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Abstract: Current account are an endogenous variable that contain information about the behavior of the economics agents and is important for economic policymaking as it gives a broad reflection of the stance of macroeconomics policies. The imbalances in current account are a reflection of the forward-looking, dynamic saving and investment decisions in the intertemporal approach to current account modeling. This study empirically analyzed the anatomy of the dynamic current account behavior for the ASEAN-5 countries using present value model. Despite the simplicity, the statistical computations suggest that the agents behave as the forward-looking rational agents in the face of the shocks in the three out of five economies. This implies that the current account acts as a buffer to smooth the consumption in the presence of shock and optimally smoothing its consumption path for these countries.

1. Introduction

The modern macroeconomic models of the open economy have emphasized the fact

that the current account is an intertemporal phenomenon. Therefore, the movements

in the current account deeply intertwined and convey the information about the

actions and expectations of all economic agents in an open economy. Thus, it is

natural for the policy makers to treat the current account as an important

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macroeconomic indicator for policy decision and the measurement of the economic performance in any open economy.

An array of theories has actually been developed to analyze the behavior of the current account movements since centuries ago. However, the failure of each successive theory to adequately explain the dynamic behavior of the current account in the face of changing economic have sparks the introduction of the intertemporal (dynamic) optimization approach. This model had gained the popularity since the introduction of the theoretical model into the literature by Sachs (1981, 1982) that builds upon the neoclassical theory. Systematic empirical tests of the intertemporal model used the approach originally pioneered by Campbell (1987) and Campbell and Shiller (1987) to derive the optimal current account of an optimizing agent within the VAR testing principle.

Following the theoretical refinements, most of the empirical studies in the literature today used the present value of current account (PVMCA) or consumption smoothing model to tackle and explains the behavior of current account movements for the developed and developing countries[1]. The work by Obstfeld and Rogoff (1994) and Razin (1995) offer excellent surveys on the intertemporal approach to current account. To date, the empirical results of such investigation are rather mixed.

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[1] The present value test is an approach that makes full use of the model's structure to derive the testable hypotheses. In testing the hypotheses, the model implies that a country's current account surplus should equal to the present value of the expected future declines in net output (GDP less net investment and government consumption). In some cases, the present value model also termed as consumption smoothing model due to the motive of smoothing the consumption in the face of shocks.

Two key objectives are included in this paper. First, the present value model (consumption smoothing model), a version of intertemporal approach are used to establish an illustrative while tracking intertemporally the optimal path of the ASEAN-5 (Indonesia, Malaysia, the Philippines, Singapore and Thailand) current account series. The purpose is to establish intertemporally that current account acts as a buffer to smooth the consumption in the presence of shock and optimally smoothing its consumption path. The second objective is to determine the relative performance of the present value model of current account by visually tracking the actual and the optimal current account over the estimation period. Both these objectives would provide an in-depth study on the behavior of current account in ASEAN-5 countries.

These sets of countries provide an interesting case study because their current account behaves in a dynamic fashion over the past four decades. Several major events have contributed to the dynamic behavior of their current account imbalances in these countries. First, the 1973-74 and 1979-80 oil shocks and its aftermath and the break down of the Bretton Woods system. Second, the commodity crisis and the 1985 Plaza Accord that pushed up the yen; and thirdly, the pre-crisis period 1988-1997 due to the surge of capital inflows from Japan and Taiwan. Fourth, the debt crisis in the 1980s, the Latin American crisis and the more recent Asian financial crises are the important points in assessing the behavior of current accounts in developing countries, especially ASEAN-5. Interestingly, we observed the current account swings from large deficit to large surplus due to the sharp depreciation of the currency in the 1997 crisis. Singapore, a special case, recorded the persistent current account imbalances due to the high involvement in the industrialization process since independent until 1985. Since then, they recorded highly positive figures in the current account data.

Thus, the inclusion of Singapore also provides an interesting case study beside the other ASEAN-5 counterparts.

The remainders of the paper are structured as follows. Present value model is laid out theoretically for the small open economy of the ASEAN-5 in Section 2. The testable implications of the present value model as well as the key features of the techniques deployed towards its empirical evaluation and the construction of the optimal measures of the current account are also discussed in same Section. Section 3 presents the data descriptions and discussed the empirical results. The discussion covers both the direct and indirect implications of the present value model. Finally Section 4 concludes the paper and provides some policy stance for the ASEAN-5 economies.

2. Model and Estimation Techniques

2.1 Present Value Model of Current Account

The main building block of the intertemporal approach to the current account is the permanent income theory of consumption and saving. In the context of small open economy with access to world capital markets, the permanent income theory implies that temporary shocks (which by definition have larger effects on current resources that lifetime resources) may lead to large fluctuations in national saving and current account.

As pointed out by Sachs (1982), the movements in the current account can be decomposed into two components. First, consumption tilting motive implies that a country would tilts its consumption toward the present or future time. Second, the

consumption smoothing motive, which smooth aggregate consumption in the presence of shocks to output, investment or government expenditure.

The theoretical model adopted here is based on Sachs (1981, 1982) and Sheffrin and Woo (1990a, b). This model starts with the small open economy populated by single, infinitely lived representative agent and maximize the lifetime utility of,

$$\sum_{t=0}^{\infty} \alpha^k E_t[u(C_{t+k})], \quad 0 < \alpha < 1 \tag{1}$$

where α is the discount factor, $u(c)$ is the instantaneous utility function which is strictly increasing in consumption and concave (that is, $u'(c) > 0$ and $u''(c) < 0$), c_t denotes consumption and E_t is the conditional expectation operator based on the information set of a representative agent at time t. The agents maximized (1) subject to the economy's intertemporal (dynamic) budget constraint captured by the current account identity at time t,

$$CA_t \equiv B_{t-1} - B_t = rB_t + Y_t - C_t - I_t - G_t \tag{2}$$

where Y denotes the country's *GDP*, B is the economy net foreign assets (debts if negative) I is the level of investment, G is the level of government expenditure and *CA* is the current account balance.

With perfect capital mobility, the *Fisherian separability* condition holds in this model where the country is small in the world capital market[2]. Assuming that the agent is

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[2] The perfect capital mobility is an important assumption embodied in the intertemporal approach of current account. Authors like Ghosh and Ostry (1995) and Ostry (1997) also assume the perfect capital mobility assumption for the similar set of countries like ours. Theoretically, the assumption is needed for the separability and determining the investment and output independently from the level of consumption. In this sense, output, investment and government expenditure may all be treated as exogenous in solving for the optimal path for consumption in Equation 3. However, we caution the reader on this restrictive assumption during the time of financial crisis. Some countries, most notably Malaysia introduced currency control and restrictions on short-term capital investment in September 1998.

facing an exogenously given world interest rate and that the utility function is quadratic, the representative agent of the small open economy determines investment and output independently from the level of consumption. Then, output, investment and government expenditure may all be treated as exogenous in the search for the optimal path for consumption which can be expressed as,

$$C_t^* = \frac{r}{\theta}\left\{B_t + \frac{1}{1+r}E_t\left[\sum_{k=0}^{\infty}\left(\frac{1}{1+r}\right)^k (Y_{t+k} - I_{t+k} - G_{t+k})\right]\right\} + \left(\frac{-\delta}{r}\right) \tag{3}$$

where C_t^* denotes the optimal path of consumption and $\theta = \dfrac{\alpha(1+r)r}{\alpha(1+r)^2 - 1}$ is the constant of proportionality that reflects the consumption tilting dynamics of consumption[3]. Along the optimal path, consumption depends on present value of the expected future stream of net output as well as the economy's existing stock of net foreign assets. The optimal consumption level can be decomposed into the consumption smoothing and the consumption tilting components by assumes that when $\alpha(1+r) = 1, (\theta = 1)$ there is no consumption tilting. The optimal consumption level in Equation (3) then becomes

$$C_t = r\left\{B_t + \frac{1}{1+r}E_t\left[\sum_{k=0}^{\infty}\left(\frac{1}{1+r}\right)^k (Y_{t+k} - I_{t+k} - G_{t+k})\right]\right\}. \tag{4}$$

Substituting (4) into (2), one can derive the optimal current account as,

$$CA_t = -\sum_{k=0}^{\infty}\frac{1}{(1+r)^k}E_t\Delta Q_{t+k}. \tag{5}$$

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[3] It is clear that when $\theta < 1$ or $\alpha(1-r) < 1$ the agents will tilt consumption towards the present. Accordingly, economic agents have an incentive to tilt (shift) consumption to the present, run current account imbalances and increase the economy's level of net liabilities while eventually lower consumption over time. Conversely, if $\theta > 1$ or $\alpha(1-r) > 1$ the agents would tilt consumption towards future the economic agents have an incentive to tilt consumption to the future, run current account surpluses, lower the economy's level of net liabilities and then gradually raise consumption over time. If $\alpha(1+r) = 1, (\theta = 1)$ there is no consumption tilting component to current account.

where $Q_t = Y_t - I_t - G_t$ is the net output or national cash flow. Equation (5) states that the current account (CA) is determined by future expectations of the changes in the net output. A shocks to net output (or to any of its components) that are expected to be permanent have no effect on the current account, because their expected change is zero. By contrast, favorable temporary shocks lead to improvements in the current account and conversely in the case of unfavorable shock. Thus, the current account acts as a buffer to smooth consumption in the presence of temporary disturbances. Equation (5) has been used as the basis for the present value model of current account behavior in the literature (see, Sheffrin and Woo, 1990a, b; Milbourne and Otto, 1992; Otto, 1992; Ghosh and Ostry, 1995; Ostry, 1997; Cashin and McDermott, 1998; Agenor *et al.*, 1999; Makrydakis, 1999; Al-Nassar, 2000; Kim *et al.*, 2001 and Otto, 2003).

Following the existing literature, we estimate an unrestricted VAR of ΔQ_{t+k} and CA_{t+k}^{SM}, where CA_{t+k}^{SM} is the actual (detrended) consumption smoothing component of current account defined as,

$$CA_t^{SM} = Y_t + rB_t - I_t - G_t - \theta C_t - \frac{\theta\delta}{r} = Q_t + rB_t - \theta C_t - \frac{\theta\delta}{r} \qquad (6)^4$$

The VAR representation may be written as

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[4] The components of θ and $\frac{\theta\delta}{r}$ maybe obtained from the cointegrating vector between C and $Q+rB$ and due to the existence of $\frac{\theta\delta}{r}$, a constant should be included in the cointegrating regression (Kim *et al.*, 2001). If net output Q is *I(1)*, its first difference ΔQ will be stationary. Under the null hypothesis that the actual current account CA^{SM} is equal to CA^{SM*} in (5), the actual consumption smoothing component of the current account is also *I(0)*. This means the left hand side of (6) is *I(0)*.

$$\begin{bmatrix} \Delta Q_{t+k} \\ CA_{t+k}^{SM} \end{bmatrix} = \begin{bmatrix} \xi_{11} & \xi_{12} \\ \xi_{21} & \xi_{22} \end{bmatrix} \begin{bmatrix} \Delta Q_{t+k-1} \\ CA_{t+k-1}^{SM} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t+k} \\ \varepsilon_{2t+k} \end{bmatrix} \qquad (7)$$

where ε_1 and ε_2 are disturbance terms with conditional means of zero and where ΔQ

and CA^{SM} are now expressed as deviation from unconditional means. In analogy of the

one variable case, $E_t \begin{bmatrix} \Delta Q_{t+k} \\ CA_{t+k}^{SM} \end{bmatrix} = \begin{bmatrix} \xi_{11} & \xi_{12} \\ \xi_{21} & \xi_{22} \end{bmatrix}^k \begin{bmatrix} \Delta Q_{t+k-1} \\ CA_{t+k-1}^{SM} \end{bmatrix}$ and substituted into (5) while

defining ξ as matrix $\lfloor \xi_{ij} \rfloor$, the result is the model's prediction of the current account,

CA_t^{SM*} and I be the 2x2 identity matrix. Then,

$$CA_t^{SM*} = -\sum_{k=1}^{\infty} \left(\frac{1}{1+r} \right)^k \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} \xi_{11} & \xi_{12} \\ \xi_{21} & \xi_{22} \end{bmatrix}^k \begin{bmatrix} \Delta Q_{t+k} \\ CA_{t+k}^{SM} \end{bmatrix}$$

$$= -\begin{bmatrix} 1 & 0 \end{bmatrix} \left(\frac{1}{1+r} \xi \right) \left(I - \frac{1}{1+r} \xi \right)^{-1} \begin{bmatrix} \Delta Q_{t+k} \\ CA_{t+k}^{SM} \end{bmatrix} \equiv \begin{bmatrix} \psi_{\Delta Q} & \psi_{CA} \end{bmatrix} \begin{bmatrix} \Delta Q_t \\ CA_t^{SM} \end{bmatrix}. \qquad (8)$$

The simple behavioral model sketched in (8) allows one to set up the predicted

(optimal) current account path which can be compared with the actual one to

determine whether the deficits or surpluses have been excessive in a given period

(Milesi-Ferretti and Razin, 1996).

2.2 Testable Implication of Present Value Model

A number of formal and informal tests should be performed after the model implied

the consumption smoothing component of current account has been estimated from

the VAR. First, if the intertemporal approach embodied in (5) is true, then the

theoretically predicted value of $\begin{bmatrix} \psi_{\Delta Q} & \psi_{CA} \end{bmatrix}$ in (8) is $\begin{bmatrix} 0 & 1 \end{bmatrix}$. The requirements that

the coefficient on net output close to zero and that on the consumption smoothing

component of current account be close to unity can be tested.

Second, equation (5) holds if and only if $E_{t-1}[CA_t^{SM*} - \Delta Z_t - (1+r)CA_{t-1}^{SM*}] = 0$. It implies that if the model is correctly specified, consumption smoothing current account CA^{SM*} and the actual consumption smoothing of current account CA^{SM} are equal, $R_t \equiv CA_t^{SM} - \Delta Z_t - (1+r)CA_{t-1}^{SM}$ should be statistically uncorrelated with the lagged values of the series ΔQ and CA^{SM} [5]. Finally, visual inspection (graphical) of the actual CA^{SM} and the optimal CA^{SM*} series also can be utilized for the studied countries. This is to strengthen the formal tests of restriction in the model.

3. Data and Estimation Results

3.1 Data Descriptions

Equation (8) is implemented for the empirical analysis over the 1961-2002 period, providing 42 annual observations while Singapore data starts in 1968 due to data availability. The net output variable (Q) was constructed as $Q = GDP - I - G$ where I is investment and G is government spending. The changes in net output (ΔQ) was arrived at by taking the first difference of (Q). The actual nominal current account is calculated as $CA = Y - C - I - G$. All the variables are all expressed in log terms and converted into real terms by using the consumer price index (CPI). Prior to the empirical computations, the world interest rate are set at 4 percent following most of

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[5] This is the orthogonality restriction adopted by Otto (2003). For example, we run following regression of $R_t = \pi + \theta_1 CA_{t-1}^{SM} + \theta_2 \Delta Q_{t-1} + v_t$ with one lag and test the hypothesis of $\theta_1 = \theta_2 = 0$ using χ^2 tests. If we reject the null hypothesis this is evidence against the intertemporal model present value model of the current account. Karfakis (1996) also adopted the orthogonality restrictions for Greece.

the previous studies that tested the similar version of the model. The main source for all the data was the various issues of *International Financial Statistics*, published by International Monetary Fund (IMF).

3.2 Univariate Unit Root and Stationarity Tests

As the prelude to any cointegration and VAR testing procedure, the variables under investigation must be a stationary time series. For this purpose, we conduct a family of unit root and stationary tests on all the series of and their first differences. Overwhelmingly, all the testing procedures suggest the existence of unit root or nonstationary in level or *I(1)* for all the variables. The results are not reported here to conserve space but are made available upon request. The findings that all the variables have the same order of integration allow us to proceed with the Johansen multivariate cointegration analysis.

3.3 Johansen-Juselius Multivariate Cointegration Results

It is necessary to determine the dynamic specification of the VAR model before testing for the existence of any cointegrating relationship between $Q+rB$ and C using the Johansen framework. Specifically, the appropriate lag length (k) for the VAR model must be determined. Following this development, we adopted the multivariate generalization of AIC criteria to tracks the optimal lag length and the results indicate VAR(1) for the Malaysia, the Philippines and Singapore while VAR(2) is most appropriate for Indonesia and Thailand.

Results of applying the Johansen-Juselius multivariate cointegration procedure are presented in Table 1. In general, the null hypothesis of no cointegrating vector (r=0)

in favor of at least one cointegrating vector is rejected at 5 percent significance level for all the countries. However, it should be noted that the results in Table 1 show that the λ-max and trace test statistics might yield conflicting results for one case in Thailand. As Johansen and Juselius (1990) pointed out that the trace test may lack of power relative to the maximum eigenvalue counterpart which produce a more clear cut result. We relied on the maximum eigenvalue results to identify the number of cointegrating ranks in the system of Thailand.

[Insert Table 1]

The results confirm the existence of long run relationships between $Q+rB$ and C in each of the country (with and without the adjustment factor). Therefore, the Johansen test identifies a single and unique cointegrating relationship in ASEAN-5 countries. Next, we consider the prospect of structural break by adopting the sequential cointegration test suggested by Gregory and Hansen (1996).

3.4 Gregory-Hansen Cointegration Results

The results of the Gregory-Hansen cointegration tests conducted for ASEAN-5 are summarized in Table 2. Figures tabulated in the brackets indicate the break points detected from the each of the particular model. In general, we found cointegrating relationship with a break in at least one specification of the models (C and C/S) for all the ASEAN-5 countries. Specifically, we found that in the first model (C), cointegration is present with a break for Indonesia (1980), Malaysia (1985) and the Philippines (1973) implying that the data supports cointegration with one change in

the intercept. In addition, the third model (C/S) exhibits empirical support for Singapore (1985) and Thailand (1980).

[Insert Table 2]

The structural break for most of the countries coincides with the aftermath of the second oil price shocks that occur in 1979 (Indonesia and Thailand) and the change of the monetary system that took place in 1973-1976 (the Philippines). The collapse of commodity prices (palm oil and rubber) in 1985 and Plaza Accord that pushed up the yen in developed countries contributed to the break detected in Malaysia. For Singapore, the cointegration conditional with a regime shift detected at 1985 are corresponds with the cutting off point from the persistent current account deficit to the surpluses starts in 1986. The presence of the long run relationship between $Q+rB$ and C enable one to proceeds with the estimation of the parameter θ that describe the degree of consumption tilting.

3.5 Estimation of Consumption Tilting Component of Current Account (θ)

Since the emphasis of the paper is that the current account acts as a buffer to smooth consumption in the presence of shock, the estimation of consumption tilting component is essential. As the consumption tilting is entirely distinct from consumption smoothing motive, the optimal current account is compared only to the current account that relates to consumption smoothing and not to the actual current account (which potentially includes both consumption smoothing and consumption tilting components). The filtering of the consumption tilting from the actual current

account can be realized by estimating the cointegrating regression obtained earlier from Tables 1 and 2.

The cointegration regression detected in Tables 1 and 2 can be estimated using Phillips and Hansen (1990, FMOLS) fully modified OLS and the Gregory and Hansen (1996, GH) methodology. The FMOLS methods yields an asymptotically correct variance-covariance estimator when estimating cointegrating vectors in the presence of serial correlation and endogeneity. The estimated consumption tilting parameter from the cointegrating regression of net output inclusive of interest earnings ($Q+rB$) on consumption (C) are reported in Table 3. We include the constant term in the cointegrating regression space.

[Insert Table 3]

The estimated magnitudes of the parameter θ are ranging from 0.540 (the Philippines) to 0.994 (Thailand) for FMOLS estimation. For the GH estimation, we obtained the estimates ranging from 0.656 (the Philippines) to 0.989 (Thailand). Importantly, the parameters θ for all the countries are statistically significantly at 5 percent level, showing the presence of consumption tilting dynamics.

Also, the value of the parameter $θ < 1$ indicate that there is tendency to tilt consumption towards the present provides the preferences of the ASEAN-5 economies for current consumption over the future consumption. In other words, the ASEAN-5 countries are consuming more that its permanent cash flow and they must be running down the stock of external assets or increasing its external liabilities. This

empirical evidence further complies with the ASEAN-5 experiences of current account being in deficit over most of the entire period of estimation.

Having established the stationary status of the consumption smoothing component of current account, one can now proceed with the setting up of the VAR for evaluating whether the current account in ASEAN-5 countries are consistent with the theoretical paradigm of the present value model.

3.6 Formal and the Orthogonality Tests of the Model

The key statistical tests of the usefulness of present value model in explaining the behavior of ASEAN-5 current account is to examine whether the actual current account formally conforms to the restrictions implied by the theory. Formally, we form the VAR in the first difference of net output and consumption smoothing component of the current account required for the formal and orthogonality tests of the fundamental hypothesis underlying the present value model estimated using OLS. Parameter estimates for the VAR model, together with the t-statistics are presented in Table 4. The empirical results are summarized as follows.

[Insert Table 4]

First, the estimates for the ΔQ equation in Table 4 indicate that there is strong support in the data for the hypothesis that current account helps to forecast future changes in net output in Indonesia, Malaysia and Thailand. The coefficients of lagged CA^{SM} in Indonesia, Malaysia and Thailand are negative in sign so that the CA^{SM} deficit is predicting future increases in the net output (Q) and the coefficients are statistically

significant at 5 percent level. These results indicate that fluctuations in Indonesia, Malaysia and Thailand current account provide a signal about how agents are expecting net output to change in the future. Additionally, this suggests the correct anticipating of agents for better times ahead when current account imbalances are increased in these countries. For the remaining countries, we found positive lagged coefficients of CA^{SM} which are not consistent with the theoretical prediction of the present value model.

Second, the estimates of the weights values of ΔQ and CA^{SM} are reported in last column of Table 4 along with the 95 percent confidence interval[6]. The estimated weights on ΔQ are closed to zero for Indonesia (-0.303), Malaysia (-0.706) and Thailand (0.095). Turning to the weight on the current account CA^{SM}, it is estimated to be 1.006 for Indonesia, 1.179 in Malaysia and 0.944 for Thailand. Moreover, the confidence interval construct from the bootstrap procedure indicates that statistically the weights cannot be distinguished from zero and one respectively.

Third, we also found that the estimated weights on ΔQ are closed to zero for the Philippines (0.061) and Singapore (-0.839) but the estimated weights on CA^{SM} are far from one. Specifically, for the Philippines the estimated weight is 0.271 with the 95

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[6] The calculations of the confidence interval are obtained from a bootstrap procedure. By drawing (with replacement) from the residuals of the VAR model we can generate a new set of residuals and use these plus the original coefficient estimates to generate new observations for ΔQ and CA^{SM}. Using the new observations a VAR model is estimated and new weights are computed. Repeating this procedure 10000 times provides the empirical distribution for the weights from which the confidence interval of the estimates can be calculated. The bootstrap algorithm program to evaluate the confidence interval was kindly provided by Glenn Otto.

percent confidence interval of [-0.201, 0.206] while Singapore estimated weight registered at –0.021.

To support the empirical evidences obtained so far, we next investigated the validity of the orthogonality restrictions by running the regression of $R_t \equiv CA_t^{SM} - \Delta Z_t - (1+r)CA_{t-1}^{SM}$ on lagged value of current account and net output and the empirical results are reported in Table 5. It is evident that the orthogonality restrictions are strongly rejected for the Philippines and Singapore. It implies that the Philippines and Singapore were not optimally smooth their consumption path. Some of the authors like Ghosh and Ostry (1995) pointed out that this evidence support the 'possibility of endogenous government behavior'[7]. In this sense, the government may act to smooth current account movements in the face of the shocks of the economy. These evidences were consistent with the findings in Table 4, where we reject the notion that validated the intertemporal model of current account.

[Insert Table 5]

However, as predicted by the theory, the coefficients of the regression model in Indonesia, Malaysia and Thailand are all insignificant so that $R_t \equiv CA_t^{SM} - \Delta Z_t - (1+r)CA_{t-1}^{SM}$ is orthogonal to the appropriate lagged values of ΔQ and CA^{SM}. Moreover, the joint tests hypothesis using χ^2 tests yield the *p*-values of 0.255, 0.505 and 0.184 for Indonesia, Malaysia and Thailand respectively. As a whole, the empirical results obtained from the formal statistical examination bring the

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[7] This is a possible outcome when the actual current account movements would be uniformly less volatile than the movements obtained from the predicted model (Ghosh and Ostry, 1995).

implications that current account acts as a buffer to smooth the consumption in the face of shocks, predicted by the intertemporal model of current account in three of the five cases.

3.7 Informal test of the model

Informal examination of the present value model by comparing the actual CA^{SM} and the optimal CA^{SM*} series graphically also can be utilized to determine how well the present value model tracks current account development in ASEAN-5 countries and acts as the supplementary examination to the formal test. The visual inspections in Figure 1(a) to 1(e) are computed from the two weight values of ΔQ and CA^{SM} obtained from Table 4 in deriving the optimal benchmark (consumption smoothing) current account series and compared with those of the actual (consumption smoothing) current account.

Figure 1(a) plots the actual current account for Indonesia against the optimal current account from the model. This simple model does well in predicting the general direction of the current account fluctuations, such as the run of sizeable deficits and turning points in the mid-1960s, late 1970s and early 1980s. However, in the end of 1980s and to the eve of 1997 financial crisis, the optimal value underpredicts the magnitude of the current account deficit. Although the optimal current account does underpredicts the current account movements in the later sample period, the formally restrictions of the present value model are fulfilled by Indonesia.

[Insert Figure 1(a)]

Compared to Indonesia, the predicted value from the present value model of Malaysia are mainly better captures the magnitudes of the fluctuations in current account over the entire period. This is shown in Figure 1(b). Basically, the benchmark time series are being able to tracks the movements and turning points in the sample. The overshooting of the current account deficit in the early 1980s and in the 1990s are well predicted by the benchmark time series obtained from the model. Also, in some cases, the optimal series of current account predicts the turning points well ahead from the actual series.

[Insert Figure 1(b)]

Although we rejected the formal restriction tests of the present value model in the Philippines and Singapore, we also graphically portrayed the comparison of the actual current account and optimal current account plots shown in Figures 1(c) and 1(d). As predicted, the benchmark time series variable poorly tracks the current account development in almost the entire period. For the Philippines, the model unable to explain most of the turning points of the actual current account series in the late 1960s, mid of the 1970s to the next decade and toward the end of the sample.

While Singapore benchmark series shows some variability from year to year, the prediction misses and underpredicts the larger swings of the current account from the balances. In particular, it underpredicts the early years of independent in Singapore till 1985. From the 1986 onwards, the model misses the larger surpluses observed in the actual current account of Singapore. Moreover, both benchmark series predicted by the model are more volatile than the actual current account observations. This further

supports the notion that both countries being practicing endogenous government behavior.

[Insert Figures 1(c) and 1(d)]

Visual illustrations of the actual current account versus the optimal current account series for Thailand are presented in Figure 1(e). Clearly one can noted from the visual impression conveyed by the figure are well tracked by the optimal series predicted from the model. The benchmark series being able to explain the large sustained deficit movements occurs particularly in late 1960s, late 1970s to 1985 and more importantly in the 1990s before the currency crisis. Importantly, during the Asian financial crisis we also observed the current account swings from deficit to large surplus primarily due to the sharp depreciation of the Baht are also been tracks well by the predicted model. This further confirmed the earlier findings obtained from Tables 4 and 5 of non-rejection of the present value model that the Thailand is optimally smoothing its consumption path.

[Insert Figure 1(e)]

4. Concluding Remarks

The key prediction of the intertemporal model is that a country's current account will be in deficit (surplus) whenever net output to rise (fall) over time. Using this theoretical foundation, this paper focuses on the modeling of dynamic current account behavior in ASEAN-5 countries by using the present value model, a variant of intertemporal model of current account. The purpose is to establish intertemporally

that current account acts as a buffer to smooth the consumption in the presence of shock and optimally smoothing its consumption path.

The empirical investigation stems from the statistical techniques for the period of 1961- 2002 are summarized as follows. First, unique cointegrating vector (with and without a break) are detected in the all the countries for the period of estimation indicating the existence of long run relationships between $Q+rB$ and C. Second, we found that the consumption tilting component of current account had the tendency to tilt the consumption towards present rather than the future period. This empirical evidence complies with the current account imbalances over most of the entire period of estimation in ASEAN-5 countries. This is consistent with the empirical investigation done by Ghosh and Ostry (1995a) and Ostry (1997).

Third, the formal examinations indicate that current account acts as a buffer to smooth the consumption in the face of shocks, predicted by the intertemporal model of current account in three of the five cases (Indonesia, Malaysia and Thailand). This implies that the expectations of future income growth appear to be an (economically and statistically) significant determinant of current account behavior. For the remaining countries, there is evidence of endogenous government behavior where the government may act to smooth current account movements in the face of the shocks of the economy. There is also an indication of effective capital mobility barrier in both the economies.

Fourth, the deviation between the actual and the optimal current account carry an interpretation of excessive borrowing for consumption. For example, in Singapore,

there is degree of excessive in private consumption on the early years of the independent to the mid-1985. High savings rate in the late 1980s had reached the level beyond the full consumption smoothing model. Turning to the Philippines, the actual current account was about 5 percent larger than warranted on the basis of consumption smoothing consideration for most of the entire time series suggesting an evidence of excessiveness in consumption. This evidence contributes to the misses and underpredicts in the benchmark optimal current account series of the Philippines and Singapore.

Solving the current account problem in the most of the countries in the globe had been at the center of international economic policymaking. As such, the issue presented in this study would be important as a guideline for the understanding the co-movements of the current account behavior and it serves as the platform of debate for the experiences of developing countries.

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Table 1:Johansen Cointegration Test Results

A: Indonesia

Null	Alternative	k=2 r=1					
		λ-max			Trace		
		Unadjusted	Adjusted	95% C.V.	Unadjusted	Adjusted	95% C.V.
r = 0	r = 1	47.685*	43.144*	15.870	48.856*	44.203*	20.180
r<= 1	r = 2	1.170	1.058	9.160	1.170	1.058	9.160

B: Malaysia

Null	Alternative	k=1 r=1					
		λ-max			Trace		
		Unadjusted	Adjusted	95% C.V.	Unadjusted	Adjusted	95% C.V.
r = 0	r = 1	29.185*	27.786*	15.870	30.264*	28.823*	20.180
r<= 1	r = 2	1.078	1.027	9.160	1.078	1.027	9.160

C: Philippines

Null	Alternative	k=1 r=1					
		λ-max			Trace		
		Unadjusted	Adjusted	95% C.V.	Unadjusted	Adjusted	95% C.V.
r = 0	r = 1	36.463*	34.727*	15.870	36.613*	34.870*	20.180
r<= 1	r = 2	0.151	0.143	9.160	0.151	0.143	9.160

D: Singapore

Null	Alternative	k= 1 r=1					
		λ-max			Trace		
		Unadjusted	Adjusted	95% C.V.	Unadjusted	Adjusted	95% C.V.
r = 0	r = 1	33.557*	31.959*	15.870	39.703*	37.813*	20.180
r<= 1	r = 2	6.146	5.853	9.160	6.146	5.853	9.160

E: Thailand

Null	Alternative	k=2 r=1					
		λ-max			Trace		
		Unadjusted	Adjusted	95% C.V.	Unadjusted	Adjusted	95% C.V.
r = 0	r = 1	20.084*	17.214*	15.870	20.245*	17.352	20.180
r<= 1	r = 2	0.161	0.138	9.160	0.161	0.138	9.160

Note: Asterisk (*) denotes statistical significance at 5 percent level. k is the lag length in the VAR and r is the number of cointegrating vectors. These statistics are computed with a restricted constant and no trends in the VAR equation. The unadjusted statistics refer to the standard Johansen statistics while the adjusted statistics is in accordance to the Reinsel and Ahn (1992) procedure. Their finite sample correction multiplies the Johansen test statistic by the scale factor of $(T-pk)/T$, where T is the sample size, p is the number of variables, and k is the lag length for the VAR model.

Table 2: Gregory and Hansen (1996) Cointegration Test

Country	C	C/T	C/S
A: Indonesia	-14.950*	-3.774	-4.539
	[1980]	[1985]	[1979]
B: Malaysia	-5.136*	-2.634	-2.834
	[1985]	[1980]	[1987]
C: Philippines	-24.337*	-4.102	-4.753
	[1973]	[1989]	[1980]
D: Singapore	-4.471	-3.655	-25.419*
	[1980]	[1992]	[1985]
E: Thailand	-2.988	-3.126	-5.237*
	[1988]	[1976]	[1980]

Notes: The critical values for models C [-4.61], C/T [-4.99] and C/S [-4.95] are obtained from Gregory and Hansen (1996 Table 1 pp.109) for m=1. Asterisks (*) denotes statistically significant at 5 percent level. Figures in [ ] refers to the breaking date.

Table 3: Cointegrating Regressions and Estimates of Consumption Tilting

Country	FMOLS		GH	
	Constant	θ	Constant	θ
A: Indonesia	27.227	0.854	27.276	0.873
	(55.113)*	(6.273)*	(58.727)*	(6.910)*
B: Malaysia	7.343	0.724	5.754	0.795
	(18.565)*	(44.081)*	(12.292)*	(38.872)*
C: Philippines	7.420	0.540	22.027	0.656
	(10.834)*	(8.061)*	(64.563)*	(15.031)*
D: Singapore	3.521	0.883	2.144	0.947
	(5.773)*	(34.117)*	(4.772)*	(46.892)*
E: Thailand	4.621	0.994	6.643	0.989
	(4.395)*	(12.646)*	(2.306)*	(5.406)*

Note: The cointegrating regressions are estimated by Phillips and Hansen (1990) Fully Modified OLS (FMOLS) and Gregory and Hansen (1996, GH). The consumption tilting parameters of θ are obtained from both the cointegrating regressions estimation. The estimations are conducted based on the cointegrating relationships detected from Tables 4 and 5 respectively. Asterisks (*) denotes statistically significant at 5 percent level. Figures in ( ) refers to the t-ratio of the corresponding coefficients.

Table 4: Results for Present Value Model

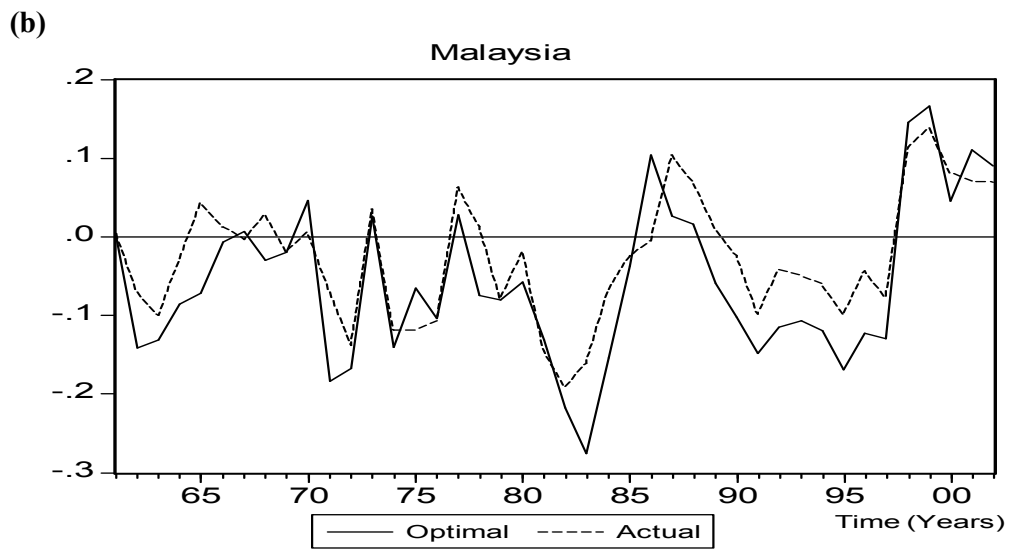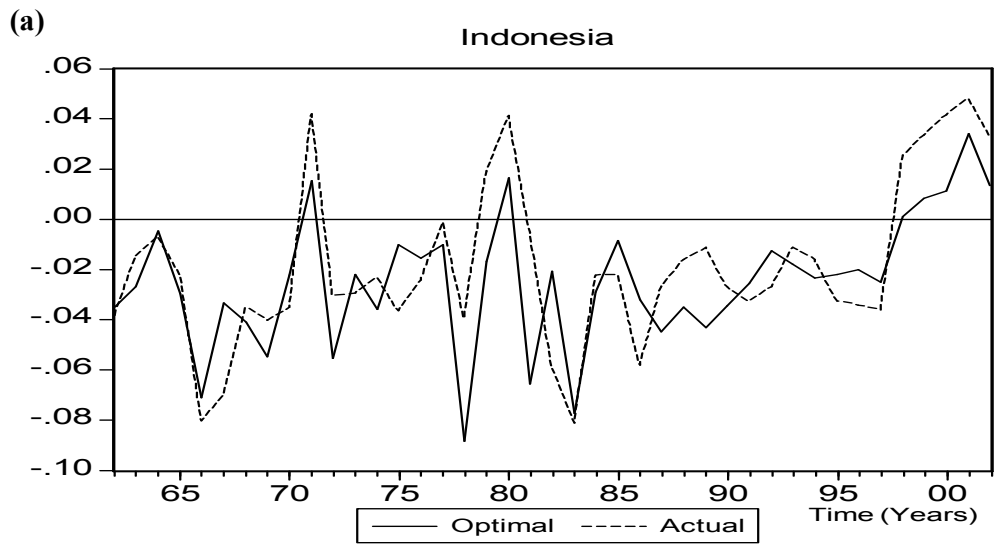|		VAR				Restriction $\begin{bmatrix} 0 & 1 \end{bmatrix}$
A: Indonesia	**Constant**	**ΔQ_{t-1}**	**ΔQ_{t-2}**	**CA_{t-1}**	**CA_{t-2}**	**$\psi_{\Delta Q}$**
ΔQ_t	0.756	0.247	-0.825	-2.781	-0.813	-0.303
	(1.848)	(1.201)	(-0.438)	(-1.779)	(-3.152)*	[-0.539, 0.110]
CA_t	-0.024	0.004	-0.003	0.700	-0.077	**ψ_{CA}**
	(-1.009)	(0.288)	(-0.320)	(7.209)*	(-0.571)	1.006
						[-0.830, 2.138]
B: Malaysia	**Constant**	**ΔQ_{t-1}**	**ΔQ_{t-2}**	**CA_{t-1}**	**CA_{t-2}**	**$\psi_{\Delta Q}$**
ΔQ_t	435.850	0.141	-	-0.084	-	-0.706
	(1.967)	(0.590)	-	(-2.915)*	-	[-1.442, 0.111]
CA_t	121.630	-0.1309	-	0.6690	-	**ψ_{CA}**
	(1.015)	(-0.577)	-	(3.363)*	-	1.179
						[0.531, 2.543]
C: Philippines	**Constant**	**ΔQ_{t-1}**	**ΔQ_{t-2}**	**CA_{t-1}**	**CA_{t-2}**	**$\psi_{\Delta Q}$**
ΔQ_t	5252.315	-0.067	-	1.178	-	0.061
	(5.375)*	(-0.717)	-	(6.002)*	-	[-0.201, 0.260]
CA_t	-17.654	-0.302	-	-0.719	-	**ψ_{CA}**
	(-1.740)	(-1.331)	-	(-3.379)*	-	0.271
						[-0.203, 0.411]
D: Singapore	**Constant**	**ΔQ_{t-1}**	**ΔQ_{t-2}**	**CA_{t-1}**	**CA_{t-2}**	**$\psi_{\Delta Q}$**
ΔQ_t	174.526	0.473	-	0.009	-	-0.839
	(2.814)*	(2.535)*	-	(0.014)	-	[-1.248, 0.311]
CA_t	-444.988	0.4839	-	0.9677	-	**ψ_{CA}**
	(-0.816)	(2.772)*	-	(17.914)*	-	-0.021
						[-0.715, 1.201]
E: Thailand	**Constant**	**ΔQ_{t-1}**	**ΔQ_{t-2}**	**CA_{t-1}**	**CA_{t-2}**	**$\psi_{\Delta Q}$**
ΔQ_t	1648.946	1.020	-0.046	-0.288	10.727	0.095
	(1.290)	(5.472)*	(-0.209)	(-2.842)*	(0.043)	[-0.141, 0.226]
CA_t	23.420	-0.001	-0.002	293.200	0.646	**ψ_{CA}**
	(1.670)	(-2.635)	(-0.642)	(1.531)	(0.887)	0.944
						[-0.334, 1.196]

Notes: The VAR(k) estimation do involve a constant term and the k are the lag length determined in Table 3. Asterisks (*) denotes statistically significant at 5 percent level. Figures in ( ) refers to the *t*-ratio of the corresponding coefficients while those in [ ] brackets refers to the 95 percent confidence interval obtained from a bootstrap procedure for each country using 10000 replications. All the estimations and the calculation of the present value model were carried out in RATS 5.02 using the algorithm kindly provided by Glenn Otto.

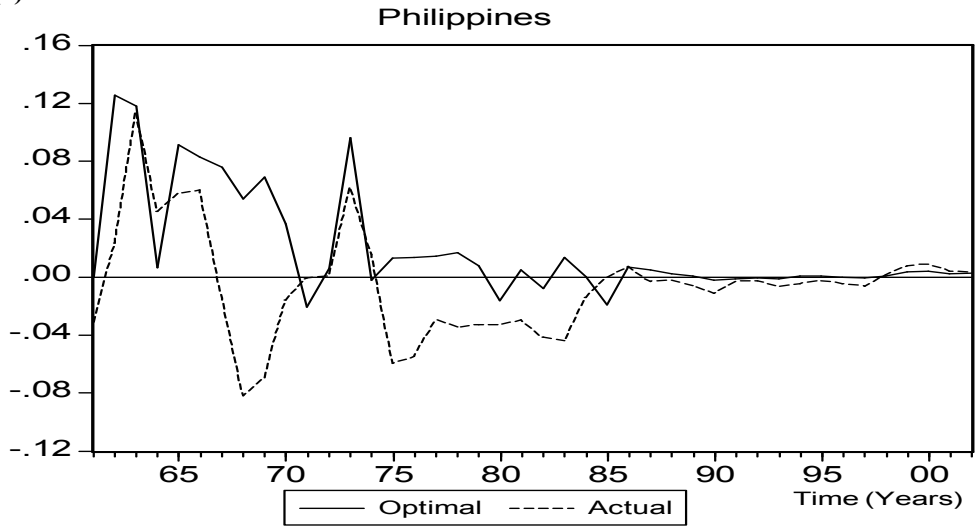**Table 5: Orthogonality Test of Present Value Model (Test on R)**

Country	$R_t \equiv CA_t^{SM} - \Delta Q_t - (1-r)CA_{t-1}^{SM}$
A: Indonesia	$-1.373 - 0.151\,\Delta Q_{t-1} + 0.150\,\Delta Q_{t-2} + 2.145\,CA_{t-1}^{SM} - 0.074\,CA_{t-2}^{SM}$
	(-2.812) (-0.612) (0.620) (1.104) (-1.345)
	χ^2 statistics = 5.235[0.255]
B: Malaysia	$-255.903 - 1.160\,\Delta Q_{t-1} - 0.263\,CA_{t-1}^{SM}$
	(-1.562) (-5.601) (-0.679)
	χ^2 statistics = 1.365[0.505]
C: Philippines	$-38996.843 - 0.002\,\Delta Q_{t-1} - 142.762\,CA_{t-1}^{SM}$
	(-5.437) (-0.001) (-1.952)
	χ^2 statistics = 43.898[0.000]
D: Singapore	$-214.749 - 0.097\,\Delta Q_{t-1} - 1.700\,CA_{t-1}^{SM}$
	(-3.836) (-0.068) (-1.886)
	χ^2 statistics = 10.166[0.006]
E: Thailand	$-13795.071 - 0.331\,\Delta Q_{t-1} + 0.301\,\Delta Q_{t-2} - 296.546\,CA_{t-1}^{SM} + 152.542\,CA_{t-2}^{SM}$
	(-1.076) (-0.927) (1.414) (-1.476) (0.716)
	χ^2 statistics = 6.201[0.184]

Notes: This restriction can be tested by running following regression of $R_t = \pi + \theta_1 CA_t^{SM} + \theta_2 \Delta Q_t + v_t$ with appropriate lagged values of ΔQ and CA^{SM} series determined in the VAR(k) estimation. Figures in ( ) refers to the *t*-ratio of the corresponding coefficients while those in [ ] brackets refers to the p-values corresponds to the hypothesis testing of $\theta_1 = \theta_2 = 0$, with one lag using χ^2 tests. All the estimations and the calculation of the present value model were carried out in RATS 5.02 using the algorithm kindly provided by Glenn Otto.
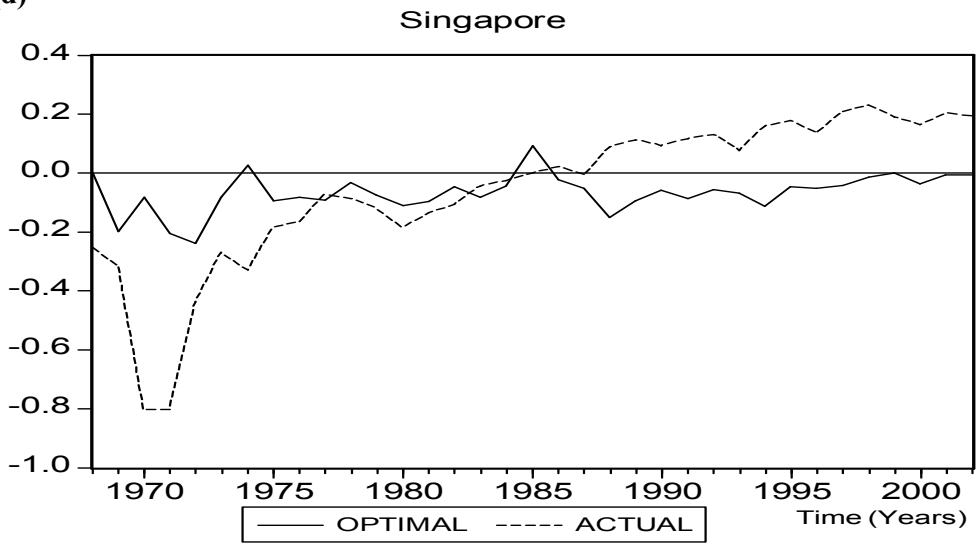
Figure 1: Actual versus Optimal Current Account (in Domestic Currency)

(a)

Indonesia

(b)

Malaysia

(c)

Philippines

.16

.12

.08

.04

.00

-.04

-.08

-.12

65   70   75   80   85   90   95   00

—— Optimal   ----- Actual

Time (Years)

(d)

Singapore

0.4

0.2

0.0

-0.2

-0.4

-0.6

-0.8

-1.0

1970   1975   1980   1985   1990   1995   2000

—— OPTIMAL   ----- ACTUAL

Time (Years)

(e)

Thailand