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SUSTAINABILITY OF CURRENT ACCOUNT BALANCE IN ASEAN COUNTRIES: EVIDENCE FROM A PANEL ERROR CORRECTION MODEL

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ABSTRACT

This paper employs a panel-based error correction approach to examine the short- and long-run dynamics of the current account sustainability in four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand) over the period 1970–2010. The empirical findings indicate that exports and imports in these countries are cointegrated. The short-run deviation of this cointegrating relationship is significant and takes slightly less than four years to return to the long-run equilibrium path. This finding reinforces the notion that the current account balance is the outcome of optimal decisions of the lenders and borrowers, and any intervention to correct it is unwarranted. This finding also provides evidence against the claim that the Asian financial crisis was the outcome of an unsustainable current account deficit.

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INTRODUCTION

Current account is one of the two most comprehensively researched issues in international macroeconomics, the other being the purchasing power (PPP) parity doctrine. The current account is not a policy variable, as are money supply or the interest rate, and is also not a target variable, as are inflation and the unemployment rate. However, it provides valuable information regarding the stance of macroeconomic policies and the behavior of economic agents (Knight and Scacciavillani, 1998). The current account also reflects the optimal decisions of rational borrowers and lenders over time in an integrated world. A country cannot run perpetual deficits in its current account, as funds borrowed from the rest of the world must be repaid. Creditors' confidence depends on a country's ability to meet its financial obligations; that is, its ability to sustain the current account deficits for longer periods determines a country's creditworthiness in the world market. If the current account deficit is not sustainable, the country faces the likelihood of bankruptcy.

Sustainability is not an issue specific only to current account deficits; it is also important for current account surplus. Although a surplus can be sustained for longer than a deficit, it cannot be sustained forever. Moreover, a current account surplus can arise from inefficient working of the economy. Blanchard and Milesi-Ferretti (2011) noted that if the current account surplus is caused by problems such as 'lack of social insurance, driving up saving; inefficient financial intermediation, leading to low investment and other distortions' (p. 6), then it is typically reflected in a more depreciated real exchange rate. From a global perspective, the current account surplus may be unwise because a larger current account surplus in one country may reduce demand and output in another country if the country is in a liquidity trap (Blanchard and Milesi-Ferretti, 2011). Therefore, in the long run, the current account balance should not tend to move in either direction; that is, the balance should tend to converge to its steady-state value (this is the notion of current account sustainability).

South-East Asian countries are an interesting case from the sustainability point of view. Table A1 in Appendix A presents the current account balances of four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand). Before the Asian financial crisis in 1997–1998, these countries ran the current account deficits. In 1998, all four experienced current account reversals. Except the Philippines, the countries have recorded persistent surpluses in their current account balances since 1998. The current account sustainability has mainly been an issue for countries running current account deficits. However, these four countries have run both deficits and surpluses, which has rendered them an issue of serious research. Accordingly, the objective of this paper is to evaluate the sustainability of the current account balances in the four crisis-affected ASEAN countries mentioned above. The motivation of this paper stems from the dearth of research on sustainability

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issues in these countries within the framework of panel cointegration and error correction methods. Most previous studies have employed univariate econometric methods (i.e., univariate unit root and cointegration). While Lau (2006) employed a panel data method, it was limited to a unit root testing procedure. The contribution of the present study is twofold: first, this work employs the most recent available data on the latest movements in current accounts; second, and most important, the paper uses a panel error correction method to examine the long-run relationship between exports and imports. It also examines the speed of adjustment of the short-run deviation of the long-run relationship between exports and imports. This study thus provides findings more robust than those of univariate studies by exploiting the information contained in a large panel data setting. The study finds that exports and imports are cointegrated and that it takes less than four years for exports and imports to converge to their long-run equilibrium from the short-run disequilibrium.

The rest of the paper proceeds as follows. The study background is discussed next, followed by a brief review of previous studies of current account sustainability in ASEAN countries. The theoretical framework to analyze the current account sustainability is then presented, followed by a description of the econometric approaches used. Empirical analyses of econometric estimation are discussed next, followed by the conclusion.

BACKGROUND OF THE STUDY

The average current account deficits (as percentage of GDP) of these countries over the period 1981–1997 were negative (Indonesia = -2.82%, Malaysia = -4.23%, Philippines = -3.69%, and Thailand = -4.90%); whereas, these figures became positive after the Asian crisis. The corresponding figures over the period 1998–2013 for Indonesia, Malaysia, the Philippines, and Thailand were 1.74%, 11.73%, 1.64%, and 3.77%, respectively[1]. Simple open-economy national income identity shows that the current account balance is the sum of domestic saving and investment (CA = S + I); that is, the current account surplus indicates that domestic saving is greater than investment. As higher investment is positively correlated with a higher standard of living (Gerber, 2014); a reduction in domestic investment caused by the current account surplus should have an adverse effect on the standard of living. Table 1 reports averages of gross fixed capital formation (GFCF) and per capita GDP growth before and after the Asian financial crisis. Here, we use per capita GDP growth to represent living standard. The table shows that average GFCFs during 1998–2013 for all countries were lower than those during 1981–1997. This lends support to the above accounting identity, which asserts that the current account surplus is associated with lower domestic investment. Average per capita GDP growth rates (except in the Philippines) during 1998–2013 were less than those during 1981–1997, which is also consistent with the view that domestic investment is positively associated with the standard of living.

TABLE1. GFCF AND PER CAPITA GDP GROWTH: 1981–2013

Country	1981–1997		1998–2013	
	Average GFCF (% of GDP)	Average of per capita GDP growth	Average GFCF (% of GDP)	Average of per capita GDP growth
Indonesia	29.95%	4.83%	25.73%	2.53%
Malaysia	33.17%	4.52%	23.57%	2.35%
Philippines	22.21%	-0.19%	20.21%	2.57%
Thailand	34.54%	5.94%	25.72%	2.55%

Source: World Development Indicators, 2014

The above analysis reveals that continuing the current account surplus is not good for the wellbeing of an economy; however, continuing the current account deficit is also not good for an economy. The current account deficit today shifts the burden of today's debt to the future generation. It also increases the stock of foreign-owned assets inside the home country. Any change in the investors' expectations about an economy's repayment capacity may lead to a sudden surge in capital flight, causing financial crisis. Therefore, continuing the current account surplus or deficit is not good for an economy. Whatever the balance, it should revert to the long-run equilibrium position, which is the notion of current account sustainability. Given the deficit and surplus current account balances of the countries under consideration, it is important to examine whether these countries can sustain these balances in the long run, as it will help establish public policy regarding each country's external competitiveness.

[1] These figures are calculated from data collected from World Development Indicators 2012 and 2014.

A BRIEF REVIEW OF PREVIOUS RESEARCH

Using a model of optimal borrowing and lending based on Friedman's permanent income hypothesis to calculate the optimal current account balance, Ostry (1997) first raised the question of whether the current account deficits in ASEAN countries were problematic. He found that optimal and actual current account balances are highly correlated. In three cases (Indonesia, Malaysia, and the Philippines), optimal and actual balances were identical. Based on this finding, he concluded that observed widening of the current account imbalance will not be a problem because it will be fully justified by economic fundamentals, as predicted by the model. Despite this prediction, current account reversals occurred in these countries. This may be due to the failure account for the net foreign asset (AFA). Benhima and Havrylchyk (2010) noted that when net foreign liabilities are above the equilibrium level, the current account deficit becomes unsustainable and reversal occurs. However, they also note that this result can predict current account reversals only in developing countries.

The speculative attacks on East Asian currencies in 1997 could have been avoided had they been predicted earlier through appropriate signal. Yan (1999) concluded that the nonstationarity of the intertemporal current account balance is an appropriate signal for currency crisis. Using rolling ADF, Yan found that the current account balance in Indonesia, Malaysia, the Philippines, Thailand, Singapore and Taiwan were nonstationary. This nonstationarity showed that '[…] a warning signal of the East Asian currency crises had been flashing for years before the crisis' (Yan, 1999, p. 284–285). This finding implies that a sustainable current account is warranted not only for ensuring external solvency, but also to predict the speculative attacks on currency that can trigger currency crises.

Since the current account reversals in Asian countries after the crisis, a number of studies have attempted to identify whether the current account balances are sustainable. The majority of those studies either examined the mean-reversion property of the current account balance or examined the long-run cointegrating relationship between exports and imports on the basis of individual countries. For example, Tang (2003) tested the cointegrating relationship between exports and imports in five ASEAN countries, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Using Pesaran's (2001) bounds-tests approach, Tang found that over the period 1970–1998, only the real exports and imports of Malaysia and Singapore were cointegrated, whereas no such evidence was found for the other countries. Accordingly, Tang (2003) concluded that any macroeconomic policies to improve the current account balances of Indonesia, the Philippines, and Thailand are unlikely to work. Baharumshah *et al's* (2003) study was an econometric improvement over the previous studies because it employed unit root and cointegration tests, thereby allowing for a structural break, which was not addressed in previous studies. Their study period spans 1961–1999 and covers four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand). Their findings suggest that only Malaysia's current account deficit was sustainable during the post-crisis period (1961–1997), whereas the current account deficits of the remaining three countries were unsustainable. Their post-crisis findings are the reverse of the pre-crisis findings; that is, except for Malaysia, the countries' current account balances are sustainable. However, findings on the post-crisis period should be taken with caution, as the period covered for post-crisis analysis was not large enough.

To overcome the low power problem associated with univariate unit root tests, Lau *et al* (2006) employed a panel-based unit root test to examine the sustainability of the current account surplus in five crisis-affected Asian countries, namely, Indonesia, Korea, Malaysia, the Philippines and Thailand. They used quarterly data from the period 1976:Q1–2001:Q4. They also split the whole sample into pre-crisis (1976:Q1–1996:Q4) and post-crisis (1997:Q1–2001:Q4) periods. Their univariate unit root tests (ADF, DFGLS, and KPSS) showed that irrespective of the sample period used, the current account balances in these countries are nonstationary. However, with panel unit root tests (IPS), they had opposite results. The panel results (the whole sample and the two sub-samples) showed that the current account balances in five Asian countries are stationary (sustainable). The differences in results are ascribed to the low power of univariate unit root tests.

Kim *et al* (2009) argued that the sustainability of the current account depends not only on the definition of sustainability, but also on the econometric procedure employed. They used a non-linear unit root test proposed by Park and Shintani (2005) over the period 1981:Q1–2003:Q4 and found evidence of non-linear mean reversion in the current account balances of five crisis-hit countries, namely, Indonesia, Korea, Malaysia, the Philippines, and Thailand. This finding disproves the argument of traditional univariate unit root tests, which states that the current accounts in Asian countries were unsustainable and thereby caused financial crisis.

Very recently, Kalyoncu and Kaplan (2014) looked at the sustainability of the current accounts of five ASEAN countries for the period 1980–2008. Using panel cointegration, dynamic OLS, and fully modified OLS, they

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concluded that the current account balances in Indonesia, Malaysia, the Philippines, Singapore, and Thailand are sustainable. However, the major drawback of this study is its outdated data and econometric method. This paper used data up to 2008, so it failed to accommodate developments in the global economy over the last five years. The paper also used Pedroni's (1999) panel cointegration; however, there are more recent methods of panel cointegration, such as Westerlund's (2007), which, in addition to cointegration, also provide error correction terms to quantify the speed of adjustment.

The foregoing review of previous studies on the current account sustainability in crisis-hit Asian countries reveals two important points. First, the studies have diverse findings and used varied econometric methods. Second, none of the studies employ a panel error correction approach to capture both the short- and long-run dynamics of cointegrating relation. The present study is an attempt to resolve the first issue by employing a panel error correction approach.

ANALYTICAL FRAMEWORK

In this paper, a simple analytical framework proposed by Husted (1992), which involves estimating the cointegrating relation between a country's exports and imports as evidence of its current account sustainability, is used. The framework starts with the assumption of a representative consumer living in an open economy that produces and exports single composite goods without any government involvement, and who can borrow and lend in the international financial market at a given world interest rate and can maximize lifetime utility subject to budget constraints. The current period budget constraint of this individual is given by

$$C_0 = Y_0 + B_0 - I_0 - (1 + r_0)B_{-1} \qquad (1)$$

where C_0, Y_0, I_0, r_0, and B_0 are current consumption, output, investment, one period world interest rate, and international borrowing, respectively. The world interest rate is assumed stationary with unconditional mean r, and $(1 + r_0)B_{-1}$ is the size of initial debt. Since equation (1) must hold every period, intertemporal budget constraint can be derived by iterating (1) forward as

$$B_o = \sum_{t=1}^{\infty} \gamma_t (X_t - M_t) + \lim_{n\to\infty} \gamma_n B_n \qquad (2)$$

where $X_t - M_t$ ($= Y_t - C_t - I_t$) is the trade balance in period t, and γ_t is the discount factor defined as $\prod_{x=0}^{t} \lambda_x$,

and λ is defined as $\lambda_0 = \frac{1}{(1 + r_0)}$. Equation (2) states that the amount a country borrows (or lends) in the international market is equal to the discounted present value of future trade surpluses (deficits), provided that the last term equals zero. If it is not zero, then the country is involved in making bubble financing or Pareto-inferior decisions. Thus, the crucial part of the equation is to test whether $\lim \gamma_n B_n = 0$. To derive a testable empirical model, Husted (1992) expressed equation (1) as

$$Z_t + (1 + r)B_{t-1} = X_t + B_t \qquad (3)$$

where $Z_t = M_t + (r_t - r)B_{t-1}$ denotes the sum of imports and additional interest payment on international debt, which depends on whether the world rate is below or above its long-run mean value. Following Hakkio and Rush (1991), Husted solves equation (3) forward and obtains

$$M_t + r_t B_{t-1} = X_t + \sum_{j=0}^{\infty} \lambda^{j-1} (\Delta X_{t+j} - \Delta Z_{t+j}) + \lim_{j\to\infty} \lambda^{t+j} B_{t+j} \qquad (4)$$

where $M_t + r_t B_{t-1}$ represents import plus interest on net foreign debt. Husted further assumes that X_t and Z_t are random walk with drift and can be expressed as

$$X_t = \phi_1 + X_{t-1} + \varepsilon_{1t} \qquad (5)$$

and

$$Z_t = \phi_2 + Z_{t-1} + \varepsilon_{2t}\,. \qquad (6)$$

Then, substituting (5) and (6) into (4) and rearranging it shows

$$X_t = \alpha + MM_t - \lim_{j\to\infty} \lambda^{t=j} B_{t+j} + \mu_t \qquad (7)$$

where $MM_t = M_t + r_t B_{t-1}$; $\alpha = [(1+r^2)/r](\phi_2 - \phi_1)$ and $\mu_t = \sum \lambda^{j-1}(\varepsilon_{2t} - \varepsilon_{1t})$. Finally, Husted assumes that the limit term in equation (7) is zero and expresses the equation in standard regression form as

$$X_t = \alpha + \beta MM_t + \mu_t . \quad (8)$$

In equation (8) if X_t and MM_t are cointegrated with the long-run coefficient, $\beta \leq 1$ is necessary, and sufficient conditions for sustainability may be weaker (Holms, 2006). In case $\beta < 1$, the current account is nonstationary and can grow without limit. Therefore, a sufficient condition for the current account sustainability should be cointegrated X_t and MM_t (hereafter, exports and imports will be used to denote X_t and MM_t respectively) and long-run coefficient in equation (8) $\beta = 1$.

ESTIMATION METHODS AND DATA

The empirical estimation procedures are implemented in two step. First, the stationarity of the underlying data are examined, and second, the long-run relationship between the variables is examined with a relatively new cointegration test.

Before estimating the regression, careful attention is given to identify all possible time series properties of the dataset. First, we examine whether there is any cross-sectional dependence in the dataset. It is possible that a common shock affects all the cross-section units in the sample. Presence of cross-sectional dependence reduces the reliability of panel unit root tests. The general diagnostic test for cross-sectional dependence in panels proposed by Pesaran (2004) is applied. The value of the test statistic is 3.88 with a *p*-value of 0.0001, which indicates that the null of cross-sectional independence is rejected.

Once the cross-sectional dependence is confirmed, the analysis proceeds to check the stationarity properties of the variables. Several methods have been proposed to test stationarity in panel data. Three methods are most widely used: Im, Pesaran, and Shin (2003) (hereafter IPS), Levin, Lin, and Chu (2002) (hereafter LLC), and Maddala and Wu (1999) (hereafter MW). However, both IPS and LLC require cross-sectional independence. The MW test is more robust than the LLC and IPS tests to the violation of this assumption. However, the MW test is not designed to directly address this problem. Pesaran (2007) proposed a new panel unit root test that allows the presence of cross-section dependence. We employed both MW and Pesaran (2007) tests.
Cointegration test: This paper uses a relatively new cointegration test proposed by Westerlund (2007). Unlike residual-based cointegration tests, this test is free from common factor restriction. Common factor restriction is the requirement that the long-run cointegrating vector for the variables in their levels is equal to the short-run adjustment process for the variables in their first differences (Kremers *et al*, 1992). This common factor restriction is forwarded as a plausible explanation for the failure of the null hypotheses in many studies, such as Ho (2002), when cointegration is strongly suggested in theory. Another advantage of this new cointegration test is that it handles the problem of cross-sectional dependence by bootstrapping the critical values of the test statistics.

In this new cointegration test, four test statistics are proposed: two are designed to test the alternative that the panel is cointegrated as a whole, whereas the other two are designed to test the alternative that variables in at least one cross-section unit are cointegrated. The former two statistics are referred to as *group statistics*, whereas the latter two are called *panel statistics.* The data-generating process in this test is assumed as

$$y_{it} = \phi_{1i} + \phi_{2i} t + z_{it} \quad (9)$$

$$x_{it} = x_{it-1} + v_{it} \quad (10)$$

where *t* and *i* represent time and space dimensions of data, respectively. In this formulation, the vector x_{it} is modeled as a pure random walk, and y_{it} is modeled as the sum of the deterministic term $\phi_{1i} + \phi_{2i} t$ and a stochastic term z_{it}. This term is modeled as

$$\alpha_i(L)\Delta z_{it} = \alpha_i(z_{it-1} - \beta_i' x_{it-1}) + \gamma_i(L)' v_{it} + e_{it} \quad (11)$$

where

$$\alpha_i(L) = 1 - \sum_{j=1}^{p_i} \alpha_{ij} L^j \text{ and } \gamma_i(L) = \sum_{j=0}^{p_i} \gamma_{ij} L^j .$$

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Now, substituting equation (9) into equation (11) gives the error correction model for y_{it} as

$$\alpha_i(L)\Delta y_{it} = \delta_{1i} + \delta_{2i}t + \alpha_i(y_{it-1} - \beta_i' x_{it-1}) + \gamma_i(L)' v_{it} + e_{it} \qquad (12)$$

where

$$\delta_{1i} = \alpha_i(1)\phi_{2i} - \alpha_i\phi_{1i} + \alpha_i\phi_{2i} \text{ and } \delta_{2i} = -\alpha_i\phi_{2i}.$$

In equation (12), the vector β_i defines a long-run equilibrium or cointegrating relationship between *x* and *y*. However, in the short run, there might be disequilibrium, which is corrected by a proportion $-2 < \alpha_i \le 0$ in each period. Here, α_i is called the error correction parameter. If $\alpha_i < 0$, there is error correction and the variables are cointegrated; if $\alpha_i = 0$, there is no error correction and the variables are not cointegrated. The test statistics are given by the following[2]:

Group test statistics

$$G_\tau = \frac{1}{N}\sum_{i=1}^{N}\frac{\hat{\alpha}_i}{SE(\hat{\alpha}_i)} \qquad (10.a)$$

$$G_\alpha = \frac{1}{N}\sum_{i=1}^{N}\frac{T\hat{\alpha}_i}{\hat{\alpha}_i(1)} \qquad (10.b)$$

Panel statistics

$$P_\tau = \frac{\hat{\alpha}}{SE(\hat{\alpha})} \qquad (11.a)$$

$$P_\alpha = T\hat{\alpha} \qquad (11.b)$$

Description of data: Annual data from the period 1970–2013 are used for four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand). The sample selection is dictated by the availability of data. All data are sourced from *World Development Indicator 2012 & 2014* (World Bank). Exports, imports, and GDP data are in current US dollars. The interest payment on long-term external borrowing (also in current US dollars) is used as a proxy for interest on net foreign debt. Export is expressed as a percentage of GDP. Similarly, the sum of import and interest payments on long-term external borrowing is expressed as a percentage of GDP to represent the MM_t term in equation (8).

ESTIMATION RESULTS AND ANALYSES

We start with testing time series properties of the underlying data. Both the MU (1999) and Pesaran (2007) tests are performed, and the results are reported in Table 2. Unit root regressions are run with and without trend. For comparison, Tables 3 and 4 report summaries of the panel unit root tests that are common in the literature.

TABLE2. PANEL UNIT ROOT TEST

	With trend				Without trend			
	X	ΔX	MM	ΔMM	X	ΔX	MM	ΔMM
Pesaran (2007)	-0.537	-7.064*	-0.890	-7.375*	-0.798	-6.991*	-0.1.117	-7.876*
Maddala and Wu (1999)	4.244	62.504*	4.806	82.131*	7.408	76.423*	7.205	94.343*

Note: * indicates significance at the 1% level.

[2] For derivation of these statistics, please see Westerlund (2007).

TABLE3. SUMMARY OF ADDITIONAL UNIT ROOT TESTS FOR EXPORTS

	X		ΔX	
Method	Statistic	*p*-values	Statistic	*p*-values
Null: Unit root (assumes common unit root process)				
Levin, Lin, and Chu *t*	0.66517	0.7470	-8.37510	0.0000
Breitung *t*-stat	0.47748	0.6835	-7.38491	0.0000
Null: Unit root (assumes individual unit root process)				
Im, Pesaran, and Shin W-stat	0.14706	0.5585	-10.6674	0.0000
ADF—Fisher Chi-square	7.94585	0.4388	95.5323	0.0000
PP—Fisher Chi-square	7.21037	0.5141	99.2465	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution; all other tests assume asymptotic normality.

TABLE4. SUMMARY OF ADDITIONAL UNIT ROOT TESTS FOR EXPORT IMPORTS

	MM		ΔMM	
Method	Statistic	Prob.**	Statistic	Prob.**
Null: Unit root (assumes common unit root process)				
Levin, Lin, and Chu *t*	0.96111	0.8318	-9.50746	0.0000
Breitung *t*-stat	1.07739	0.8593	-5.75974	0.0000
Null: Unit root (assumes individual unit root process)				
Im, Pesaran, and Shin W-stat	0.15090	0.5600	-10.3115	0.0000
ADF—Fisher Chi-square	12.7627	0.1203	88.2587	0.0000
PP—Fisher Chi-square	12.8729	0.1163	129.394	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution; all other tests assume asymptotic normality.

Results in these three tables indicate that at the null levels, the unit root cannot be rejected at any acceptance significance level. However, when variables are tested with their first-difference series, the null of the unit root is rejected at a very high significant level. These results confirm that the variables are I(1) processes.

As the variables are first-difference stationary, we next examine the long-run cointegrating relation between exports and imports using Westerlund's approach (2007). Table 4 reports the cointegration test results. Following Westerlund (2007), the lag length in the cointegration test is chosen according to $2(T/100)^{2/9}$, which gives a lag length of two. Column 2 of Table 5 reports test statistics, and column 4 reports their respective *p*-values. The *p*-values of both the group and panel statistics indicate that the null hypotheses of no error correction are rejected at very high significance levels. This implies that there is a long-run equilibrium relationship between the log of real broad money and the population growth rate.

TABLE5. WESTERLUND (2007) COINTEGRATION TEST RESULTS

Test statistics (1)	Value (2)	*Z*-value (3)	*p*-value (4)	Bootstrapped *p*-values (500) (5)
G_τ	-2.504	-2.936	0.002	0.004
G_α	-12.092	-3.645	0.000	0.010
P_τ	-5.222	-3.599	0.000	0.006
P_α	-10.413	-6.484	0.000	0.006

A major problem often encountered in panel data structure is cross-sectional dependence of the error terms caused by common shocks to all cross-section units in the panel. To remove the cross-sectional dependence, Westerlund (2007) proposed bootstrapped *p*-values, which are reported in column (5) of Table 4. With 500 replications, the *p*-values strongly reject the null of no error correction. Therefore, the *p*-values both with and without bootstrapping provide sound evidence for the cointegrating relationship between exports and imports in the sample countries.

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When the no error correction hypothesis is rejected, it is of practical importance to see the speed of adjustment in the short run. This can be done by calculating the error correction parameter α_i. The estimated value of this error correction parameter is found by equation (6b). From Table 4, the value of P_α is -10.413, and the time period T is 41; therefore, the value of α is $\hat{\alpha} = \frac{P_\alpha}{T} = \frac{-10.413}{41} = -0.2540$, that is, the speed of adjustment of short-term departure towards the long-run equilibrium, is 0.2540 per year.

This means that 25.40% of the deviation of the long-run relation between exports and imports is eliminated each year (i.e., it takes less than four years to restore the equilibrium relation). This adjustment period is a bit higher than the half-life adjustment of 6.3177 quarters found in Lao *et al* (2006). This may be due to the quarterly data used in Lao *et al* (2006) as opposed to the annual data used in this study. It may also be due to the different econometric methods used in these two studies.

The cointegrating relations between the export and import current account balances in ASEAN-4 countries are sustainable in the long run. This is the notion of sustainability as outlined in Husted (1992). However, following Quintos (1995), two forms of sustainability can be identified. The current account is strongly sustainable if X_t and MM_t in equation (8) are cointegrated, and $\beta = 1$. The current account is weakly sustainable if either $0 < \beta < 1$ and X_t and MM_t are cointegrated, or $\beta = 1$, but X_t and MM_t are not cointegrated. Cointegration between X_t and MM_t are already established. Therefore, we proceed to examine the value of the long-run coefficient β. To estimate the value of β, the panel dynamic OLS (DOLS) is used and the results are reported in Table 4.

The cross-sectional dependence found in the dataset indicates that any external shock will cause the exports and imports to correlate across countries. Common time dummies are intended to account for this type of dependency (Pedroni, 2001). Accordingly, panel DOLS were estimated with and without common time dummies, and the results are reported in Table 6. The results show that in both cases (with and without common time dummies) the long-run coefficients are one and are highly significant, as indicated by high *t*-statistics. Our result lend support to Kalyoncu and Kaplan (2014), who also found evidence for the current account sustainability in five ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, and Thailand).

TABLE6. PANEL DYNAMIC OLS ESTIMATION OF β

	Coefficient	*t*-statistic
Common time dummies not included	1.0612	31.4250
Common time dummies included	1.0808	17.8924

Panel cointegration and DOLS results indicate that the conditions for strong sustainability are met; that is, exports and imports are cointegrated and the long-run cointegrating coefficient is one.

CONCLUSION AND POLICY IMPLICATIONS

This paper employs a panel error correction method to examine the long-run relationships between exports and imports in four crisis-hit ASEAN countries, namely Indonesia, Malaysia, the Philippines, and Thailand. Empirical findings of the paper indicate that exports and imports are cointegrated in the long run and that the long-run coefficient is one, which implies, according to Quintos (1995), strong sustainability of the current account balance in these four countries. This finding supports that the current account balance reflects the optimal decisions of the borrowers and lenders; therefore, policy intervention to correct the balance is unwarranted and could reduce welfare (Belkar *et al*, 2007). Any policy intervention to correct the current account balance in the short run may cause dynamic inconsistency problems. This finding also invalidates the claim that the current account deficit was the leading cause of the Asian currency crisis in 1997. To avoid future crises, policymakers should not be concerned about the current account balance, but should pay direct attention to other issues, such as supporting long-term capital flows and liberalizing short-term capital movements, as suggested by Kim *et al* (2009).

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Appendix - A

TABLEA1. CURRENT ACCOUNT BALANCE (% GDP)

Year	Indonesia	Malaysia	Philippines	Thailand
1990	-2.61	-1.97	-6.08	-8.53
1991	-3.32	-8.51	-2.27	-7.70
1992	-1.99	-3.66	-1.88	-5.65
1993	-1.33	-4.47	-5.54	-5.08
1994	-1.57	-6.06	-4.60	-5.58
1995	-3.18	-9.73	-2.67	-8.08
1996	-3.37	-4.42	-4.77	-8.07
1997	-2.26	-5.92	-5.28	-2.00
1998	4.29	13.20	2.14	12.73
1999	4.13	15.92	-3.46	10.13
2000	4.84	9.04	-2.74	7.58
2001	4.30	7.85	-2.29	4.41
2002	3.99	7.12	-0.34	3.66
2003	3.45	12.14	0.33	3.34
2004	0.60	12.08	1.77	1.71
2005	0.09	14.48	1.92	-4.33
2006	2.97	16.73	4.37	1.11
2007	2.42	15.93	4.76	6.34
2008	0.02	17.47	2.08	0.81
2009	1.96	16.48	5.55	8.30
2010	0.72	11.47	4.47	4.10

Source: World Development Indicator, 2012, The World Bank.

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Figure-A1: Current account balance (% of GDP) in four ASEAN countries: 1980 – 2013

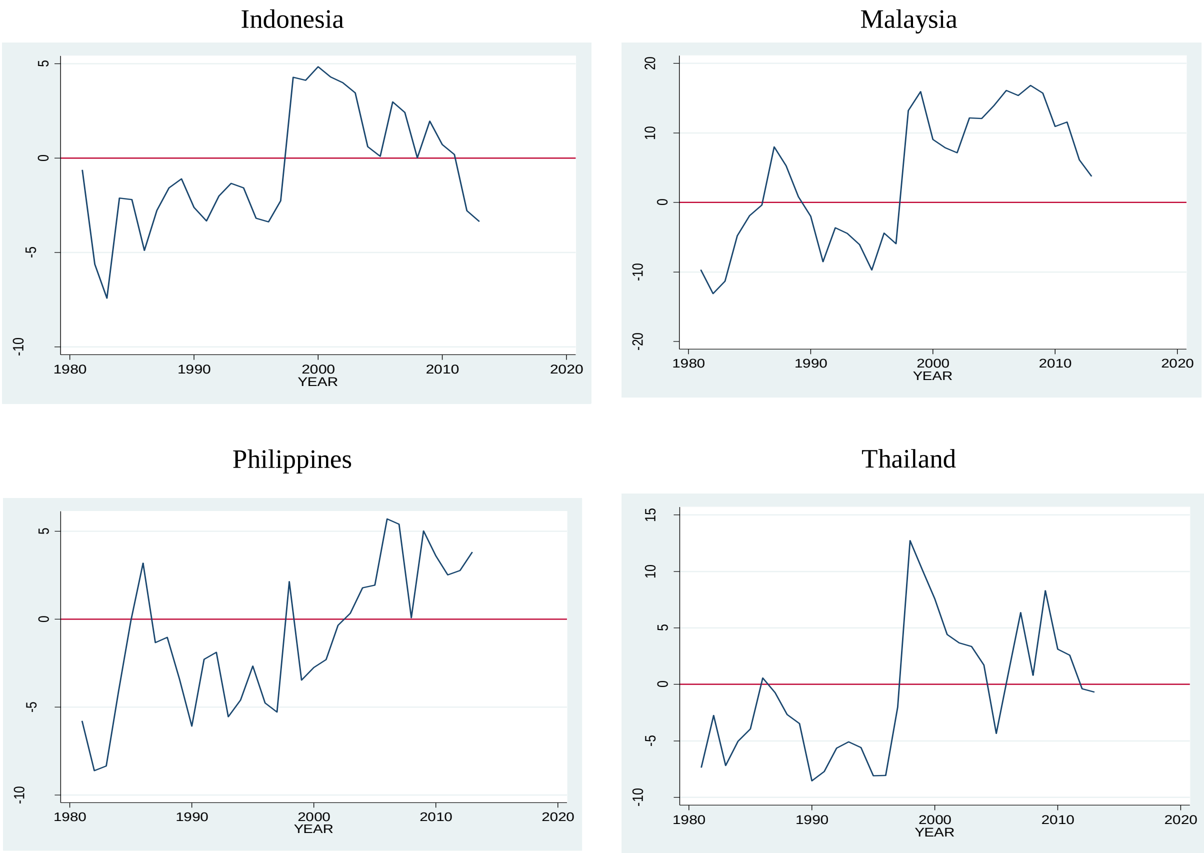

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Figure A2: Exports (X) and imports (MM) as % of GDP in four ASEAN countries: 1970 – 2013.