Current Account Dynamics and Capital Mobility in Small Asian Economies

Sheikh Tareq Selim*

This paper explores the current account dynamics in eight small economies of Asia to examine whether or not capital flows have been excessive in these countries. Standard assumptions of perfect capital mobility and small open economies are jointly instrumental in simplifying theoretical tractability of many open economy models. In empirical estimations, however, the identification of a small open economy is often oversimplified, which makes celebrated results, such as excessive or too low capital flows in OECD economies, questionable. This paper establishes that the actual extent of capital mobility in small open economies generally cannot be too high or too low. This, in turn, implies that the general idea of excessive capital flows in small open economies requires revision.

Introduction

Using the intertemporal approach to current account determination, this paper examines current account volatility in eight small Asian economies and thus attempts to relate the volatility to the extent of capital mobility in these small open economies. Earlier studies of similar kind like Ghosh and Ostry (1995), find that, based on the estimated volatility of current account, the possibility of high capital mobility cannot be rejected for a majority of developing countries. The current paper establishes that this conclusion is not strong and general; since small open economies are more likely to be affected by global shocks, the external balance position of such economies that reflects the allocation of riskless foreign assets actually infers agents’ motivation to cushion future consumption against unanticipated future shocks. The allocation of foreign assets for small open economies thus depends crucially on the consumption smoothing motive of agents, and capital mobility in small open economies is actually determined by how agents tilt present consumption against future.

The current paper also argues that in most empirical applications of the intertemporal model, the identification of a small open economy is oversimplified. The first stage empirical studies that tested the degree of capital mobility, using the idea of savings-investment correlation, have concluded that even among industrialized countries capital mobility is
ignored, and similar studies are often conducted on industrialized and/or OECD economies, assuming, rather inappropriately, that these economies are small and take the world interest rate as exogenous.

The intertemporal model which is used in this paper to address the issue of capital mobility is simple in its features and standard in relevant literature. The underlying assumption which drives the theoretical reasoning of a dynamic current account is that economic agents choose contingent consumption plans in the face of shocks to output, and hence, prefer to smooth consumption over time by accumulating foreign assets. In a small open economy, it is reasonable to assume that these assets are available in a homogenous riskless form. The empirical model, derived from the theoretical model, therefore, necessitates characterization of the expectation formation behavior of economic agents, since the consumption-tilting component of the current account with optimal consumption profile depends crucially on how agents form expectations about changes in national cash flow. Under the assumption that economic agents form expectations rationally, a simple Vector Auto Regression (VAR) can be applied to derive the augmented matrix that governs the expectation formation behavior of agents. The generated optimal current account, therefore, acts as the benchmark current account series with which the actual consumption-smoothing current account series can be compared to check whether or not actual volatility has exceeded the optimal volatility. If the actual current account is more volatile than what should have been observed with optimizing behavior of agents, the model’s interpretation would be that capital mobility has been excessive, which in turns would justify the twin assumptions of perfect capital mobility and small open economy.

This paper finds that capital flows in small open economies of Asia have not been excessive (or too limited) in general, and the extent of country-specific capital mobility actually depends on the agents’ motive to tilt present consumption against future. The consumption tilting behavior is found to be consistent with Khan and Selim (2004). The current paper finds that capital flows are excessive in three, too limited in another three and at par with optimal current account in two economies studied. The extent of capital flows corresponds directly to how agents smooth consumption over time. Hence, unlike the conventional idea, capital mobility in small open economies is not excessive in general.

If an economy is large but identified as small, the worst problem an empirical study will face is that a simple model with exogenous interest rate will not be a true representation of the case. No matter how sophisticated the econometric methodology is and how precise the estimates are, results on the degree of capital mobility will lack economic intuition. Moreover, another crucial assumption of such models that economic agents smooth consumption in the face of shocks to output and investment is more appropriate if the economy is truly small. Economic agents belonging to small economies use foreign borrowing to cushion their consumption in the face of unusually high investment needs. Similarly, in case where output is above its permanent level, agents choose to accumulate interest-yielding foreign assets. While such uncertainties are pervasive in countries like Bangladesh, for instance, to my

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1 This current account series which is derived from the optimizing behavior of economic agents will be referred to as the optimal consumption-smoothing current account, or simply the optimal current account, hereafter, without loss of generality.
Where, b is the level of foreign assets held by the economy, r is the world interest rate, q is the level of domestic output, i is the level of private investment, and g is the level of government expenditure. National income at any time t, \( y_t \), is equal to the sum of domestic output and net interest payments from foreign assets. The national income identity at any time t, therefore, is simply:

\[
y_t = c_t + i_t + q_t + b_{t-1} + g_t
\]  

Expression (3) states that the economy’s current account balance, the sole external component of national income, at any time t is the change in the value of its net claims on the rest of the world, i.e., the change in its net foreign assets. This formation of the external balance component of national income is consistent with the consumption smoothing motive of the household. The representative household prefers to smooth consumption over time, which is induced by the concavity assumption of the utility function. In situations, where output is above its permanent level, for instance, the representative household prefers to accumulate interest-yielding foreign assets as a way of smoothing consumption over future periods. This behavior of the household, in turns, contributes to a higher current account surplus since the additional output is invested in the risk-free foreign asset. The model, therefore, incorporates dynamics in the current account determination by introducing consumption-smoothing motive of the representative household.

The social planner’s problem, therefore, is to maximize (1) subject to the economy’s dynamic budget constraint (2). With \( E_t Q \) as the multiplier attached to the time t budget constraint, the necessary conditions for an optimum is the budget constraint itself and the followings:

\[
c_t \quad Q \quad E_t u_c(t)
\]  

\[
b_{t-1} \quad \frac{t}{Q_t} \quad H_t \quad r
\]  

And for any time T, the Transversality condition that puts a restriction on the present discounted value of the foreign assets in the limit:

\[
\lim_{T \to t} (1 - r)^T b_T = 0
\]  

Combining of (4.1) and (4.2) yields the stochastic Euler equation:

\[
E_t u_c(t) = H_t \quad r \quad E_t u_c(t - 1)
\]  

The choice of utility function, as long as made from a family of utility functions that satisfy desirable properties as mentioned, does not alter important theoretical results of this model. Consider a simple quadratic form that satisfies the assumptions of mapping, concavity and differentiability conditions:

\[\text{Condition (4.3), more popularly known in literature as the No Ponzi-Games constraint, restricts the borrowers to leave the scene with unpaid debts or unused resources.}\]
Equation (9) reconfirms that consumption is proportional to permanent cash flow, and for $T < 1$ ($T > 1$), the representative household is consuming more than (less than) its current permanent cash flow, i.e., it is tilting consumption towards the present (the future).

Consider (3) with consumption tilting dynamics and optimal consumption. When the national income identity is $T$ incorporated, it is implicitly assumed that the representative household has consumption-tilting behavior. The external component of the national income identity, therefore, can be defined as the actual consumption-smoothing component of the current account. When (3) incorporates both $T$ and optimal consumption, the optimal consumption-smoothing current account can be defined by:

$$\text{CA}^* = y_t - i_t - g_t + T_t$$  \hspace{1cm} \text{(10)}$$

Substituting (9) for optimal consumption in (10) and simplifying yields:

$$\text{CA}^* = E_t \frac{1}{1 - r} \left( q_{t_{j_j}} + i_{t_j} + g_{t_{j_j}} \right)$$  \hspace{1cm} \text{(11)}$$

Expression (11) states that the optimal current account is the expected present discounted value of changes in national cash flow, and computation of this series requires computation of the expected present discounted value of changes in national cash flow, where the expectation is conditional on the information set used by individual agents. Within the scope of this simple model, one way to capture this information set of consumers is to have them base forecasts on information on lagged current account and lagged changes in national cash flow, where the lag length depends crucially on the expectation formation behavior of the consumers. This motivates the empirical version of the model.

**The Empirical Model and Data**

In order to capture the transition matrix that governs consumers’ expectation formation of changes in national cash flow, this paper closely follows the techniques developed by Campbell and Shiller (1987). Consider first a simple unrestricted stationary Vector Auto Regression (VAR) model in $(q_t - i_t - g_t)$ and $\text{CA}_t$, where $\text{CA}_t$ is the actual consumption-smoothing component of the current account:

$$Z_t = V_{t-1} + \epsilon_t$$  \hspace{1cm} \text{(12)}$$

where, the vector $Z_t = (q_t' - i_t' - g_t')$ and $J$ is the coefficient (transition) matrix of the VAR and $\epsilon_t$ is a vector of independently and identically distributed stochastic disturbances. Using the transition matrix, redefine the term $E_t (q_{t_{i_k}} - i_{t_{i_k}} - g_{t_{i_k}})$ in the infinite sum in (11) as:

$$E_t (q_{t_{i_k}} - i_{t_{i_k}} - g_{t_{i_k}}) [1 \ 0] E_t Z_{t\ k}$$  \hspace{1cm} \text{(13)}$$
(1948-2002), Sri Lanka (1950-2001) and Thailand (1950-2002), are used for empirical estimation. The reasons of this choice of samples are obvious enough: These countries belong to a subset of economies which are almost of similar sizes in terms of their share in world GDP, possess similar pattern of institutions and structure of economy, and are located in a neighborhood inside Asia. More importantly, the underlying assumptions of small open economy and perfect capital mobility are justifiable for this set of samples. Understandably, relatively large Asian economies like India and China are not included in the group. All data for the purpose of estimation of the empirical model are collected from the International Monetary Fund’s International Financial Statistics (IFS), March 2003 edition.

For estimation and testing of the validity of the model, most empirical works established in literature, as mentioned earlier, have focused on the current account dynamics of major industrialized developed economies. The main motivation of this paper is to test similar results for small open economies that are of similar size, norms and possess similar structure of the economy, arguing that the intertemporal model can be better characterized if the sample under testing represents a truly small open economy. In this regard, the main purpose of the empirical investigation is to show that economic agents belonging to small open economies are prone to tilt consumption, which empirical studies on developed countries were not able to establish. Quarterly complete time series of national aggregates for most small economies are difficult (and in most cases impossible) to accumulate from secondary sources. Ghosh (1995) uses time series quarterly dataset of national aggregates of five major industrialized countries in his analysis of capital mobility. Jones and Obstfeld (1994), Taylor (1996) and Hoffmann (2001) use similar datasets of seven industrialized developed countries. In empirical investigation of the aggregate consumption tilting behavior, we use time series of annual national aggregates of four small economies of South Asia, namely, Bangladesh (1973-2002), Nepal (1970-2002), Pakistan (1960-2002) and Sri Lanka (1950-2001), and four small economies of the Asia Pacific, namely, Indonesia (1960-2002), Malaysia (1955-2001), The Philippines (1948-2002) and Thailand (1950-2002). None of these economies are high savers, meaning that none of these economies have prolonged episode of current account surplus or deficit. Understandably, relatively large Asian economies like India, strong Asian

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\[3\] That the chosen countries are small relative to the world economy is easily understandable, since all chosen countries are developing countries, and collectively account for a mere proportion of the world GDP. The unilateral actions of none of these countries have potential impact on world interest rate, and none of these countries have a sustained growing trend of foreign asset accumulation. Development economists may have the ground to argue why emerging market economies like Malaysia, Indonesia, Thailand and perhaps, the Philippines are included in the group. This choice is justifiable if one considers the relative share of these economies in world GDP. I agree that for case of Malaysia there are episodic patterns of sustained current account deficits which indicate that the accumulation of foreign assets may have periodic growing trend. But these episodic patterns are not that severe, if compared to the case of its neighbor Singapore. The assumption of perfect capital mobility is also justifiable since these countries were amongst the early followers of trade liberalization spree in Asia. The choice also allows the study to be conducted on four South Asian and four Asia-Pacific countries, which may be of interest.

\[4\] The study by Ghosh (1995), for instance, establishes that aggregate consumption tilting behavior is significant in only two out of five major industrialized countries. This is intuitively trivial since economic agents belonging to such economies are least affected by idiosyncratic global shocks to output or components of it, which makes them rather indifferent about tilting consumption towards future or present. A high saver country, therefore, would enjoy a potential first order impact on global interest rates through unilateral actions, which allows its agents to stay indifferent about tilting consumption. Hence there is limited need for smoothing consumption in these countries.

\[5\] An obvious reason to exclude Singapore as an Asia-Pacific small open economy, for instance, is that the current account of Singapore exhibits sustained deficits indicating a prolonged episode of asset accumulation.
But collecting quarterly time series of national aggregates of the chosen countries over the chosen sample period is a daunting task. These countries do not have reported quarterly time series before the 1990s in IFS, and using the reported quarterly data from 1990s again restricts the sample size to be (possibly) of the same size as used from the annual data. In addition to testing the model’s robustness for small economy data, it will, however, be interesting to check if the model works with relatively smaller datasets. This is because tests of unit root, cointegration and estimation of VAR systematically excludes observations for lagged variables and differences, and there remains a caveat of losing precision and reliability of estimated parameters when sample size is relatively small. However, a smaller frequency dataset should be acceptable for the model as long as the model is a true representation of the process under consideration. In this regard, increasing the frequency of the dataset will not necessarily increase the precision of the estimates. In conducting the estimations, therefore, a dataset is not readily excluded just because it has a relatively low frequency.

**Estimation, Tests and Results**

A summary of results from Augmented Dickey-Fuller (ADF) test for unit roots in $c_t$ and $(y_t - i_t - g_t)$ and their first differences (to test if both are I(1) processes) for each of the eight countries over available sample period, is presented in Table 1 (see Appendix). In order to test if $c_t$ and $(y_t - i_t - g_t)$ are cointegrated, the residuals from the ordinary least squares regression of $(y_t - i_t - g_t)$ and $c_t$ are tested for a unit root. If $c_t$ and $(y_t - i_t - g_t)$ are both I(1) and cointegrated, the consumption-smoothing component of the actual current account, $C_A$ is stationary, which is tested and reported in Appendix Table 1. The other variable to be used in the VAR estimation is changes in national cash flow, $(q_t - i_t - g_t)$, which is also tested for the presence of a unit root and results are presented in Appendix Table 1.

Among the ADF test results reported in Appendix Table 1, results of the tests conducted on the differenced series are based on a specification with no trend and a constant; results
In order to test whether capital flows have been too limited to allow consumption-smoothing behavior, a simple test, involving the null hypothesis that the ratio of variance of optimal current account to variance of actual consumption-smoothing component of the current account is one, is conducted. The summary is reported in Appendix Table 3. Results indicate that except for the samples of Nepal and Pakistan, the volatility of actual current account and optimal current account are not the same for the rest six economies. For samples of Bangladesh, Malaysia and the Philippines, there is strong evidence of excessive capital flows, since volatility of actual current account significantly exceeds volatility of optimal current account. On the contrary, for samples of Thailand, Sri Lanka and Indonesia, the variance of the optimal current account significantly exceeds variance of the actual current account, implying that the actual current account has not varied significantly enough to allow capital flows to smooth consumption. This finding is interesting, since it does not allow one to generalize the degree of capital mobility for the set of countries studied.

The last column in Appendix Table 3 reports the sample correlations between $C_A$ and $C_{A*}$. For all samples except Bangladesh, the correlation of these two series is positive and convincingly high, which implies that the model works reassuringly well in explaining the major current account movements. This result is visually verified in the Figures 2.1a to 2.8a presented in the Appendix, where the two series are plotted against time. Except for the case of Bangladesh, it is quite interesting how highly correlated the two series are for the remaining samples. For samples of Indonesia, Nepal and Philippines, the plots show almost a perfect fit. These plots, if compared to relevant studies on industrialized countries, are much more convincing as far as the applicability of the model in determining capital mobility is concerned. This, as may be evident from the discussion of this paper, is due to the fact that the twin assumption of small open economy and perfect capital mobility is better justified empirically for truly small open economies of Asia, as compared to industrialized developed countries which possess relatively larger share of the world GDP.

**Conclusion**

This paper has followed the intertemporal approach to the current account, which was primarily applied for industrialized countries in comparable studies established in literature, to establish that capital mobility in small open economies which take the world interest rate as exogenous smoothes consumption in the face of shocks to national cash flow. While the assumption of a small open economy is often empirically oversimplified, this paper identifies a subset of truly small open economies of Asia with relatively more open structure by demarcating the features of these economies (and hence confirming that these countries take the world interest rate as exogenous), and tests the empirical validity of the model for this subset of countries. Results indicate that the model works impressively well for seven out of eight economies studied. Whether or not capital flows have been excessive in these economies remains ambiguous and cannot be generalized for all countries studied, since results indicate excessive capital flows for three countries, limited capital flows for three countries and benchmark capital flows for the remaining two.

Out of curiosity, alternative VARs were estimated with current account and individual components of the changes in national cash flow, such as changes in domestic output,
account may well be due to different economic facts which are beyond the capacity of this simple model. The extent of capital flows in small economies (in general), for instance, may be caused by short-term capital flows that respond to speculation in the world foreign exchange market. The magnitude and precariousness of these private capital flows suggests that they are much larger than would be deemed necessary to smooth real idiosyncratic shocks to consumption, arising from transitory shocks to changes in national cash flow or any of its components.

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References


Figure 2.2a: Indonesia—Optimal and Actual Current Account

Figure 2.3a: Malaysia—Optimal and Actual Current Account
Figure 2.6a: The Philippines—Optimal and Actual Current Account

Figure 2.7a: Sri Lanka—Optimal and Actual Current Account
Table 2: LR Statistic for Granger Causality Test from Unrestricted VAR Estimation and the Estimated Consumption-tilting Parameter

<table>
<thead>
<tr>
<th>Sample</th>
<th>LR Statistic (j) [p-value]</th>
<th>Estimate of T [p-value]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh (1973-2002)</td>
<td>3.320 (j=1) [0.0684]</td>
<td>0.994 [0.000]</td>
</tr>
<tr>
<td>Indonesia (1960-2002)</td>
<td>11.693 (j=1) [0.0006]</td>
<td>0.961 [0.000]</td>
</tr>
<tr>
<td>Malaysia (1955-2001)</td>
<td>1.521 (j=1) [0.217]</td>
<td>0.882 [0.000]</td>
</tr>
<tr>
<td>Nepal (1970-2002)</td>
<td>28.295 (j=2) [0.000]</td>
<td>0.796 [0.000]</td>
</tr>
<tr>
<td>Pakistan (1960-2002)</td>
<td>2.836 (j=1) [0.0921]</td>
<td>0.874 [0.000]</td>
</tr>
<tr>
<td>Philippines (1948-2002)</td>
<td>8.606 (j=3) [0.035]</td>
<td>0.969 [0.000]</td>
</tr>
<tr>
<td>Sri Lanka (1950-2001)</td>
<td>8.782 (j=2) [0.012]</td>
<td>0.846 [0.000]</td>
</tr>
<tr>
<td>Thailand (1950-2002)</td>
<td>33.407 (j=2) [0.000]</td>
<td>0.980 [0.000]</td>
</tr>
</tbody>
</table>

Note: LR statistic is the test statistic for the likelihood ratio test of null hypothesis that the coefficients of lagged values of CA_t in the block of equations explaining \((q_t - i_t - g_t)\) is zero, and j is the number of restrictions imposed.

Table 3: Ratio of Variance of CA* to CA, and Correlation between CA and CA*

<table>
<thead>
<tr>
<th>Sample</th>
<th>Ratio</th>
<th>P[F&lt;=f] One Tail</th>
<th>Correlation (CA, CA*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh (1973-2002)</td>
<td>0.595</td>
<td>0.087</td>
<td>-0.938</td>
</tr>
<tr>
<td>Indonesia (1960-2002)</td>
<td>2.784</td>
<td>0.000</td>
<td>0.995</td>
</tr>
<tr>
<td>Malaysia (1955-2001)</td>
<td>0.431</td>
<td>0.002</td>
<td>0.939</td>
</tr>
<tr>
<td>Nepal (1970-2002)</td>
<td>1.042</td>
<td>0.453</td>
<td>0.999</td>
</tr>
<tr>
<td>Pakistan (1960-2002)</td>
<td>1.030</td>
<td>0.462</td>
<td>0.885</td>
</tr>
<tr>
<td>Philippines (1948-2002)</td>
<td>0.178</td>
<td>0.000</td>
<td>0.999</td>
</tr>
<tr>
<td>Sri Lanka (1950-2001)</td>
<td>1.498</td>
<td>0.070</td>
<td>0.976</td>
</tr>
<tr>
<td>Thailand (1950-2002)</td>
<td>1.805</td>
<td>0.010</td>
<td>0.963</td>
</tr>
</tbody>
</table>

Note: • Ratio = Var(CA*)/Var(CA).
• P[F<=f] one tail is the p-value, with one degree of freedom, for the null that the ratio of the variances is equal to one.