IS balance adjustment versus expenditure switching effects can be confirmed. Furthermore, except for Malaysia, the reversal of the respective trade balance of these four Asian countries is driven mainly by IS balance adjustment. In other words, results show that exchange rate

adjustment plays only a minor role despite the steep devaluation. Additionally, the size of IS balance adjustment becomes greater concomitantly with the deterioration of financial conditions, which implies that trade balance surplus after the Asian crisis will decrease along with economic recovery.

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Table 1: Ratios of Nonperforming Loans of Four Asian Countries (%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Indonesia	48.6	32.9	34.4	31.9	24.0	9.4	14.3	14.8	13.2
Korea	7.4	8.3	8.9	3.4	2.4	2.6	1.9	1.2	0.8
Malaysia	18.6	16.6	15.4	17.8	15.9	13.9	11.7	9.6	8.5
Thailand	42.9	38.6	17.7	11.5	15.7	13.5	11.9	9.1	8.1

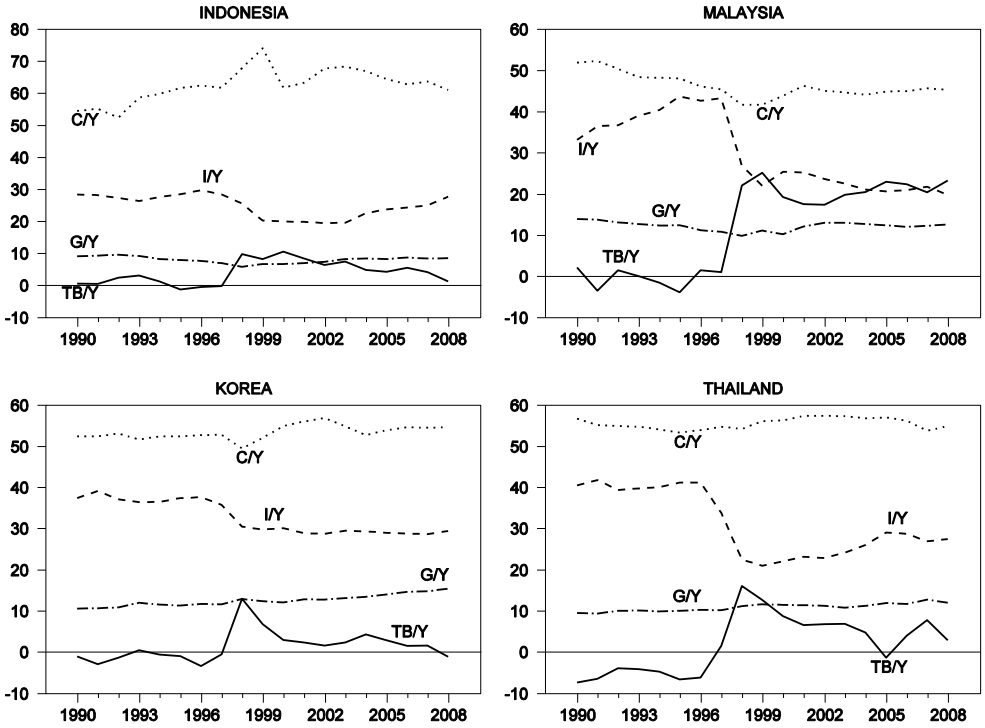
Source: IMF, *Global Financial Stability Report*

Table 2: Sign Restrictions

	NF shock	TECH shock	DEP_REX shock
Relative Real Investment (INV)	negative (8 quarter)	positive (16 quarter)	no restriction
Relative Real Stock Price (STOCK)	negative (8 quarter)	no restriction	no restriction
Real Exchange Rate (REX)	no restriction	no restriction	negative (16 quarter)
Trade Balance/GDP (TB/Y)	no restriction	no restriction	no restriction

Note: Numbers in parentheses are the periods of restriction.

Figure 1: Ratios of Trade Balance and Domestic Expenditures to GDP of Four Asian Countries (%).



Note: TB/Y, C/Y, I/Y, G/Y respectively denote trade balance, consumption, investment, and government expenditure shares of GDP.

Source: IMF, *International Finance Statistics (IFS)*

Figure 2: Impulse Response for Indonesia.

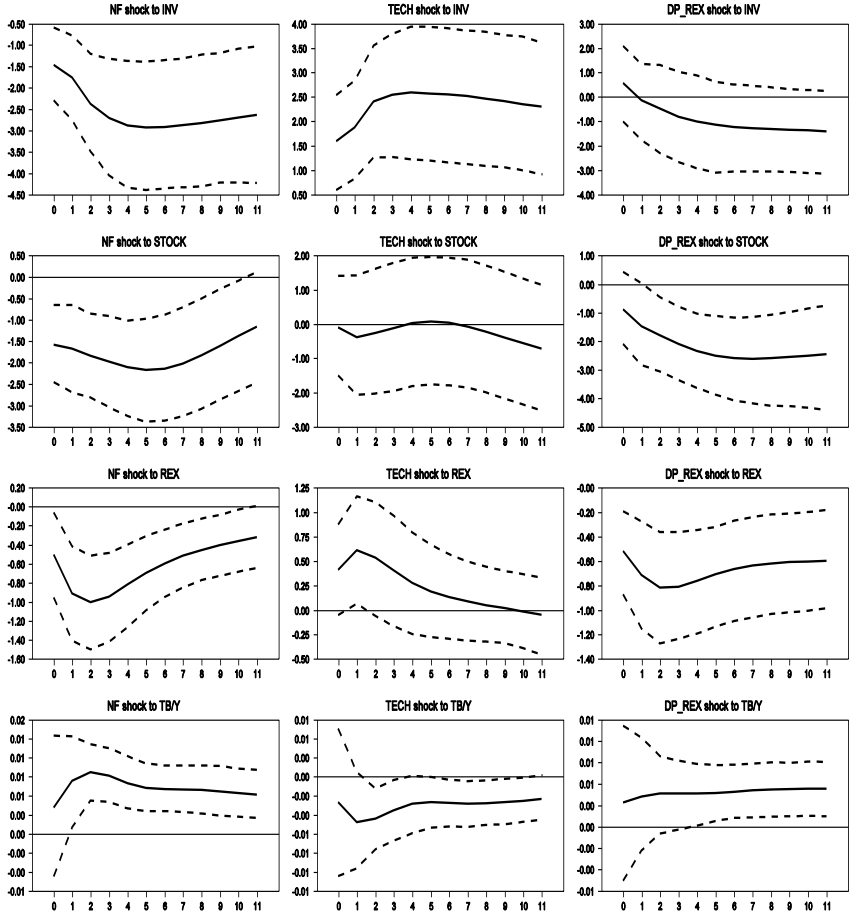
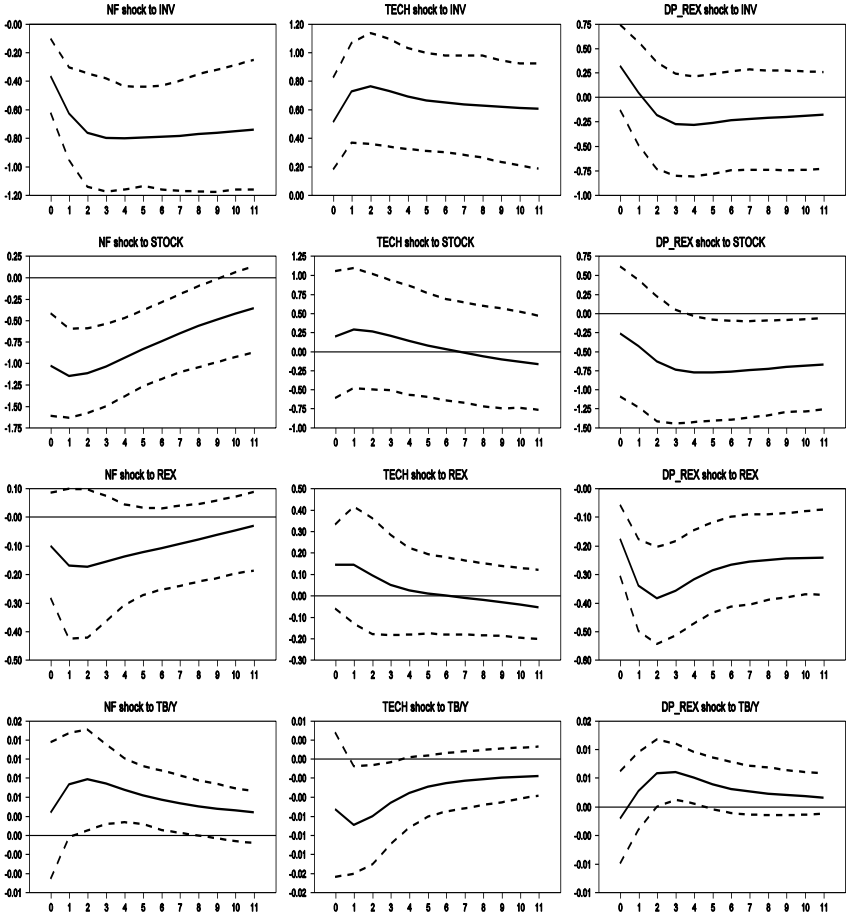


Figure 3: Impulse Response for Korea.



Note: From left, the structural shocks (NF, TECH, DEP, REX) are in order. From top, the variables (INV, STOCK, REX, TB/Y) are in order. The upper panel for REX shows appreciation.

Figure 4: Impulse Response for Malaysia.

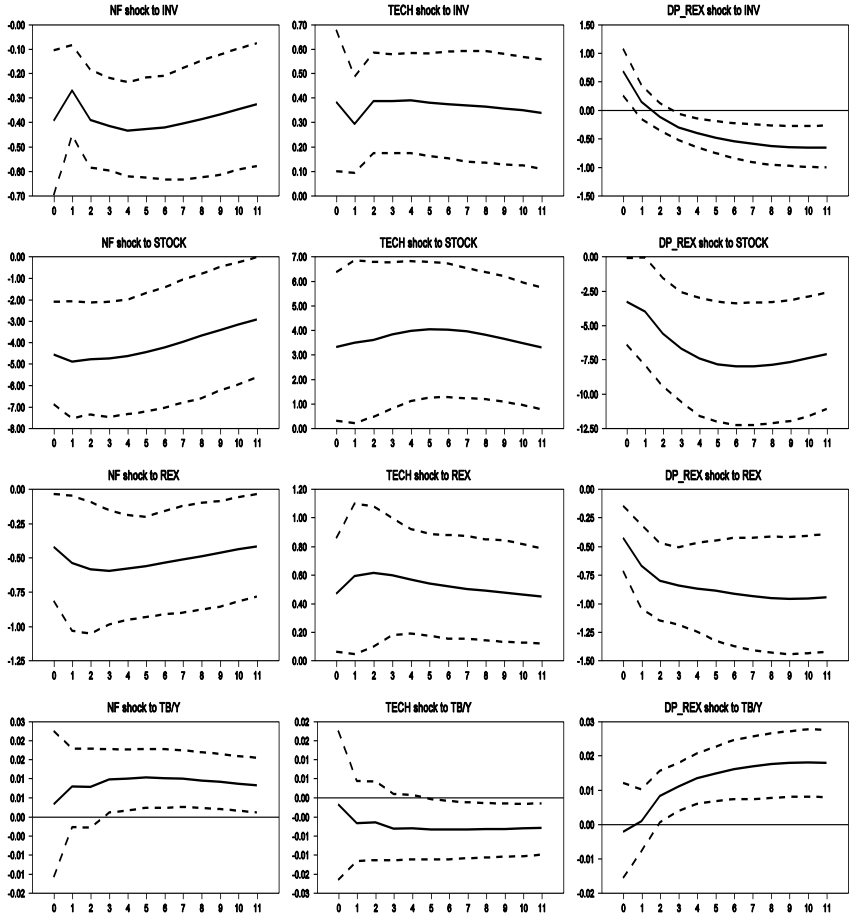
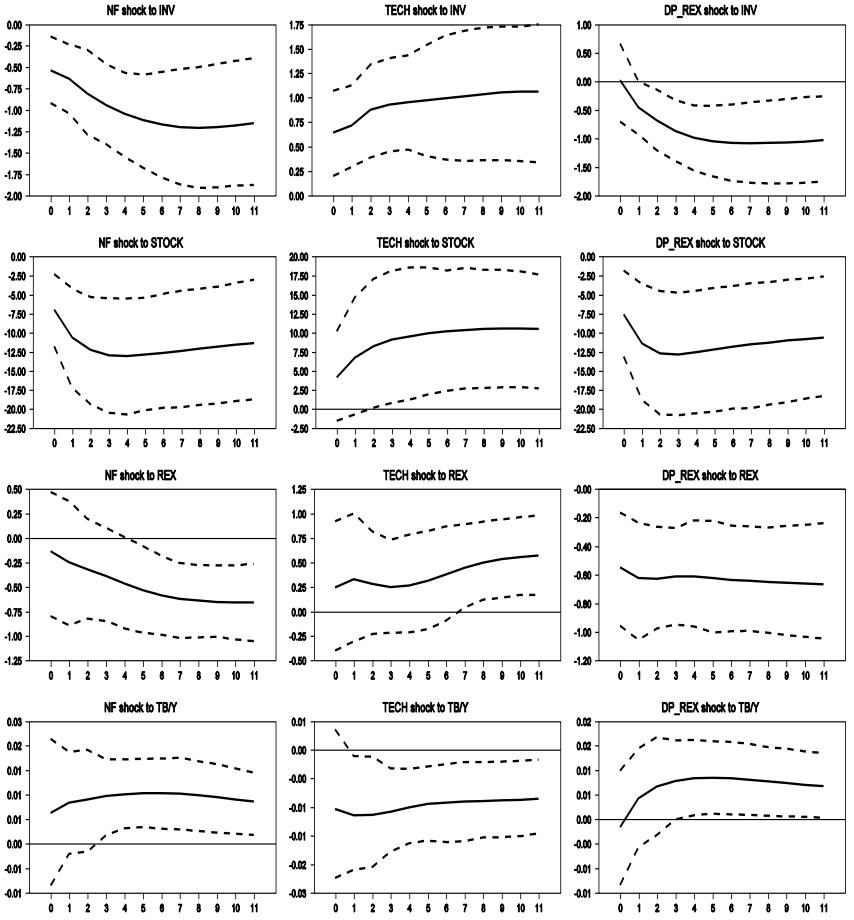


Figure 5: Impulse Response for Thailand.



Note: From left, the structural shocks (NF, TECH, DEP, REX) are in order. From top, the variables (INV, STOCK, REX, TB/Y) are in order. The upper panel for REX shows appreciation.

Figure 6: Historical Decomposition of Trade Balance to GDP for Indonesia.

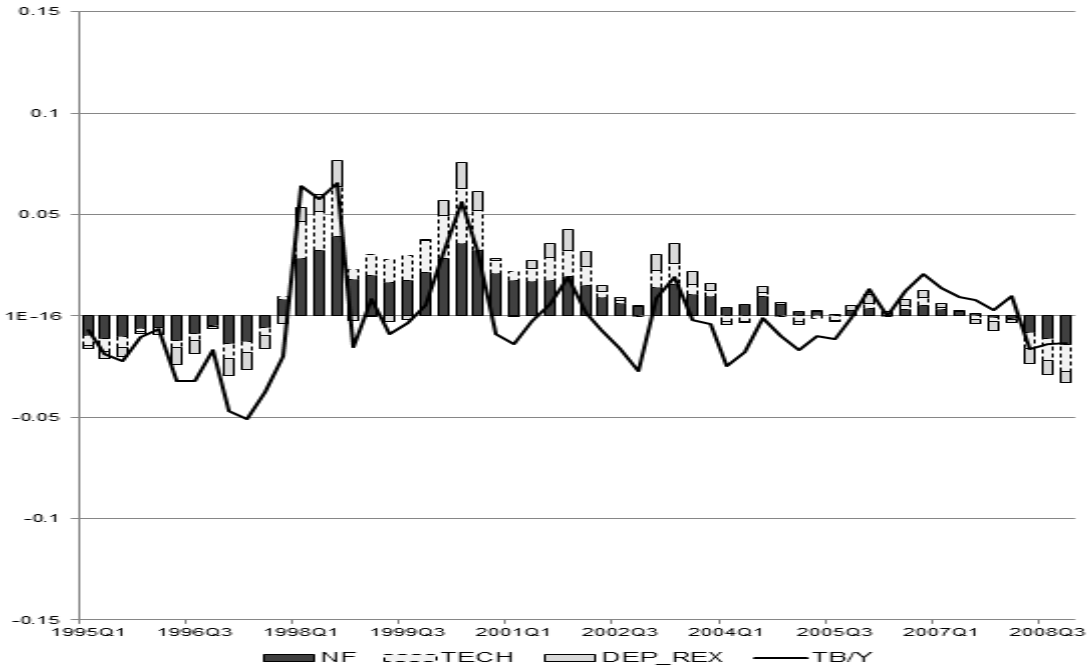
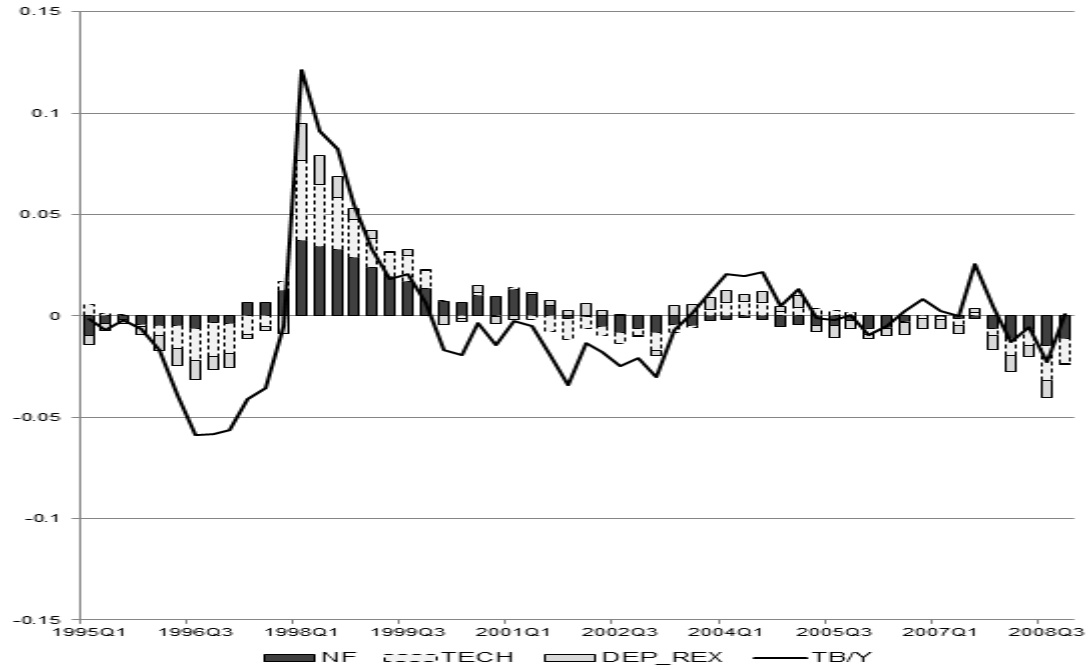


Figure 7: Historical Decomposition of Trade Balance to GDP for Korea.



Note: Trade Balance to GDP (TB/Y) is detrended using a Hodrick–Prescott (HP) filter. Zero is assumed as the starting value of the vector of endogenous variables to abstract from initial conditions. NF, TECH, DEP_REX denote structural shocks.

Figure 8: Historical Decomposition of Trade Balance to GDP for Malaysia.

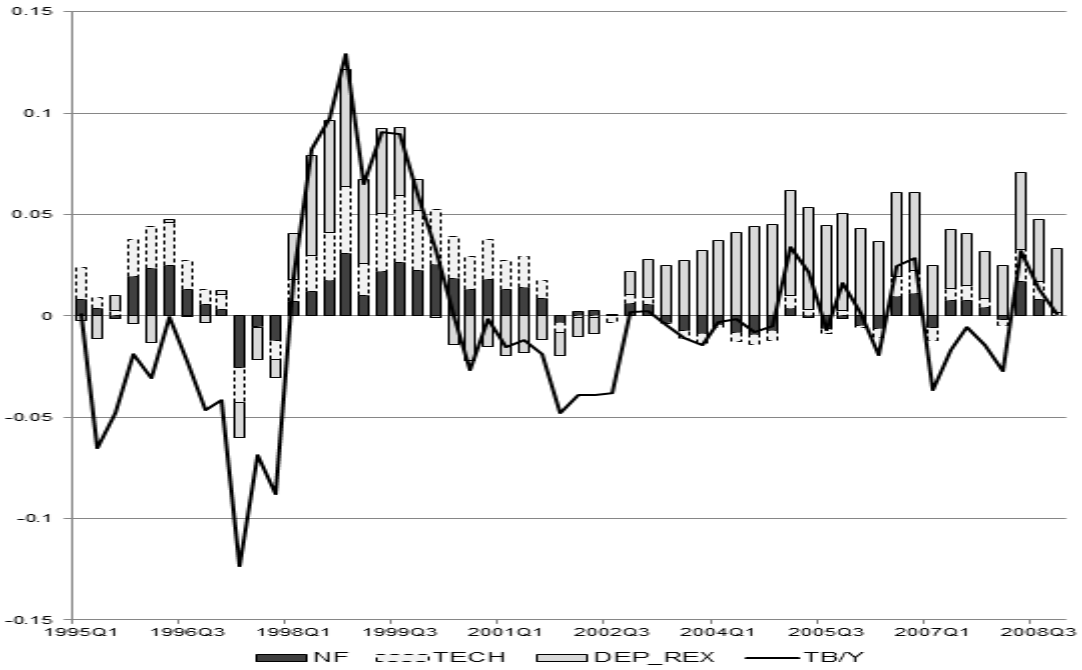
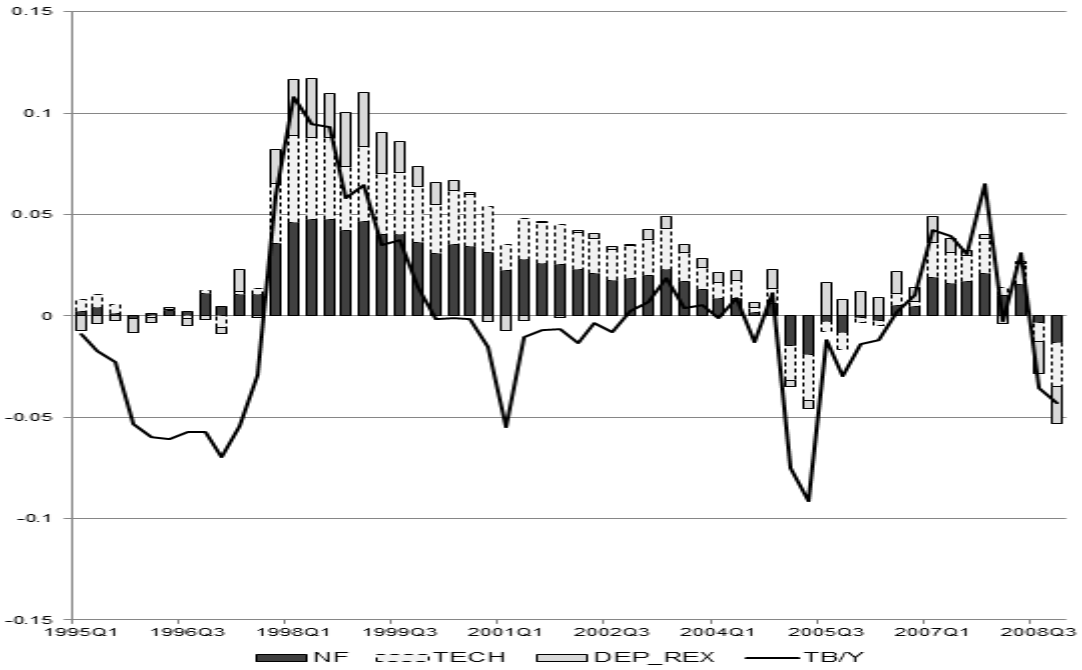


Figure 9: Historical Decomposition of Trade Balance to GDP for Thailand.



Note: Trade Balance to GDP (TB/Y) is detrended using a Hodrick–Prescott (HP) filter. Zero is assumed as the starting value of the vector of endogenous variables to abstract from initial conditions. NF, TECH, DEP_REX denote structural shocks.