DETERMINANTS AND SUSTAINABILITY OF INDONESIA’S CURRENT ACCOUNT BALANCE

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BANK INDONESIA

Abstract

This paper examines dynamics of Indonesia’s current account, factors determining the
dynamics of the current account, and sustainability of the current account over the period of 1994-
2008. The estimation results show a number of findings. First, the dynamics of actual current
account in Indonesia was very much in line with the optimal current account based on inter-
temporal approach. In other words, the level and movement of actual current account were
consistent with the level and movement of optimal current account. Second, consumption,
investment, and real effective exchange rate significantly influenced the movements of Indonesia’s
current account. On the other hand, GDP growth, government budget and other external factors
did not have a significant effect on the current account. Third, excessive consumption or
investment, as well as the appreciation of the rupiah real exchange rate potentially result in
unsustainable current account.

Keywords: Current account, intertemporal model, Indonesia.
I. Introduction

Over the past thirty years or so, Indonesia has recorded current account surplus as well as current account deficit. For about a decade prior to the Asian crisis in 1997/98, Indonesia recorded mostly current account deficit, and then since the crisis Indonesia’s has recorded mostly current account surplus. In average, Indonesia’s current account balance from 1980 to 1997 recorded deficit by -2.54 percent of GDP, while the average of the current account over the period of 1998-2008 recorded surplus by 3.05 percent of GDP. A significant change in Indonesia’s current account balance before and after the crisis could be a result of significant change of the relationship between the current account and its determinants, or a result of a significant change in the main factors driving the movements of the current account. Theoretical models have different predictions on the factors driving the movements of current account balances and on the sign and magnitude of the relationship between current account and its determinants.¹

Given the dynamics of the current accounts and its implications for other economic variables, the sustainability of current account has become of great interests for not just academics but also policymakers. Some studies say that current account deficit above five percent of GDP should be an alarm for the sustainability of the deficit when such a deficit reflects high consumption spending and is financed with short-term debt or foreign exchange reserves (Milesi-Ferretti and Razin, 1996). Meanwhile, other studies argue that the threshold for current account stability is two percent of GDP (O’Neill and Hatziouhd, 2002.) Empirical evidence does not conclude that there is a ‘fit for all’ rule in determining the importance of current account deficit in bringing an economy to external crises. As Milesi-Ferretti and Razin (1996) show, Australia, Ireland, Israel, Malaysia, and South Korea have been able to sustain large current account deficit for years, while Chile and Mexico have suffered severe external crisis due to a large current account deficit.

The purpose of this paper is to examine the determinants and sustainability of Indonesia’s current account balance. Although Indonesia—and some other countries in the region—has recorded mostly current account surplus since the crisis, a concern on the sustainability of the surplus comes along with the global economic crisis. Specifically, we address the questions: (i) what are the determinants of current account in Indonesia? and (ii) how sustainable is Indonesia’s current account?

¹ See, for example, Chinn and Prasad (2003)
account? The results are expected to shed some light on the determinants and sustainability of Indonesia’s current account balance.

The remainder of the paper proceeds as follows. Section 2 reviews related literature. Section 3 describes the developments of Indonesia’s current account in the past thirty years or so. Section 4 provides theoretical framework for analyzing current account dynamics. Section 5 analyses empirical results. Finally, this paper concludes with section 6.

II. Literature Review

The literature on current account balance provides many studies that try to explain determinants and sustainability of current account, and so far the studies are mostly either using industrialized countries or cross-country data. Chinn and Prasad (2003), for example, examine factors influencing medium-term current account balances using data of industrial and developing countries over the period of 1971-1995. Specifically for developing countries, they found that government budget surpluses, initial net foreign asset positions, and higher terms of trade volatility are associated with larger current account surpluses (or smaller current account deficits.)

Calderón et al. (2000) examine the determinants of current account deficits in developing countries. Their study covers 44 developing countries for the period of 1966-1995. They find the following relationships. First, persistence level of current account in developing countries is quite moderate and much smaller in heavily indebted countries. Second, higher domestic output growth in developing countries leads to a larger current account deficit. Third, higher growth rate of industrialized countries reduces current account deficit. Fourth, higher in saving rate—both public and private—tends to reduce current account deficit. Fifth, an increase in exports reduces current account deficits. Sixth, real a exchange rate appreciation increases current account deficit. Finally, a lower international interest rate leads to a larger current account deficit.

A study focusing on the current account of ASEAN countries has been done by Ostry (1997). His findings show that up until 1995 excessive external borrowing for private consumption was not experienced by ASEAN countries, except to a small extent in Indonesia and Malaysia. However, he pointed out that the level and composition of external liabilities, less flexible macroeconomic policies, the efficiency of investment, and the health of banking systems in ASEAN countries put risks on the sustainability of their current accounts. The period covered in his study, i.e. prior to 1997/8’s Asian crisis, is a period in which most ASEAN countries recorded current account deficit. On the other hand, since the crisis most ASEAN countries have been experiencing current account surplus. Thus, the issue now is more on the sustainability of current account surplus rather than current account deficit such as in Ostry’s study.
This paper contributes to the literature on current account by providing empirical regularities of Indonesia’s current account using more up to date data. The way internal and external economic conditions affects current account of industrialized countries may differ from the way such conditions affect current account in developing countries. For example, while industrialized countries have access to international finance, access of developing countries to international finance is much more limited. This, of course, has implications for the way countries smooth their consumption that in turn affects their current account. Moreover, the fact that the exports of less developed countries rely more on primary commodities, the dynamics of current account balance of developing countries may also depend more on supply and demand of primary commodities.

III. Developments of Indonesia’s Current Account

There are two periods in which Indonesia’s current account shows a substantial difference: period of 1960-1997 (when GDP growth was relatively high) shows current account deficit; and period of 1998 – 2008 (when GDP growth was relatively low) shows current account surplus. Although in the first period the current account tended to be deficit, in 1974 and 1979-1980 the current account was surplus due to a temporary oil shock. The development in the Indonesian economy entered a period of high growth and was driven by the flow of incoming foreign capital tended to result in deficit current account. Meanwhile, the post-1998 crisis, which economic growth tended to slow, and the flow of external foreign debt was relatively stable, the current account mostly recorded surplus.

The composition of the current account is strongly influenced by the trade balance (Figure 2). Based on its component, the transaction of trade and transfer always records a surplus, while the transaction of services and income was deficit. The trend in surplus trade balance in some literature could represent a persistent structural competitiveness in international trade. In nominal term, the trade balance account is relatively greater than other parts of the current account. Therefore, major changes that occurred in trade balance, will affect on the value of current account significantly.

In contrast, income and services account are persistently deficits. The structure of that income transaction that tends to be deficit is a reflection of the dependency on foreign capital, such as external debt, foreign portfolio investment, and foreign direct investment. Services transaction is closely related to the import of goods in which the payments of insurance and transport services
are more reliant on the services of foreign insurance and foreign shipping companies. Meanwhile, the current transfer balance recorded surplus due to Indonesian worker remittance from abroad.

The degree of current account imbalance may be less sustainable when it is derived from a large trade deficit rather than from large negative in net factor income (Adedeji, 2001). In case of Indonesia, when current account recorded deficit, the deficit was mainly driven by deficit of income and services account. The deficit in income balance is mainly due to a high dependence of Indonesia on the external debt financing.

![Figure 1 Current Account 1970-2008](image1.png)

![Figure 2 Composition of Current Account](image2.png)

The common feature of developing countries is that, since in the initial process of economic development, they require a large amount of foreign capital inflows, particularly external debt. This accumulation of external debt will bring consequence on the rising interest payment burden in the future. The process of liberalization and economic stabilization in the era of late 60’s was marked by the issue of Law No. 1 1967 on Foreign Direct Investment. By this law, the Government intended to increase the openness of Indonesian economy to the global economy and to increase certainty for foreign investors in doing business in Indonesia. Before 1967, foreign investors were burdened by the national investment climate highlighted by government nationalization. Various international cooperation efforts also began to switch on and rejoin the members of the World Bank and the IMF. Various package policies and deregulation run by government in 90’s gave fresh wind for the industrial sector to grow. With the support of macroeconomic stability and better political condition, foreign investors were become more attracted to invest in Indonesia. Source of corporate financing and banking also lied more on foreign debts and issuing securities in abroad.

When the era of high economic growth slowed down in 1980, the deficit of current account increased. Entering the 1980’s, the global economy faced economic crisis and the fall in
the world oil prices. Structure of the economy also faced high costs economy and become big caveat for the development of industrial and export competitiveness. In this period, surplus of trade balance has decreased sharply, in which the deficit ratio of current account to GDP reached 8% in 1983 (Figure 3). To reduce the pressure on Indonesia’s balance of payment and increase its export competitiveness, the government devalued rupiah exchange rate by 27.6% and 31% in 1983 and 1986, respectively.

During the 1990’s, deregulation and reducing bureaucracy in various sectors, have given benefits to business activities, including foreign investors. Foreign investment approval shows sharp increase in that period (Figure 4). The industrial sector, including the export-oriented industries such as textile, electronics, and shoes grew very well as boosted by the import of apparatus technology. However, economic expansion with the increase in the deficit raised concerns on current account sustainability in mid 1990's, in which the ratio reached minus 3.4% of GDP.

The development of Indonesia’s current account during the 1990s was also related to outstanding foreign debt that tended to increase until 1998. As one of the main sources of financing for development in the period of high economic growth, the outstanding of foreign debt increased and reached $150,9 billion in 1998 (Figure 5). Therefore, the sustainability of external indicator which are known as debt service ratio (DSR) and the ratio of external debt to exports deteriorated, to about 60% and 260%, respectively. In fact, the reasonable limit on the size of DSR for a developing country like Indonesia is about 20% (International Development Association, 2004). With the burden of foreign debt repayment, high export revenues cannot be fully utilized to increase activities for the import and investment capacity for the economy.
In post-crisis 1998, the outstanding of foreign debt had decreased. In the period of crisis and recovery, foreign capital inflows were mainly for government, especially from the IMF, World Bank, and ADB. Funds that flowed to the private sector went down sharply as a result of the perception of high risk business in Indonesia. Besides, the domestic banking system was also vulnerable that made the credit line from foreign banks was very limited.

Over the last thirty years or so, there was also a change in the composition of foreign capital flow in Indonesia. Before 1998, foreign capital inflows were mostly Foreign Direct Investment (Figure 6). Meanwhile, in the post-crisis period the composition of portfolio capital flows become more dominant and structure of domestic capital market become more sensitive to market sentiment.

![Figure 5 Foreign Debt](image1)

![Figure 6 Composition of Foreign Capital Flow](image2)

IV. Theoretical Framework

By definition, a country’s current account balance in a certain period is a country’s net exports of goods and services. Since a country must acquire foreign assets of equal value of its net exports or borrowing of equal value of its net imports, current account balance can also be defined as a change in its net foreign assets (Obstfeld & Rogoff, 1996, p.5). The equation for current account can be derived from national account identity, in which current account surplus reflects the excess of domestically produced output over domestic absorption, and current account deficit reflects the excess of domestic absorption over domestically produced output. Specifically, current account can be formulated as:

\[
CA_t = F_{t+1} - F_t = Y_t + r_tF_t - C_t - G_t - I_t
\]  

(1)
where \( F_i \) is net foreign asset, \( Y_i \) is domestic output, \( r_i \) is the world interest rate, \( C_i \) is domestic private consumption, \( G_i \) is government consumption, and \( I_i \) is private and government investments. From maximization problem of consumers, consumption function is given by:

\[
C_i = \frac{r_i}{1+r_i} \left[ (1+r_i)F_i + \sum_{s=t}^\infty \left( \frac{1}{1+r_i} \right)^{s-t} (Y_s - G_s - I_s) \right]
\]  

(2)

Under constant interest rate, let \( \tilde{X}_i \) be permanent level of variable \( X_i \) and is defined as

\[
\tilde{X}_i = \frac{r_i}{1+r_i} \sum_{s=t}^\infty \left( \frac{1}{1+r_i} \right)^{s-t} X_s, \quad \text{for } X_s = Y_s, G_s, I_s
\]

where \( r_i \) is constant interest rate.

By substituting equation (2) into equation (1) and using definition of \( \tilde{X}_i \), then fundamental equation for current account is given by:

\[
CA_i = F_{i+1} - F_i = (Y_i - \tilde{Y}_i) - (I_i - \tilde{I}_i) - (G_i - \tilde{G}_i)
\]  

(3)

Equation (3) predicts the relationship between output, consumption, investment, government budget balance and current account. First, due to consumption smoothing, output above its permanent level contributes to a higher current account surplus. When output rises temporarily above its long-run level, individuals choose to accumulate foreign assets as a way for smoothing consumption over future period. Second, in the case of high investment, individuals use foreign borrowing to smooth their consumption. Instead of financing investments entirely out of domestic savings, countries want to avoid sharp temporary drops in consumption. Finally, abnormally high government spending needs the same effects as low output, that is, higher current account deficit. A higher current account deficit enables people to minimize the impact of shock in any given period by spreading that impact over the entire periods.

If future level of output, investment, and government consumption are random variables, then individuals can only choose contingency plans for future consumption, and therefore

---

2 Obstfeld and Rogoff (2006) provide more explanation on this model.
consumptions are random variables. Taking into account such uncertainty, current account defined by equation (3) can be replaced with equation:

\[
CA_t = F_{t+1} - F_t = (Y_t - E_t\tilde{Y}_t) - (I_t - E_t\tilde{I}_t) - (G_t - E_t\tilde{G}_t)
\]

(4)

where \( E_t\tilde{Y}_t, E_t\tilde{I}_t, \) and \( E_t\tilde{G}_t \) are mathematical conditional expectation of variables \( \tilde{Y}_t, \tilde{I}_t, \) and \( \tilde{G}_t \) respectively.

**Testable Implications of the Intertemporal Model of the Current Account**

To test intertemporal model of current account empirically, following the approach developed by Campbell (1987), we can write equation (4) in a compact form. Define net output as gross domestic output less gross investment and government expenditure, i.e.:

\[
Q_t = Y_t - I_t - G_t
\]

(5)

Using this definition, then equation (4) can take a simple form:

\[
CA^*_t = Q_t - E_t\hat{Q}_t
\]

(6)

Permanent value of the net output, \( \hat{Q} \), can be derived as follows:

\[
\sum_{t=1}^{\infty} \left( \frac{1}{1 + r} \right)^{t-\tau} \hat{Q}_t = \sum_{t=1}^{\infty} \left( \frac{1}{1 + r} \right)^{t-\tau} Q_t
\]

\[
\hat{Q}_t = \frac{r^\tau}{1 + r^\tau} \sum_{t=1}^{\infty} \left( \frac{1}{1 + r} \right)^{t-\tau} E_tQ_t
\]

(7)

Substituting equation (7) into equation (6), we get:

---

3 This approach is also used in Adegbite (2001) and Ostry (1997).
\[ CA_t^* = Q_t - E_t \left[ \frac{1}{1 + r^*} \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} E_t Q_t \right] \]

\[ CA_t^* = Q_t - \left[ 1 - \frac{1}{1 + r^*} \right] \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} E_t Q_t \]

\[ CA_t^* = Q_t - E_t \left[ \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} Q_t - \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau+1} Q_t \right] \]

\[ CA_t^* = Q_t - E_t \left[ \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} Q_t - \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau+1} Q_{t-1} \right] \]

\[ CA_t^* = -E_t \left[ \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} (Q_t - Q_{t-1}) \right] \]  

\[ CA_t^* = \left[ \sum_{t=1}^{\infty} \left( \frac{1}{1 + r^*} \right)^{t-\tau} E_t (\Delta Q_t) \right] \]  

(8)

Equation (8) predicts that a temporary shock leads to a change in the current account and the change is a decreasing function of the shock persistence, and current account will record a surplus when future net output is expected to fall temporarily. The intertemporal approach employed here has a number of policy implications. First, current account deficit does not necessarily indicate that the economy is facing a structural problem, and therefore a policy response—such as exchange rate devaluation—is not necessarily needed to correct such a deficit. A current account deficit can be a result of an increase in investment, in government expenditure, or a decline in productivity. Second, if the observed current account deficit indicates a consumption smoothing by private economic agents, then such a deficit may not result in the accumulation of unsustainable foreign liabilities. Third, an observed current account deficit may reflect a need for the economy to accelerate future output growth in order to be able to repay its foreign borrowings.

Based on equation (8), a test for consumption smoothing hypothesis of the current account can be conducted. To determine the consistency of current account with the joint hypothesis of
consumption smoothing behavior and intertemporal budget constraint, the optimal current account, $CA_t^*$, is compared with the actual current account $CA_t$. The optimal current account is derived from equation (8) as follows. Under the null hypothesis of equation (8), current account should incorporate all of the consumers’ information on future net output changes. Therefore, consumers’ forecast of changes in net output, $\Delta Q_t$, for $t > \tau$, is based on the $p$-order vector auto regression (VAR) model as follows (for simplicity $p$ is set to 1):

$$
\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix} =
\begin{bmatrix}
\psi_{11} & \psi_{12} \\
\psi_{21} & \psi_{22}
\end{bmatrix}
\begin{bmatrix}
\Delta Q_{t-1} \\
CA_{t-1}
\end{bmatrix} +
\begin{bmatrix}
V_{1t} \\
V_{2t}
\end{bmatrix}
$$

(9)

where $V_{1t}$ and $V_{2t}$ are errors with a conditional mean of zero. Taking the expectation of equation (9), and using the condition that $E[H_{t+j}] = \Psi^j X_t$, the expected value of $\Delta Q_t$ in equation (8) is obtained from:

$$
E_t\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix} =
\begin{bmatrix}
\psi_{11} & \psi_{12} \\
\psi_{21} & \psi_{22}
\end{bmatrix}^{t-\tau}
\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix}
$$

(10)

where $\Psi$ is a matrix with elements $\psi_{ij}$. By pre-multiplying equation (10) with vector $[1 \ 0]$ we get the expected value of $\Delta Q_t$:

$$
E_t\Delta Q_t = [1 \ 0]
\begin{bmatrix}
\psi_{11} & \psi_{12} \\
\psi_{21} & \psi_{22}
\end{bmatrix}^{t-\tau}
\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix}
$$

(11)

By substituting equation (11) into equation (8), then we get the optimal current account balance $CA_t^*$ as follow:

$$
CA_t^* = -[1 \ 0](1 + r^*)^{-1}\Psi\left(I - (1 + r^*)^{-1}\Psi\right)^{-1}
\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix}
$$

$$
= \Phi_{\Delta Q} \Phi_{CA}^t
\begin{bmatrix}
\Delta Q_t \\
CA_t
\end{bmatrix}
$$

(13)
Optimal current account obtained from equation (13) is compared with the actual current account data. One of the main implications of this model is that if actual current account moves closely with the optimal current account, then the economy can be considered receiving sufficient capital flows to ensure consumption smoothing (Adedeji, 2001).

V. Empirical Estimations

V.1. Data

Data we use in this paper run from 1994 to 2004 with quarterly frequency. Starting period of the data is chosen based on data availability. While many variables with quarterly frequency are available even before 1994, GDP data with quarterly frequency only available since 1993. Another issue with GDP data is the change in investment in 2002. Before June 2002, investments in Indonesia’s GDP data included statistical discrepancy, and then since June 2002 statistical discrepancy is excluded from investment. Since there is no way to separate investment up until march 2002, for comparability reason, we also include statistical discrepancy into investment data after March 2002. Dynamics of the variables in the empirical model are presented in Figure A1-A6.

V.2. Testing for the Present Value Model

Before we estimate the empirical models current account determinants, we assess the optimal level of Indonesia’s current account based on inter-temporal model. Using equation (13), we obtain optimal level of current account, and the movements of the actual current account and optimal current account implied by the present-value model are shown in Figure 7. The figure shows that the optimal current account based on the present-value model move closely with actual current. The correlation coefficient between optimal and actual current account is 0.94. This indicates that optimizing-based current account can capture Indonesia’s current account very well.
To check for the robustness of the results to the 1997/98’s crisis, we also estimate the optimal current account using the period prior to the Asian crisis 1997/1998. Still, dynamics of the optimizing-based current account capture dynamics of actual current account very well (Figure 8). The correlation coefficient between optimal and actual current account during the period of 1980-1997 is 0.86.
V.3. Determinants of Current Account

The empirical model for current account determinants used here is using similar empirical models widely used in the literature on current account. The dependent variable is ratio of current account to GDP, in which a positive value represents a current account surplus, and a negative value represents a current account deficit. Based on the theoretical explanation on the determinants of current account, as exogenous variables, we include economic growth, consumption ratio to GDP, investment ratio to GDP, real effective exchange rate, the US economic growth, and international interest rate. In addition, to control for the change in Indonesia’s exchange rate regime—which also the time when Asian crisis occurred—we use dummy variable with value of one since 1998. Specifically, the empirical model of current account is formulated as:

\[
\left( \frac{CA}{GDP} \right)_t = \beta_0 + \beta_1 \left( \frac{CA}{GDP} \right)_{t-1} + \beta_2 g_{GDP_t} + \beta_3 \left( \frac{C}{GDP} \right)_t + \beta_4 \left( \frac{I}{GDP} \right)_t + \beta_5 REER_t + \beta_6 DUMM_t + \beta_7 GDPUS_t + \beta_8 r_t^{int}
\]

An increase in GDP growth is expected to have a positive effect on current account, while increase in consumption, investment or real exchange rate appreciation is expected to have a negative effect on the current account.

Unit Root Test

Before we estimate the model, we first check whether the data are stationary. For that purpose, we use both Augmented Dickey-Fuller Test (ADF) and Phillip Perron Test. The results of the unit root tests show that in level, for almost all variables used in the equation, we fail to reject the hypothesis that the variables follow unit root process (Table 1). Then we take first difference of all series in the equation, and the results of the unit root tests show that for all variables we reject that the difference of the variables follow unit root process (Table 2). This result is then used as a rational for using the difference of the variables in estimating the empirical model.

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4 See, for example, Calderón et al (2000), and Chinn and Prasad (2003).
Table 1. The Results of Unit Root Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>PP</td>
</tr>
<tr>
<td>Current Account/GDP</td>
<td>1.75</td>
<td>2.61</td>
</tr>
<tr>
<td>Budget Surplus/GDP</td>
<td>2.38</td>
<td>7.94**</td>
</tr>
<tr>
<td>Consumption/GDP</td>
<td>2.22</td>
<td>4.22**</td>
</tr>
<tr>
<td>Investment/GDP</td>
<td>2.59</td>
<td>2.41</td>
</tr>
<tr>
<td>Real Effective Exchange Rate</td>
<td>1.92</td>
<td>2.09</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>3.26*</td>
<td>2.64</td>
</tr>
<tr>
<td>US Real Interest Rate</td>
<td>2.38</td>
<td>2.19</td>
</tr>
<tr>
<td>US GDP Growth</td>
<td>2.54</td>
<td>2.40</td>
</tr>
</tbody>
</table>

Note: Test critical values for ADF and PP (based on MacKinnon, 1996): 4.08(1%); 3.47(5%); 3.16(10%)

Estimation Results

We estimate two different measures of current account, i.e. current account including net foreign payments, and current account excluding net foreign payment. Estimation results using current account including net foreign payment are shown in Table 2.5 The results show that, among the exogenous variables included in the model, beside the lag of the current account, as expected, domestic consumption and investment significantly affect current account movements. A one percent increase in consumption to GDP ratio leads to a lower current account to GDP ratio by 0.38 percent. And a one percent increase in investment to GDP ratio leads to a lower current account to GDP ratio by 0.39%.

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5 We also estimate the model with exogenous variables in their lag, and the results show that none of the exogenous variable significantly affect current account ratio to GDP.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>d(CA/PDB)(t-1)</td>
<td>-0.31**</td>
<td>-0.31**</td>
<td>-0.31**</td>
<td>-0.32**</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.12)</td>
<td>(0.12)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>d(GDP Growth)</td>
<td>-0.07</td>
<td>-0.07</td>
<td>-0.07</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.09)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>d(Consumption/GDP)</td>
<td>-0.378***</td>
<td>-0.38***</td>
<td>-0.38***</td>
<td>-0.37***</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>d(Investment/GDP)</td>
<td>-0.39***</td>
<td>-0.39***</td>
<td>-0.38***</td>
<td>-0.37***</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>d(Budget Surplus/GDP)</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
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<td></td>
<td>(0.06)</td>
<td>(0.06)</td>
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<tr>
<td>d(Real Exchange Rate)</td>
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<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>d(GDP Growth US)</td>
<td></td>
<td>-0.07</td>
<td>-0.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.36)</td>
<td>(0.37)</td>
<td></td>
</tr>
<tr>
<td>d(Interest Rate US)</td>
<td></td>
<td></td>
<td></td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.35)</td>
</tr>
<tr>
<td>Dummy Exch Regime</td>
<td>0.07</td>
<td>0.05</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.53)</td>
<td>(0.54)</td>
<td>(0.54)</td>
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<tr>
<td>$R^2$</td>
<td>0.44</td>
<td>0.44</td>
<td>0.44</td>
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<tr>
<td>Adjusted $R^2$</td>
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<td>0.36</td>
<td>0.35</td>
<td>0.35</td>
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<tr>
<td>Durbin-Watson stat</td>
<td>2.12</td>
<td>2.11</td>
<td>2.11</td>
<td>2.12</td>
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</table>

Using the second measure for current account, by excluding net foreign payment, the estimation results show that, in addition to consumption and investment, real exchange rate also significantly affects current account movement (Table 3). Nevertheless, the magnitude of the exchange rate effect is only very small. A one percent increase in real exchange rate appreciation leads to a lower current account ratio to GDP by 0.07 percent.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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<tbody>
<tr>
<td>d(CAPDB)(t-1)</td>
<td>-0.22*</td>
<td>-0.22*</td>
<td>-0.21*</td>
<td>-0.22*</td>
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<td>(0.12)</td>
<td>(0.12)</td>
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<tr>
<td>d(GDP Growth)</td>
<td>-0.10</td>
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<td>-0.09</td>
<td>-0.09</td>
</tr>
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<td></td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>d(Consumption/GDP)</td>
<td>-0.44***</td>
<td>-0.44***</td>
<td>-0.44***</td>
<td>-0.43***</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.12)</td>
<td>(0.12)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>d(Investment/GDP)</td>
<td>-0.44***</td>
<td>-0.44***</td>
<td>-0.43***</td>
<td>-0.43***</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>d(Budget Surplus/GDP)</td>
<td>-0.08</td>
<td>-0.08</td>
<td>-0.07</td>
<td>-0.08</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>d(Real Exchange Rate)</td>
<td>-0.07**</td>
<td>-0.06**</td>
<td>-0.07**</td>
<td>-0.07**</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>d(GDP Growth US)</td>
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<td></td>
<td>-0.32</td>
<td>-0.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.41)</td>
<td>(0.41)</td>
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<tr>
<td>d(Interest Rate US)</td>
<td></td>
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<td>0.30</td>
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<td>(0.39)</td>
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<tr>
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<td>0.02</td>
<td>0.10</td>
<td></td>
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<td>(0.60)</td>
<td>(0.61)</td>
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<tr>
<td>( R^2 )</td>
<td>0.50</td>
<td>0.50</td>
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<td>0.51</td>
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<tr>
<td>Adjusted ( R^2 )</td>
<td>0.44</td>
<td>0.43</td>
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<tr>
<td>Durbin-Watson stat</td>
<td>2.15</td>
<td>2.15</td>
<td>2.11</td>
<td>2.11</td>
</tr>
</tbody>
</table>

The sustainability of Indonesia’s current account can be inferred from the estimation results (Table 2 and 3). During the period of 1994-2008, Indonesian current account has reached the ratio ±2% of to GDP several times. The highest level of surplus, which was 5.17 percent and 7.19 percent, happened only on crisis 1998 and 2004. This historical data of current account motivates us to use ±2% (instead of ±5%) as the threshold of CA sustainability in Indonesia. Based on the estimation results, an increase in consumption or investment ratio to GDP by 4.5 percent will result in lower current account ratio to GDP by 2 percent. When we exclude net foreign payment from the calculation of current account, then the appreaciation in real exchange rate may also leads to
unsustained current account. To lower current account ratio to GDP by 2 percent, other things being equal, real exchange rate needs to appreciate by 28 percent.

VI. Conclusions

Current account is one of the key macroeconomic indicators, and it reflects external balance of the economy. A persistent large surplus or deficit current account reflects the external imbalance of the economy. This paper examines dynamics of Indonesia’s current account, factors determining the dynamics of the current account, and sustainability of the current account. The empirical results show a number of findings. First, the dynamics of actual current account in Indonesia was very much in line with optimal current account based on inter-temporal approach. In other words, the level and movement of actual current account were very close with the level and movement of optimal current account.

Second, the estimation results show that consumption, investment, real effective exchange rate significantly influenced the movements of Indonesia’s current account. On the other hand, GDP growth, government budget, and other external factors did not have significant effect on the current account. A one percent increase in consumption to GDP ratio leads to a lower current account to GDP ratio by 0.38 percent. And a one percent increase in investment to GDP ratio leads to a lower current account to GDP ratio by 0.39 percent. On the other hand, a one percent increase in real exchange rate appreciation leads to a lower current account ratio to GDP by only 0.07 percent. The results here are robust to the change in Indonesia’s exchange rate regime, in which started in September 1997 Indonesia has adopted floating exchange rate regime.

Finally, the results in this paper imply that excessive consumption or investment, as well as the appreciation of the rupiah real exchange rate potentially result in unsustainable current account. If we take current account ratio to GDP ±2% as the threshold of current account sustainability, other things being equal, an increase in consumption or investment ratio to GDP by 4.5 percent will result in lower current account ratio to GDP by 2 percent. And an increase in real exchange rate appreciation by 28 percent leads to a lower current account ratio to GDP by 2 percent.
References:


APPENDIX

Figure A1: Current Account and Consumption Dynamics

Figure A2: Current Account and Investment Dynamics
Figure A5: Current Account and Budget Balance Dynamics

Figure A6: Current Account and Net Foreign Asset Dynamics