THE INTERTEMPORAL APPROACH TO THE CURRENT ACCOUNT: EVIDENCE FROM INDONESIA AND MALAYSIA

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ABSTRACT

The study presents the empirical analysis of the current account positions of two ASEAN countries (namely, Indonesia and Malaysia) during the past four decades. We address the issue of external solvency by measuring the deviation of actual from the optimal path of the current account balance using Sachs's (1982) intertemporal model. Of these two countries, our results show that the model performed noticeable better for Malaysia. We found that the Malaysia's actual path moves closely to the estimated consumption-smooth currents accounts, with small (insignificant) deviations between them. Unlike Malaysia, we found weaker support of the model for the case of Indonesia. Indonesia's external imbalances reveal the following: (i) the deficits of the mid 1980s and 1990s prior to 1997 financial crisis appear to be unsustainable; (ii) the evidence appears to be broadly consistent with the intertemporal model and hence suggests that capital is mobile; (iii) the large surpluses observed during the post-1997 period significantly deviate from the optimal path, implying that savings have reached a level that is beyond what would be required to support full consumption-smoothing; and (iv) there is excessive volatility in international capital movements for consumption-smoothing purpose.

JEL classification: E 21, F30, F32

Keywords: current account deficits; external solvency; consumption-smoothing optimization

1. Introduction

Malaysia relied heavily on foreign capital to support its high gross domestic investment (GDI) in the last two decades. Investment boom during the 1980s and 1990s was primarily lead by the surge in foreign capital, mainly in foreign direct investment (FDI). During the period 1989 to 1996, capital inflows to Malaysia were equivalent to 9.3 % of the GDP. By comparison, Indonesia received only moderate amounts of foreign capital in order to support the saving-investment gap. Foreign capital inflow represents 4.2 % of the county's GDP over the same period. The external positions during the period proceeding the 1997 crisis were relatively smaller than Malaysia.

In the aftermath of the crisis, however, we observed that the current account took a sharp reversal in both countries due mainly to the fall of their currencies (the Indonesia rupiah and the Malaysian ringgit) against the currencies of its major trading partners (namely the US dollar and the yen)[1]. The sharp depreciation in the exchange rate was followed by falling imports and rising exports. One is tempted to speculate from the size of the deficits of the tune of 2-10% and for over a decade that the 1997 currency crisis was associated with the sustainability of the external balance[2]. Numerous theoretical and empirical studies have indicated that the financial crises in the 1990s such as the Mexican crisis of 1994 and the Asian financial crisis of the 1997 were preceded by a deteriorating current account and/or the investor's panic (Kaminsky and Schmukler, 1999; Miyakoshi, 2000; Ryan, 2000; Bustelo, 2000, among others). However, the high correlation between current account deficits and currency crisis observed in the 1997/98 period need not necessarily imply causation[3]. In other words, problems in external balances do not always precede a currency crisis.

This paper is motivated by the history of Indonesia's and Malaysia's current account deficits—the recurring current account deficits and the apparent close link between the size of the current account and economic crisis, including the recent 1997 financial crisis. These two experiences offer potential useful lessons for other developing countries with large and persistent deficits. Specifically, the primary objective of this paper is to examine the usefulness of the intertemporal (consumption-smoothing) model by demonstrating its ability to gauge the movement of the current account balances. The optimality and excessiveness of the external account for the two emerging ASEAN economies are examined using data over four decades that ended in 2005. To this end, we estimate the consumption-smoothing current account path using a vector autoregressive

[1] Both these countries had large outstanding (short-term) liabilities dominated in the US dollar but their assets were dominated in the domestic currency. This currency mismatch make them vulnerable to currency attach (dollar devaluation).

[2] The conventional wisdom is that a deficit of more than 5% of GDP flashes a red light, especially if the deficit is finance with short-term debt or foreign exchange reserves, and if it reflects high consumption spending. For more discussion on this issue, see the articles by Milesi-Ferretti and Razin (1996, p. 161) and Collins et al., (1998, p.30).

[3] We note that all the ASEAN countries had deficit in the external balance and were severely affected by the 1997 financial crisis—the sole exception is Singapore. The deficits in both Malaysia and Thailand widen to over 8% of GDP in 1995, which is significantly larger than Indonesia and the Philippines (4%).

(VAR) model and establish it as the "benchmark" (optimal) path, and in what follows an array of formal statistical tests was deployed to test the restriction implied by the standard intertemporal model. Additionally, the optimal size and volatility of the current account imbalances are computed in order to address the issue concerning external solvency and judgments about the size of the deficits in the two countries[4].

The rest of this paper is organized as follows: Section 2 provides the intertemporal approach to current account, and highlights the important econometric implications of the model. In Section 3, we present the empirical results of the study; and Section 4 summarizes and concludes the paper.

2. The Intertemporal Optimization Approach to Current Accounts

The theoretical model on the intertemporal approach to the current account developed in Sachs (1982) and Ghosh (1995), among others, provides a useful framework to address issues relating to external balance in a small open economy like that of the ASEAN economies as the underlying assumption of the model is likely to be satisfied[5]. Additionally, the model provides a useful vehicle to highlight the stylized facts about the current account of an emerging economy: The model predicts that a country's current account will be in deficit (surplus) whenever national cash flow defined as output minus investment minus government spending is expected to rise (fall) overtime. In addition, the model contains enough economics to avoid the risk of 'measurement without theory' but at the same time it is simple and data-driven.

The optimum external borrowing generated by the model serves as a benchmark against which the actual current account may be judged. For example, if the actual current account exceeds the optimum series generated by the intertemporal model, it is said to be excessive. Briefly, the model constitutes an extension of the rational expectations permanent income hypothesis model of private consumption to an open economy setting and predicts that the current account should be equal to the expected future decline in an economy's national cash flow (Campbell and Shiller, 1987; Otto, 2003). The model treats the current account balance as the end product of forward looking savings and investment decisions and predicts that transitory shocks to output are primarily reflected in national saving while aggregate consumption is smoothed.

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[4] External solvency is satisfied when a country fully meets its external obligation, that is, its intertemporal budget is satisfied. Meanwhile sustainability requires that a country not be subjected to 'liquidity constraint' imposed by foreign lenders; that is, in addition to the intertemporal having to be satisfied, factors influencing (i) willingness (as well as ability) to pay, and (ii) willingness to lend, should be taken into account (see Milesi-Ferretti and Razin, 1996; and Cashin and McDermott, 1998).

[5] The theoretical model is also discussed in Ghosh (1995), Cashin and McDermott (1998), Agenor et al. (1999), and Kim et al. (2002), to name a few. For example, one of the assumptions is that the economy can borrow from the global financial markets without inducing a change in the other variables such as the world real interest rate. Major aspect of this literature is covered comprehensively in Obstfeld and Rogoff (1995)

A brief review of the literature finds that the model has been applied in several studies to calculate the optimal and determine the sustainability a country's current account. Examples of empirical application of the model include Kim et al. (2001, 2006) on New Zealand data, Adedeji (2001) on Nigeria data, Hoffmann (2001) on G7 data, Agenor et al. (1999) on French data, Apergis et al. (2000) on Greece data, Irandoust and Sjöö (2000) on Swedish data, Bergin and Sheffrin (2000) on Australian, Canadian, and United Kingdom data, and Cashin and McDermott (1998) on Australian data. In context of the ASEAN countries, Guest (1999), Guest and McDonald (1999), Yan (1999), Ostry (1997), and Milesi-Ferretti and Razin (1996) are the few that have appeared in the recent literature[6].

The intertemporal model for the current account, which is also commonly referred to as the present value model, is given as

$$CA_t = -\sum_{j=1}^{\infty}(1+r)^{-j} E_t\left(\Delta Z_{t+j}\right) \tag{1}$$

where r is the world interest rate, $Z_t = Y_t - I_t - G_t$, Y_t is GDP, I_t is investment expenditure, G_t is government expenditure. Z can be tought of as a country's net cash flow. Eq. (1) links the current account balance to the expectation of future discount changes in net output. It shows that the consumption-smoothing component of the current account is in deficit when the present discounted value of future net output changes is positive, and vice versa. It also suggests that the consumption-smoothing component of the current account itself should incorporate all information on future net output changes. This equation can be viewed as a country's net cash flow. If the representative agents expect the national cash flow to increase (fall) in the future, they will increase (reduce) current consumption and this will give rise to a current account deficit (surplus).

We estimate the model of Eq. (100) by using the VAR representation which is conveniently written as

$$\begin{bmatrix}\Delta Z_{t+j}\\ CA_t^s\end{bmatrix} = \begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}\begin{bmatrix}\Delta Z_{t+j-1}\\ CA_{t+j-1}^s\end{bmatrix} + \begin{bmatrix}\varepsilon_{1t+j}\\ \varepsilon_{2t+j}\end{bmatrix} \tag{2}$$

where $\varepsilon_1$and ε_2 are disturbance terms with a conditional mean of zero and where ΔZ and CA^s is the actual consumption-smoothing component of the current account. Making use of

$$E_t\begin{bmatrix}\Delta Z_{t+j}\\ CA_{t+j}^s\end{bmatrix} = \begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}^j\begin{bmatrix}\Delta Z_t\\ CA_t^s\end{bmatrix} \tag{3}$$

and substituting Eq. (2) and Eq. (3) into Eq. (1) leads to the optimal current account:

[6] The intertemporal approach to current account is not without criticism despite its popularity. For example, Reisen (1998) raised some doubts about the reliability of the model to assess macroeconomic policy and its failure to provide reliable bench mark to measure the excessiveness in external deficits. To date, the results from this model when applied to the emerging market economies are at best mixed. The model when applied to small countries may fail because they are likely to be affected by external shocks (e.g. debt crisis of the 1980s).

$$CA_t^* = -\sum_{j=1}^{\infty}(1+r)^{-j}\begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}\psi_{11} & \psi_{12}\\ \psi_{21} & \psi_{22}\end{bmatrix}^j\begin{bmatrix}\Delta Z_t\\ CA_t^s\end{bmatrix}$$

$$= \begin{bmatrix}1 & 0\end{bmatrix}[(1+r)^{-1}\psi][I-(1+r)^{-1}\psi)]\begin{bmatrix}\Delta Z_t\\ CA_t^s\end{bmatrix} = \quad . \qquad (4)$$

There are two important tests that will be undertaken in the present research. The first hypothesis concerns the role of the current account as a signal of future changes in the national cash flow. This hypothesis is equivalent to testing whether the current account Granger-causes changes in the national cash flow: if the present value model described in Eq. (1) is true, then today's current account should reflect the agents' expectations about future movements in the national cash flow. This hypothesis can be formally tested by estimating the following model:

$$\Delta Z_t = \pi + \alpha\Delta Z_{t-1} + \beta CA_{t-1}^s + \varepsilon_t \qquad (5)$$

and testing whether β is negative and statistically significant. This will be the case if the model is true and agents use more information than simply lagged changes in the national cash flow to forecast future changes in the national cash flow.

The second test is to justify the validity of the present value model (as described by Eq. (1), which is also called the orthogonality test. Eq. (100) holds if and only if $E_{t-1}[CA_t^* - \Delta Z_t - (1+r)CA_{t-1}^*] = 0$. Therefore, if the model is correct so that the estimated optimal consumption-smoothing current account, CA^* , and the actual consumption-smoothing component of the current account, CA^s, are equal, then $R = CA_t^* - \Delta Z_t - (1+r)CA_{t-1}^*$
should be statistically uncorrelated with lagged values of ΔZ and CA^s series. This restriction can also be tested by constructing R_t and run the following regression:

$$R_t = \pi + \theta_1 CA_{t-1}^s + \theta_2\Delta Z_{t-1} + \nu_t \qquad (6)$$

and testing the null hypothesis H_0: $\theta_1=\theta_2=0$. The rejection of the null hypothesis in favor of the alternative provides evidence against the present value model.

In practice, the two tests described above do not provide any indication of exactly how well the model fits the actual data. To this end, we estimate the corresponding bivariate VAR model and use the results from the model to generate the optimal current account as shown in Eq. (4). The optimal path of the current account is the path that would be observed if the restrictions implied by Eq. (4) are satisfied. Thus, comparing the estimated optimal values with the actual values of the current account provides some indications of the fitness of the model.

3. Empirical Results

The annual data covering the period 196 to 2004 was used in the analysis. For the 1960-1999 period, the annual series of private consumption (*C*), investment expenditure (*I*), public expenditure (*G*) and gross national product (*Y*+*rB*), all are ratios to the GDP, were derived from their respective ratios to GDP obtained from Heston, Summers and Aten's *Penn World Table* published by the University of Pennsylvania's Center for International Comparison. The series for current account to GDP ratio, (*CA*), was computed from the identity (*Y*+*rB*)-(*C*+*I*+*G*), while the series of national cash flow to GDP ratio, (*Z*), was calculated as *Z*=*Y*-*I*-*G*. For the 2000-2004 period, private consumption, investment expenditure, public expenditure, gross national product and the GDP series were obtained from the IMF's *International Financial Statistics*, and the current account balances were taken from the Asian Development Bank's Key Indicators 2005. Finally, for simplicity, the world interest rate, *r*, was set at 4% per annum, a value typically used for this type of study.[7]

We commenced the analysis by performing the standard unit roots tests for the all the series under investigation, first on levels and then on their first differences. To this end, we applied the standard Augmented Dickey-Fuller (Said and Dickey, 1984, ADF), Phillips-Perron (Phillips and Perron, 1988, PP) unit root tests. Since the conventional unit root test are themselves subjected to low power and therefore unable to reject the nonstatinary null, we also relied on the tests advocate by and Kwiatkownski-Phillips-Schmidt-Shin (Kwiatkownski et al., 1992, KPSS). The KPSS test, unlike the ADF and PP tests, takes stationarity as the null hypothesis.

For Indonesia, results from each of the three univariate tests suggest that that current account, *CA* is a stationary variable (at 5% significant level) while *Z* appears as an *I(1)* process at the usual significance levels. Likwise, as shown in Table 1, results of the unit-root tests for Malaysia's *CA* and *Z* also suggests that *CA* is a stationary variable and *Z* is an *I(1)* process.

Next, we estimated the unrestricted VAR model of ΔZ and CA^s and the results of the fitted model are summarized in Table 2. As mentioned earlier, the present value model implies that current account should in general Granger-cause future changes in net output (or changes in national cash flow). For Indonesia, the slope coefficient of CA^s_{t-1} in equation (16) β carries the expected negative (-0.1682) but is not statistically significant at 5% level. Thus, the null hypothesis of non Granger-causality running from current account to national cash flow (net output) cannot be rejected by the data. This implies that Indonesia's data is not consistent with the present value model. Meanwhile, we observed that β is negative (-0.3667) and significant at 5 % level for Malaysia (Table 2). In this case, the null hypothesis is easily rejected. The distinguish feature of this finding is that it supports the proposition that today's current account reflect agents' expectations

[7] Kim et al. (2001) and Agenor et al. (1999) experimented with various different values of *r*, ranging from 1% to 8% and still produced similar results in those cases.

about future movements in the national cash flow, and therefore in consonance with that predicted by the present-valued model (Otto 2003). Therefore, in contrast with Indonesia, the Malaysian data appear to support the present-valued model. Nonetheless, it is worth pointing out that the ability of the current account to forecast future changes in national cash flows is only a weak (less stringent) condition implied by the present value model.

The estimated regression results of regressing $R_t = \pi + \theta_1 CA^s_{t-1} + \theta_2 \Delta Z_{t-1} + v_t$ are presented in Table 3. We observed that the coefficients of ΔZ_{t-1} and CA^s_{t-1} are all insignificant for both of the countries, indicating that R_t is orthogonal to ΔZ_{t-1} and CA^s_{t-1}. Additionally, we tested the null hypothesis:H_0:$\theta_1=\theta_2=0$ using the standard Wald test. The Wald statistic for the joint test has χ^2 with 2 degree of freedom. As shown in table 3, the computed χ^2-statistics are 0.0001 [p-value=0.9999] and 0.0114 [p-value=0.9887], respectively, for Indonesia and Malaysia. Failure to rejecting the null hypothesis suggests that R_t is uncorrelated with the lagged ΔZ and ΔCA^S, and hence is consistent with the present value model of the current account (Ostry, 1997; Otto, 2003).

At this point, it is unclear that the Indonesia's data is consistent with the present value model since outcome from Granger causality test is inconsistent with the orthogonality test, which is a more stringent test[8]. To provide further insight on the explanatory ability of the simple model, we examine the time profile of optimal path of current account along with its actual path as usually done in the literature (Ostry, 1997; Kim, et al., 2006). As we can observe from the plot in Figure 1, even though the results from the statistical tests cast doubt on the validity of the present value model to the Indonesian data, the predicted model seems to adequately capture the direction of the movement of the actual path of the current account variable. Second, the deviation between optimal and actual current account variable may also be interpreted in such way to explain the period of either excessive borrowing for consumption purposes or excessive savings. Within this context, it can be observed from the Indonesia’s plot that the country was in the period of either excessive borrowing for the most part of the 1980s and also in the mid-1990s.

Figure 2 plots the Malaysia’s actual and optimal consumption-smoothed current accounts. Visual inspection shows the actual and predicted observations track the major turning points for most of the sample period, except a brief period in the 1980s (when the economy took a sharp fall due to the commodity crisis). In addition, we found that the correlation between the optimal consumption and the actual data of the current account (0.96) to be highly correlated over the entire sample period. The post-1998 period marked a new turn in the evolution of the external balance. The surplus during the recent years reflects substantial increase in exports (with import falling) due to the fixing of the ringgit and capital controls, and thus suggesting that the model captures both the statistical aspects as well as the economic events aspects of the current account behavior in Malaysia.

[8] Ostry (1997) pointed out that this is a very stringent requirement of the model. For ASEAN-5, the author showed that actual and optimal current account series are identical for Malaysia, Indonesia and the Philippines. In the case of Singapore and Thailand, the null the two series are equivalent is rejected by the Wald tests. In an earlier paper, Gosh and Ostry (1995) found that this stringent requirement was rejected for one third of the countries in the sample of 45 countries.

It is worth mentioning that our finding is consistent with Ostry (1997), who pointed out that the sharp increase in investment, as illustrated in Figure 1 and Figure 2, financed both by increased domestic saving and also by a surge in net capital inflows from abroad, was certainly consistent with a sharp deterioration in both actual and optimal current account positions in a number of ASEAN countries in the early 1990s. However, Guest and McDonald (1999) using a different approach, arrived at the conclusion that the optimal path is over the actual path of Malaysia's current account for the 1985-1995 period, which, as suggested by their model, is due to over-investing rather than under-saving.

On the robustness of the estimated models

In order to check the statistical significance of the deviation between the actual and the estimated paths of the current accounts of both countries, we provided the two-standard deviation bands of the estimated models by simulation using the @RISK software. To this end, we assumed that each data point is random with a certain triangular-shape probability distribution function. Relying on the Monte-Carlo sampling technique, we simulated the data for 5000 times, in which each iteration generates a series of estimated current account values. We then estimated the standard deviation for each data point using the result of the simulation. The two-standard deviation bands of the estimated current account paths for both countries are displayed in Figure 3 and Figure 4. Interestingly, almost all of the observations for the actual current account balance fall within the two-standard deviation band for Malaysia. On the other hand, several sub-periods of the Indonesian actual current account series do not fall within the two-standard deviation band, especially for the periods of the years 1962-1969, 1979-1987 and 1995-1998. While the figures confirm the robustness of the estimated model of the Malaysian current account balance, similar conclusion cannot be made for the case of Indonesia. Evidently, this result seems to challenge the validity of the present value model for the Indonesian data.

Excess volatility of international financial capital flow

Another important issue relating to the current account is the 'excess volatility' of international financial capital flow which in turn would imply inappropriate utilization of these flows for domestic consumption purposes. Specifically, is there evidence of excessive volatility in foreign capital inflows? In order to examine this issue, we tested the null hypothesis of equal variances between the actual and the optimal paths of the current account as predicted by consumption smoothed model[9]. Rejection of the null would imply that there is potential of excess volatility in foreign financial capital flows. As exhibited in Table 7, the results of the *F*-test, the Bartlett test, Siegel-Tukey test, the Levene test and the Brown-Forsythe test all indicated that the null hypothesis is rejected at the five percent significance level for Indonesia. In contrary, the null hypothesis is not

[9] As pointed by Agênor et al. (1999) this is a joint test of the assumption of a high degree of capital mobility and the validity of the intertemporal model (see also Ghosh, 1995). Sheffrin and Woo (1990), Ghosh (1995), Agênor et al. (1999), among other also reported similar results. They interpreted the result as suggesting that capital flows between the host country and the rest of the world may have been more volatile than would be justified by changes in fundamental.

to be rejected for Malaysia. Therefore, the Malaysian data is consistent with 'no excess volatility' of international financial capital flows. As for Indonesia, the result suggests the possibility of 'excess volatility' in (foreign) financial capital flows and hence possibly inappropriate utilization of these flows for domestic consumption purposes. To provide a better picture, we computed the volatility of the actual and the optimal paths of the current account. To accomplish this, we applied the Box-Jenkins procedure to obtain the appropriate ARMA representation of both series, and calculated the measure of volatility as the square of the fitted residuals from the estimated ARMA representation. The volatility of the current account for both countries is displayed graphically in Figures 5-6. Consistent with the results of the equal variance test, the figures showed that the actual path of Indonesia's current account is more volatile than the optimal path, while for Malaysia the contrast is not too noticeable.

4. Conclusions

The importance of the implications and appropriate policy response on the size and persistency of current account deficits has received considerable attention even before the crisis of the 1990. From the ASEAN perceptive, the concern has been heightened by the substantial increase in the current account deficits of ASEAN countries during the early and mid-1990s. This paper contributes to this debate by examining the external solvency and the optimality of the intertemporial consumption-smoothing through it current account in two ASEAN countries.

In general, we observed that all the restrictions implied by the basic intertemporal model are easily satisfied for the case of Malaysia. Malaysia's current account was consistent with optimum consumption-smoothing, the solvency condition is met, and there is no evidence to show that there is excess volatility in capital inflows. In short, these findings are consistent with optimal smoothing for the full sample period. All in all, the results show that the actual consumption-smoothed current account path is within the one standard-deviation band until the second half of the 1990s. Therefore, we conclude that the present value model fits the data reasonably well and that Malaysia's external balances were used to smooth consumption optimally. This means that the fluctuations in the current account are the outcome of consumption smoothing behavior. It also means that Malaysia had little difficulty in the past in smoothing consumption through borrowing and lending in events of exogenous shocks.

In the case of Indonesia the picture is less clear. The statistical evidence fails to reject the following hypothesis: a) the current account does not Granger-cause changes in national cash inflows; (b) variance of the actual current account is equal to the optimum consumption-smoothing current account. We note that this variance ratio test is a joint test of the assumption of high degrees of capital mobility and the validity of the intertemporal model (Gosh, 1995; Kim et al., 2001); and (c) The consumption smoothing component of the current account lies outside the two standard deviation band of the current account balance as predicted by the intertemporal model. Nonetheless, the results reveal that there is a close association between movement in the actual and optimum current accounts as measured by the intertemporal model. This important aspect of the model of the model is captured by the data for Indonesia.

We also found that the volatility of the actual and the optimal paths of malaysia's current account is about the same, hence suggesting moderate degree of capital mobility between Malaysia and the global financial markets. However, we did not find any systematic tendency for the actual current account movements to be smaller than the optimum movements, as would be the case if there are effective barriers to effective international capital mobility. Perhaps, our empirical finding is suggesting the Malaysia's capital control during a brief period in the post-crisis era is ineffective. We note that despite the capital control in place in the period 1998-2003, a recent study based on real interest parity reveal that Malaysia's capital market is integrated with the major capital markets, namely the US and Japan.

As for Indonesia, it is clear that in the years preceding the crisis, the actual has been smaller than the optimal current account as predicted by the consumption-smoothing model. Indeed, this finding reflects excessive savings rather than excessive consumption. Unlike the case of Malaysia, we found statistical evidence to support the hypothesis that speculative factors is driving capital movements in Indonesia especially during the period prior to the 1997 currency crisis (actual movements more volatile than the predicted movements). The actual current account deficits are greater than the optimal current account deficit during these periods. In the post-1998 period, the actual exceeded the optimal current account balance (excessive savings), which in turn suggests that capital inflow has been less desired for the case of Indonesia.

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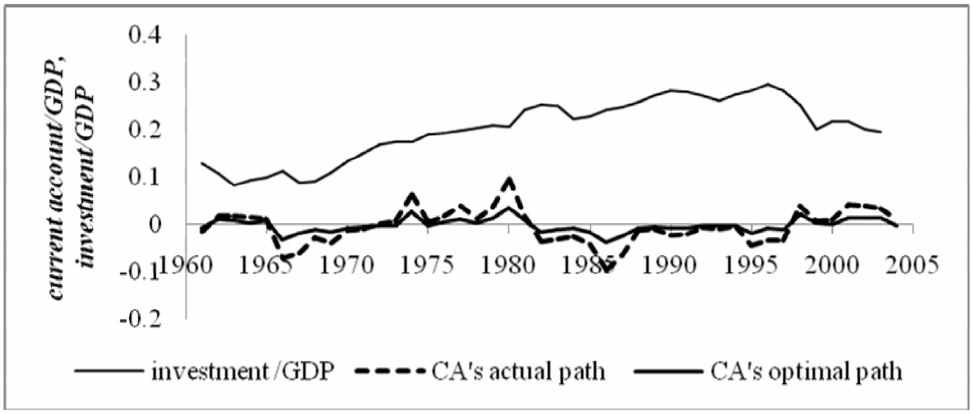

Figure 1: Indonesia's actual and optimal paths of the current account and investment, 1960-2004.

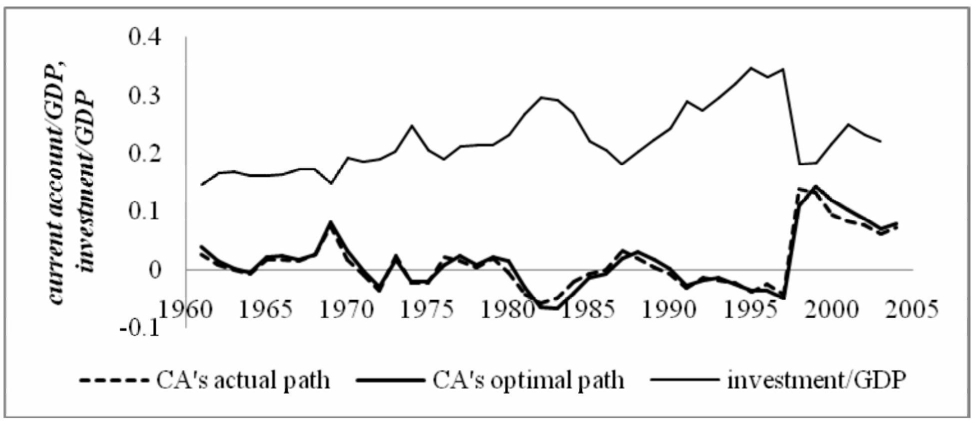

Figure 2: Malaysia's actual and optimal paths of the current account and investment, 1960-2004.

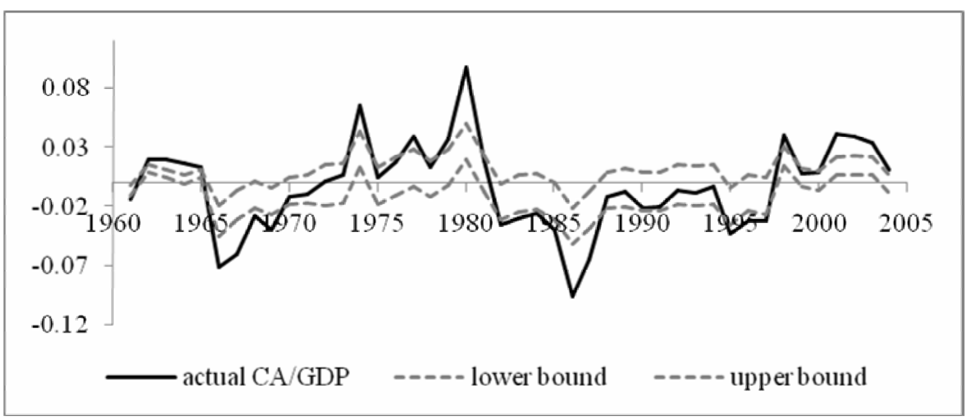

Figure 3: The two-standard deviation bounds for the estimated model and the Indonesia's actual current account 1960-2004.

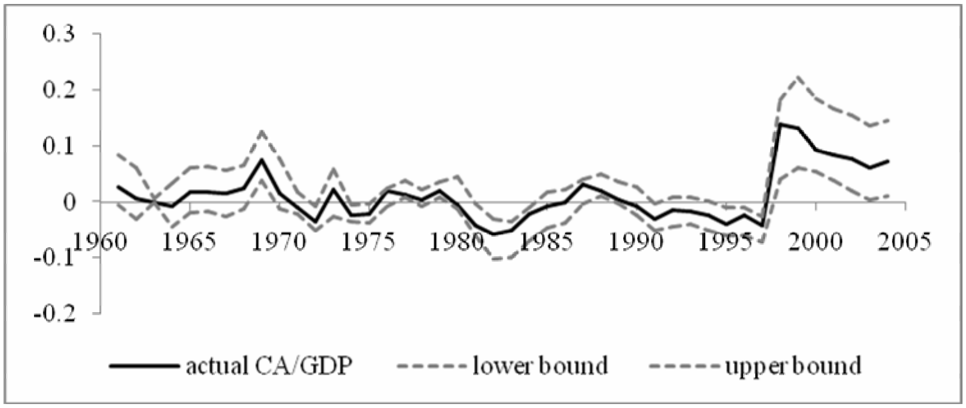

Figure 4: The two-standard deviation bounds for the estimated model and the Malaysia's actual current account 1960-2004.

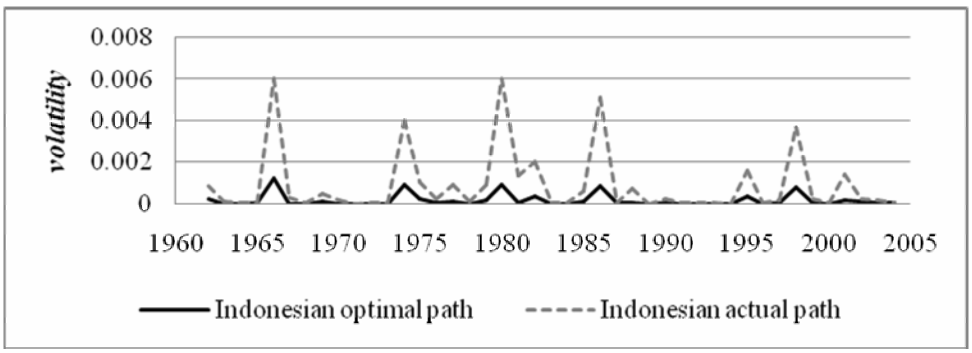

Figure 5: The volatilities of the actual and the optimal paths of Indonesia's current account 1960-2004.

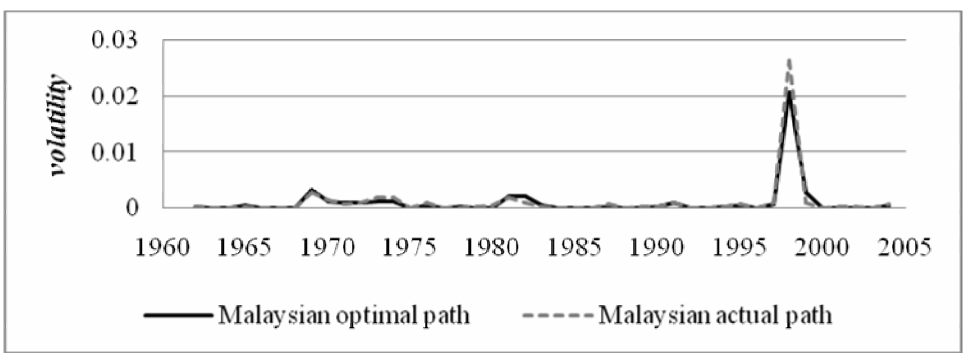

Figure 6: The volatilities of the actual and the optimal paths of Malaysia's current account 1960-2004.

Table 1: Test for Unit Roots

Test	*Indonesia* Level	*Indonesia* First difference	*Malaysia* Level	*Malaysia* First difference
Augmented Dickey-Fuller Test (ADF)				
Z	-1.6816	-7.7763***	-2.3455	-5.1484***
CA	-3.5746**	-6.5282***	-3.0429**	-7.2959***
Phillips Perron Test (PP)				
Z	-1.6816	-7.7763***	-2.4076	-5.1484***
CA	-3.5546**	-7.7605***	-3.1091**	-8.9114***
KPSS Test				
Z	3.4375***	0.0591	2.0489***	0.0445
CA	0.0792	0.1021	0.2124	0.2682

Notes: In all of tests, we assume that the data has a constant but with no (linear) trend. All the lags values and bandwidths are determined by Eviews-5. The lags for the ADF test and the PP test are chosen based on the SIC, while the bandwidths for KPSS tests are also based on the SIC. The (*), (**), and (***) indicate that the statistics are significant at 10%, 5% and 1% levels, respectively.

Table 2: Unrestricted VAR model parameters of ΔZ and CA^S

Variable	ΔZ_t	CA_t^S
	Indonesia	
ΔZ_{t-1}	-0.1766	-0.2116
	(0.1587)	(0.1493)
	[-1.1127]	[-1.4175]
CA_{t-1}^S	-0.1682	0.6202
	(0.1360)	(0.1279)
	[-1.2371]	[4.8506]
	Malaysia	
ΔZ_{t-1}	0.3994	0.1784
	(0.1573)	(0.1438)
	[2.5397]	[1.2405]
CA_{t-1}^S	-0.3667	0.6347
	(0.1393)	(0.1273)
	[-2.6334]	[4.9854]

The standard errors and t-statistics are given in the () and [] parentheses.

Table 3: The estimated $R_t = \pi + \theta_1 CA^S_{t-1} + \theta_2 \Delta Z_{t-1} + \nu_t$

Coefficient	Estimated Value	Std. Error	t-Statistic	*p*-value
		Indonesia		
π	0.0006	0.004190	0.1380	0.8909
θ_1	-0.0009	0.134648	-0.0059	0.9954
θ_2	0.0018	0.115957	0.0152	0.9880
		Malaysia		
π	0.0046	0.0022	2.0817	0.0438
θ_1	-0.0022	0.0325	-0.0691	0.9453
θ_2	0.0093	0.0615	0.15067	0.8810

Wald test: $H_0 : \theta_1 = \theta_2 = 0$

Country	F-statistic	*p*-value
Indonesia	0.0001	0.9999
Malaysia	0.0114	0.9887

Table 4: Test for equality of variances between the actual and the optimal paths of the current account.

Method	test statistic (p-value)	
	Indonesia	***Malaysia***
F-test	6.5777 (0.0000)	1.1496 (0.6497)
Siegel-Tukey	4.5357 (0.0000)	0.4799 (0.6313)
Bartlett	33.1731 (0.0000)	0.2063 (0.6497)
Levene	22.1940 (0.0000)	0.1103 (0.7407)
Brown-Forsythe	22.1546 (0.0000)	0.1656(0.6851)