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Are trade deficits sustainable? Evidence from the ASEAN-five

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Abstract

Purpose – The purpose of this paper is to examine the long-run sustainability of trade deficits for the ASEAN-five economies, viz., Indonesia, Malaysia, the Philippines, Myanmar and Thailand, in the presence of structural breaks.

Design/methodology/approach – It utilizes the Saikkonen and Lütkepohl cointegration procedure, allowing for structural breaks in the series. To determine endogenous structural breaks, the Lanne *et al.* unit root test is applied.

Findings – The study confirms a long run relation between exports and imports for Indonesia, Myanmar and Thailand; and finds sustainable long-run trade deficit only for Myanmar.

Research limitations/implications – The results suggest that macroeconomic policies in Myanmar have been sustainable and effective in leading exports and imports to the long-run steady state equilibrium. However, the paper did not find cointegration between exports and imports for Malaysia and the Philippines. This result suggests that macroeconomic policies have failed to establish; a long-run equilibrium; and sustainable external (import and export) balance. For Indonesia and Thailand while the macroeconomic policies may give the appearance of being effective in establishing a long-run equilibrium, the relation may not be sustainable, however.

Originality/value – The paper finds that despite the presence of structural breaks, Myanmar represents the only economy among the ASEAN-five that is on a long-run sustainable trade deficit. To the author's knowledge this the only work that examines sustainability of trade deficits using time series techniques that incorporates structural breaks in the context of ASEAN-five with implication for trade openness policy. From that perspective the work can be seen as an original contribution to the literature.

Keywords Exports, Imports, Endogenous structural breaks, ASEAN-five, Trade, Indonesia, Malaysia, Philippines, Myanmar, Thailand

Paper type Research paper

1. Introduction

Conceptually trade balance, defined as the net merchandise exports, is a major component of the current account balance[1]. The sustainability of trade balance (i.e. follows mean-reverting process) is important from policy perspective and lies at the core of open macroeconomics[2]. For example, (a) if trade balance is sustainable, predictions based on past behavior will be reliable. On the contrary, unsustainable trade balance (follows random walk process) implies that a shock/innovation to trade balance would have a permanent effect. Consequently, predictions based on past behavior will be unreliable. (b) As Lau *et al.* (2006, p. 91) documented, "because trade balance determines advancement over time of anation's stock of net liabilities to (or claims on) the rest of the world, it reflects the intertemporal path of domestic and foreign resident debts in an open economy".

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A stationary current account balance is compatible with sustainable imbalances between country's in-house savings and investments and the accumulated debt to be serviced, in line with the theoretical fundamentals of the intertemporal solvency approach of Husted (1992) and Fountas and Wu (1999). Some argue that the accumulation and sustainability of external debt and exchange rate realignment can be predicted by analyzing the behavior of current account. Bohn (2007) points out that stationary current account balance is sufficient but not necessary condition for the sustainability of external debts. Thus, knowledge of time series properties of current account balance and a long-run relationship between imports and exports can be useful for policymaking. Further, since trade balance tends to be sensitive to changes in exchange rate; and the latter policy is affected by other macroeconomic policies such as, fiscal or monetary, it is difficult to evaluate the effects of one policy without controlling for the others. The overall effects of policies on trade balance tend to vex academicians. However, Bahmani-Oskooee and Rhee (1997) points out that a few studies proposed that a long-term relationship between exports and imports may help craft macroeconomic policies to correct trade imbalances. Irandoust and Ericsson (2004), Herzer and Nowak-Lehmann (2006) and Erbaykal and Karaca (2008) argue that cointegration between exports and imports may indicate that a country is not in violation of her international budget constraints (IBC); and that trade imbalances are only short-run divergences and sustainable in the long-run. Further, cointegration between exports and imports implies that:

- The country under study is in long-run equilibrium, where trade deficits are transitory phenomena and are offset by future surpluses.
- The forces of macroeconomic policies (fiscal, monetary and commercial) restore long-run equilibrium by bringing exports and imports together.
- The domestic economy is not going through permanent shocks, originating in technology, productivity or major policy changes.

Absence of cointegration of exports and imports implies that the economy is not well managed, perhaps due to "poor policy", and thus serious problems. Non-cointegration may be due to technological, productivity or policy shocks (Irandoust and Ericsson, 2004). Evidence of cointegration in the presence of endogenous structural breaks (those arises due to technological, productivity or policy shocks) implies that the policies are effective and that the economy can adjust to the shocks and thus function well.

The objective of this is to explore cointegration between exports and imports for the ASEAN-five economies in the presence of endogenous structural breaks and also to evaluate sustainability of trade deficits in these economies. The study utilizes Lanne *et al.* (2002) unit root test to endogenously determine structural break; and Saikkonen and Lütkepohl (2000a, b, c) cointegration test, for exogenous determination of structural break, if any. The study uses annual data for export and import (expressed as percentage of GDP), taken from the official web site of World Bank. Study period for Indonesia, Philippines and Thailand is 1960-2008 and for Malaysia and Myanmar it is 1960-2007 and 1960-2004, respectively. The paper contributes to the existing literature in three distinct ways. First, the unit root and cointegration tests can accommodate structural breaks in the series relating to the ASEAN-five countries. Second, study provides evidence of cointegration between exports and imports for the Indonesia, Myanmar and Thailand and absence there to for Malaysia and the Philippines. Third, the study demonstrates that budget constraint is obeyed only by Myanmar.

Rest of the paper is organized as follows. Section 2 provides a brief overview of the trends in trade balance in ASEAN-five countries. Section 3 reviews the literature. Section 4 describes the data sources and methodology used; Section 5 reports the results. Finally, Section 6, concludes with a discussion on policy implications arising out the findings.

2. A brief overview of the trends in trade balance in ASEAN-five

This study focuses on the ASEAN-five countries namely Indonesia, Malaysia, the Philippines, Myanmar and Thailand. Table I presents trend of trade balance for the ASEAN-five economies.

Indonesia

Indonesia ran merchandise trade surpluses from 1960-1965 (except 1961), 1972-1994 (except 1983 and 1986), and 1998-2008, and had deficits during the periods: 1966-1971 and 1995-1997.

Malaysia

The Malaysia experienced trade surpluses before 1980; except 1972 when it was deficits. During 1981-1983 Malaysia ran trade deficits; which was repeated during 1991-1995 (except 1992). Thereafter, trade surplus saw huge surplus.

Myanmar

Myanmar faced trade deficits during the study period 1960-2004, except 1962, 1963, 1966, and 2002-2004, at which time it was in surplus albeit a small one.

Philippines

Similar to Myanmar, Philippines has had trade deficits from 1960 to 2008, but had trade surplus during 1960, 1963, 1965, 1966, 1970-1973, 1985-1988, 1999-2000 and 2007.

Thailand

Thailand's trade balance of has been persistently negative during 1960-1985 (except 1961). The next two years (i.e. 1986 and 1987) balance was positive which again turned negative during 1988-1996. The balance was in surplus during 1997-2008 (except 2005).

3. Literature review

One of the pioneering works in this area is Husted (1992). Using quarterly US trade data (1967-1989, he showed that exports and imports are cointegrated. Husted (1992)[3] argues that the existence of cointegration between exports and imports implies that countries do not violate their IBC. The finding lends support to the effectiveness of macroeconomic policies in restoring long-run equilibrium. Using quarterly Korean data on exports and imports Bahmani-Oskooee and Rhee (1997) found cointegration with positive coefficient on exports.

Fountas and Wu (1999) did not find cointegration between US exports and imports during 1967-1994; and observed that current account deficit is not sustainable. Arize (2002) used quarterly data from 1973 to 1998 from 50 OCED and developing countries to examine the relation. He found cointegration for 35 out of 50 countries; and for 31 of 35 countries, the export coefficient was positive. Narayan and Narayan (2005) applied the bounds testing

Year	Indonesia	Malaysia	Myanmar	Philippines	Thailand
1960	3.150791	12.15516	−0.99655	0.472197	−1.3294
1961	−2.19218	5.211609	−1.0899	−1.43247	0.310055
1962	0.702896	2.397495	1.500097	−2.28697	−1.97134
1963	1.305887	1.65741	0.6154	1.663414	−3.16896
1964	1.378305	1.648914	−2.25895	−0.30621	−1.44164
1965	0.103917	4.211941	−5.8893	0.424459	−1.17012
1966	−7.5186	3.879403	0.093184	2.146475	−0.35025
1967	−6.74842	2.289602	−1.80554	−0.64004	−1.99028
1968	−3.33491	3.24722	−2.58002	−2.58756	−3.69546
1969	−4.54821	9.265135	−2.02723	−3.04882	−3.84632
1970	−1.51902	4.09684	−3.52826	0.531565	−4.40977
1971	−1.02514	1.401418	−2.56779	0.039876	−2.86832
1972	1.380824	−1.22518	−2.38581	0.211156	−0.99941
1973	2.409145	5.364784	−0.20452	4.877941	−1.44079
1974	9.333755	0.281436	−1.98977	−2.3315	−2.3639
1975	2.985416	0.481588	−1.17562	−6.09171	−4.61586
1976	3.005904	9.918516	−1.26153	−5.92166	−2.48196
1977	5.64977	7.141324	−4.2778	−3.06701	−5.42751
1978	3.206677	5.44289	−7.21698	−4.26968	−4.21958
1979	8.008661	8.700967	−4.83401	−5.0759	−6.70961
1980	13.96862	2.416793	−3.84367	−4.89848	−6.25617
1981	5.017475	−6.1435	−6.28732	−3.33776	−6.2739
1982	1.245446	−8.63771	−8.72444	−5.80149	−1.71251
1983	−1.51785	−5.68093	−3.66096	−6.74141	−7.16208
1984	3.509259	1.833809	−3.5599	−1.04904	−4.2665
1985	1.751398	5.012063	−3.99364	2.122112	−2.72797
1986	−0.99939	5.960494	−2.56997	3.953771	2.03274
1987	1.536811	13.8694	−3.50956	0.42079	0.560038
1988	2.685789	10.20678	−1.72475	1.453736	−1.38953
1989	2.879691	6.064632	−0.2254	−2.15648	−2.56388
1990	1.595133	2.119562	−1.69157	−5.76781	−7.51851
1991	1.695133	−3.66037	−1.29056	−2.99044	−6.54251
1992	2.933125	1.356495	−0.71184	−4.89842	−4.0097
1993	2.986238	−0.09989	−1.02561	−8.44725	−4.23907
1994	1.145754	−1.6034	−0.61913	−6.30817	−4.84317
1995	−1.33426	−3.93488	−0.8713	−7.82397	−6.74166
1996	−0.61564	1.385317	−0.79434	−8.78664	−6.27459
1997	−0.27537	0.913782	−0.70736	−10.3374	1.415628
1998	9.750076	21.99525	−0.63009	−6.63253	15.88792
1999	8.084344	25.05187	−0.42103	0.159293	12.57171
2000	10.51772	19.21263	−0.09531	1.903553	8.633073
2001	8.271061	17.44034	−0.05715	−3.14343	6.490307
2002	6.295779	17.25437	0.089685	−0.48316	6.691742
2003	7.338817	19.69176	0.009343	−5.9389	6.781698
2004	4.672094	20.37241	0.059016	−3.65475	4.856461
2005	4.146599	22.83093	Na	−4.1606	−1.11931
2006	5.412306	22.2452	Na	−0.70138	3.487635
2007	4.043795	20.26063	Na	0.246759	7.664104
2008	1.138515	Na	Na	−1.83563	2.773771

Note: All figures are in (nominal) million US dollar and measured as percentage of GDP
Source: World Bank and complied by author

Table I.
Trade balance trends in ASEAN-five (1960-2008)

approach to cointegration to investigate a long-run relationship between exports and imports for 22 least developed countries (LDCs). They found that exports and imports were cointegrated only for six out of 22 countries, with a coefficient of exports were less than one. In examining sustainability of current account deficit of 11 OECD countries from 1980 to 2002, Holmes (2006) found that six of 11 countries (Australia, Belgium, Canada, Japan, the UK and the USA) exhibited sustainability in current account, while France, Germany, Italy, Norway and Spain did not. Upender (2007) had shown that India's nominal exports and imports were cointegrated by employing data for the period 1949-1950 to 2004-2005. Herzer and Nowak-Lehmann (2006) and Erbaykal and Karaca (2008) have shown the existence of a cointegrated relationship between exports and imports suggests that trade deficits are only short-run phenomenon therefore, sustainable in the long-term. Konya and Singh (2008) employed one-time structural break to 1992-1993 to India's exports and imports series from 1949-1950 to 2004-2005, but did not find evidence of cointegration. The structural break in 1992-1993 was exogenously determined assuming that the switch from a fixed to floating exchange rate regime in March 1993 would have some impact. Tiwari (2011) examined the long-run relationship between exports and imports for China and India using monthly data from January 1992 to February 2010. He applied the endogenously determined structural breaks method to unit root and cointegration and found that trade deficit was sustainable in India but not in China. Tiwari and Pandey (2011) examined Indian data from April 1984 to March 2009 and found long-run relationship between exports and imports in all the cases in all the cases (i.e. by using different dates of structural breaks). In another study, Tiwari (2012) was the first to use disaggregated Indian data at the level from 1970 to 2007 and allowed for endogenous determination of structural breaks in the unit root and exogenous structural breaks for cointegration. Specifically, he tested long-run sustainability in the current account deficit in India using oil and non-oil exports and imports. He found strong evidence of long-run relationship between non-oil exports and imports, but not for oil exports and imports. He also found long-run non-sustainability of trade deficits for oil; and long-run sustainability of trade deficits for the non-oil commodities.

4. Data sources variables and estimation methodology

4.1 Data source and variables description

The data used are of annual frequency[4] in million nominal US dollars. Exports and imports are taken as percentage of gross domestic product, taken from the official web site of World Bank. Study period for Indonesia, Philippines and Thailand is 1960-2008 and for Malaysia and Myanmar it is 1960-2007 and 1960-2004, respectively. All variables have been transformed into natural log to minimize fluctuations in the series.

4.2 Estimation methodology

Given the length of the study period and the major changes in the global landscape it is plausible that the events might have impacted trade relations causing potential structural break in the series. Ignoring such feature leads to falsely accepting the null of no cointegration (Herzer and Nowak-Lehmann, 2006). To insure reliability of the results the paper uses the Saikkonen and Lütkepohl (2002) and Lanne *et al.* (2002) procedures. The equation takes the following form:

$$y = \mu_0 + \mu_1 t + f_t(\theta)'\gamma + x_t \tag{1}$$

where, $f_t(\theta)'\gamma$ is a shift function and θ and γ are unknown parameters or parameter vectors and the errors x_t are generated by AR(p) process with possible unit root. We used a simple shift dummy variable with shift date T_B:

$$f_t^{(1)} = d_{1t} := \begin{cases} 0, & t < T_B \\ 1, & t \geq T_B \end{cases}$$

The function does not involve any extra parameter θ. In the shift term $f_t^{(1)}\gamma$, γ is a scalar. Differencing this shift function leads to an impulse dummy. Dates of structural breaks have been determined through Lanne *et al.* (2001) who recommend choosing a reasonably large order of AR in the first step[5] and then pick the break date that minimizes the generalized least square (GLS) objective function used to estimate the parameters of the deterministic part.

After confirming that all variables are I(1) in the presence of structural breaks, we proceed to test for cointegration. Perron (1989) argues that ignoring potential structural breaks can render not only the unit root tests invalid, but also the cointegration test. To avoid this, we applied the Saikkonen and Lütkepohl (2000a, b, c) test that considers the effects of potential structural breaks on cointegration. This test allows for a possible shift in the mean of the data-generating process (DGP). Several DGP's exhibit breaks caused by exogenous shocks over the observation period. In line with Saikkonen and Lütkepohl (2000a, b, c), we take into account the level shift in the series for correct inference about the cointegrating rank. The test incorporates the impact of structural breaks even in the context of multiple equation frameworks, unlike the residuals based Gregory and Hansen (1996) tests which considers structural break in a single equation framework.

According to Saikkonen and Lütkepohl (2000b) and Lütkepohl and Wolters (2003), let y_t be an observed $_n$-dimensional time series observed as $(t = 1, \ldots, T)$, i.e. $y_t = (y_{1t}, \ldots, y_{nT})$, and generated by the following process:

$$y_t = \mu_0 + \mu_1 t + \delta_1 DT_{ot} + \delta_2 DU_{1t} + x_t \tag{2}$$

where, DT_{ot} and DU_{1t} are impulse and shift dummies, respectively, which account for structural breaks. DT_{ot} (impulse dummy) takes value 1 when $(t = T_0)$, and zero otherwise. Step (shift) dummy, (DU_{1t}), takes value one for $(t > T_1)$, and zero otherwise. The parameters μ_0, μ_1, δ_1 and δ_2 are associated with the deterministic terms. The term x_t is an unobservable error process that is assumed to have a Vector Autoregressive of order p $(VAR(p))$ representation as follows:

$$x_t = A_i x_{t-1} + \cdots + A_p x_{t-p} + \varepsilon_t \tag{3}$$

where, ε_t is assumed to be a white noise process. Subtracting x_{t-1} from both sides of equation (3) and rearranging the terms, the usual error correction form of equation (3) is given by:

$$\Delta x_t = \Pi x_{t-1} + \sum_{j=1}^{p-1} \Gamma_j \Delta x_{t-j} + u_{\mathrm{t}} \tag{4}$$

This equation specifies the cointegration properties of the system; where, u is a vector white noise process; $x_t = y_t - D_t$ and D_t are the estimated deterministic trends

and other dummies; Δ is the first difference operator; Γ is the coefficient matrix. The rank r, of Π determines the number of cointegrating relationships. The rank of Π is the cointegrating rank of x_t and thus of y_t (Saikkonen and Lütkepohl, 2000b (SL)).

There are three possible specifications in the SL procedure, a constant, a linear trend term, or a linear trend orthogonal to the cointegrating relations. The critical values depend on the particular specifications adopted. The critical values remain valid even with dummy variables. The approach can be adapted with any number of (linearly independent) dummies in the model. It is also possible to exclude the trend term from the model; $\mu_1 = 0$ may be set a priori. The model selection criteria (SIC, AIC, or HQIC)[6] can be used to make decision on the VAR order. We implement the SL tests for the cointegration rank in the presence of structural breaks. Further, three important points must be kept in mind. First, the SL approach assumes that the break point is known a priori. We use the structural breaks dates from the unit root test to carry out cointegration. Second, there is no lag structure for the dummy series. So, dummy variable is included in the system, but not in the cointegration space. As such, the dummy result is not presented in the cointegration results. Following the SL procedure we consider the case of shift dummy and impulse dummy for different break dates when trend, intercept or orthogonal trend are included. In these cases the optimum number of lags have been determined by AIC and SIC. Finally, to test sustainability of current account, we employ the Husted (1992) model as follows:

$$EX_t = \beta_0 + \beta_1 IM_t + u_t \tag{5}$$

where, EX_t, IM_t and u_t are the exports and imports of goods and services, and the disturbance term, respectively. Under the null hypothesis, for an economy that satisfies IBC (i.e. a sustainable current account deficit) we expect $\beta_1 = 1$ and u_t is a stationary process. In other words, if exports and imports are I(1), under the null hypothesis, they are cointegrated with a cointegrating vector $(1, -1)$. However, the condition $\beta_1 = 1$ is not, strictly speaking, a necessary condition for the IBC to hold. Hakkio and Rush (1991) showed that if EX_t and IM_t are in levels, and not as percentage of GDP or in per capita terms, $0 < \beta_1 < 1$ is a sufficient condition for the IBC to be obeyed, implying current account sustainability. In the context of the study testing condition $\beta_1 = 1$ helps assess whether an economy satisfies its IBC.

5. Data analysis and results interpretation

The results of unit root, based on endogenous structural breaks are presented in Table II.

From the Table II we found that both exports and imports are stationary for Indonesia when endogenous structural breaks are incorporated by including shift dummy or impulse dummy. However, when a shift dummy was incorporated for structural break date of 1966, both variables turned to be non-stationary in levels. However, for other countries both variables are non-stationary at level, but first difference stationary. In examining the series in first difference, we adopted two procedures to check their stationarity. First, we determined the structural breaks for the first differenced series and then carried out unit root test again. Second, unit root test was conducted given the structural breaks dates were, determined in their levels[7]. In both cases the variables turned out stationary for all countries. This implies that both variables evolve as AR(1) process. This sets the stage for exploring cointegration subject to lag length selection.

Table II.
Saikkonen and Lütkepohl unit root analysis

Variables	Unit root test with endogenous structural break					
	Indonesia			*Malaysia*		
	Time trend (impulse dummy and used break date is 1965; 1965)	Time trend (shift dummy and used break date is 1965; 1966)	Saikkonen and Lütkepohl (k)	Time trend (impulse dummy and used break date is 1972; 1974)	Time trend (shift dummy and used break date is 1998; 1974)	Saikkonen and Lütkepohl (k)
Ln(Export)	Yes	–	−3.5322 (1)	–	–	−0.9989 (0)
Ln(Export)	–	Yes	−3.6660(1)	–	–	−1.0884 (0)
Ln(Import)	Yes	–	−4.0578 (0)	Yes	–	−1.3898 (0)
Ln(Import)	–	Yes	−2.6735 (0)	–	Yes	−1.3250 (0)
DLn(Export)	–	–	[. . .]	Yes	–	−5.2669 (1)
DLn(Export)	–	–	[. . .]	–	Yes	−3.3667 (1)
DLn(Import)	–	–	[. . .]	Yes	–	−3.8202 (0)
DLn(Import)	–	Yes	−6.6124 (1)	Yes	–	−3.3464 (0)
	Myanmar			*Philippines*		
	Time trend (impulse dummy and used break date is 1987; 1973)	Time trend (shift dummy and used break date is 2000; 1977)	Saikkonen and Lütkepohl (k)	Time trend (impulse dummy and used break date is 1969; 1974)	Time trend (shift dummy and used break date is 1970; 1974)	Saikkonen and Lütkepohl (k)
Ln(Export)	Yes	–	−1.4194 (0)	Yes	–	−1.9831 (0)
Ln(Export)	–	Yes	−1.2373 (0)	–	Yes	−1.5079 (0)
Ln(Import)	Yes	–	−1.0335 (0)	Yes	–	−2.0843 (0)
Ln(Import)	–	Yes	−1.2190 (3)	–	Yes	−1.6108 (0)
DLn(Export)	Yes	–	−5.5090 (0)	Yes	–	−4.1124 (1)
DLn(Export)	–	Yes	−3.8221 (0)	–	Yes	−3.2604 (1)
DLn(Import)	Yes	–	−5.4043 (0)	Yes	–	−3.2338 (0)
DLn(Import)	–	Yes	−5.9242 (0)	–	Yes	−2.9051 (0)
	Thailand					
	Time trend (impulse dummy and used break date is 1974; 1982)			Time trend (shift dummy and used break date is 1975; 1982)		Saikkonen and Lütkepohl (k)
Ln(Export)	Yes			–		−1.9122 (0)
Ln(Export)	–			Yes		−1.9305 (0)
Ln(Import)	Yes			–		−2.7067 (0)
Ln(Import)	–			Yes		−2.5070 (0)
DLn(Export)	Yes			–		−5.3195 (0)
DLn(Export)	–			Yes		−3.3674 (0)
DLn(Import)	Yes			–		−5.5852 (0)
DLn(Import)	–			Yes		−4.1884 (0)

Notes: "k" denotes lag length; critical values −3.55, −3.03 and −2.76 are obtained from Lanne *et al.* (2002) at 1, 5, and 10 percent, respectively; "D" denotes first difference form of the variable; first and second structural break date are for exports and imports, respectively; [. . .] denotes values are not computed
Source: Author's calculation

Following Saikkonen and Lütkepohl (2000a, b, c) we consider a shift dummy and impulse dummy for different break dates when trend, intercept and orthogonal trend are included for cointegration. The results are presented in Table III.

It is evident from Table III that exports and imports are cointegrated for the Indonesia, Myanmar and Thailand, but not for Malaysia and the Philippines. For Myanmar and Thailand cointegration relationship between exports and imports is stronger. It should be noted that we have evidence of more than one cointegration equation for Thailand (when impulse dummy is used for 1974 and shift dummy is used for 1975) and for Myanmar (when impulse dummy is used for 1973 and 1987 and shift dummy is used for 1977 and 2000) when constant term is included in the cointegration equation. This can arises if model is not properly specified. Such cases should be ignored from the further analysis.

Finally, because exports and imports are expressed as ratio of GDP, we test sustainability of trade deficit, i.e. whether economy satisfies its IBC condition $\beta_1 = 1$. We do this for the most appropriate model which includes trend and constant term both. The null hypothesis Ho:$\beta_1 = 1$ is not rejected for Myanmar only. This implies that among the ASEAN-five, Myanmar alone satisfies IBC and her trade deficit is sustainable.

6. Discussion, conclusions and policy implications

The present study examines the nature of long-run relationship between exports and imports for the ASEAN-five namely, Indonesia, Philippines, Thailand, Malaysia and Myanmar. The study employs unit root test methods in the presence ofendogenous structural breaks and the appropriate cointegration techniques that allow such structural breaks for the analysis. The results suggest that nominal exports and imports each (measured as percentage of GDP have multiple breaks. In case of Indonesia structural breaks occurred in 1965 and 1966 in exports and imports, respectively.

For Malaysia, structural breaks were found in exports in 1972 and 1998; and in imports in 1974. In Myanmar, structural breaks were detected in exports in 1987 and 2000 and in imports in 1973 and 1977. Philippines' exports showed structural breaks in 1969 and 1970 and imports in 1974. The Thai experienced with structural breaks in exports were in 1974 and 1975 and in imports in 1982. Overall, we found at least one structural shift in the long-run current account of the ASEAN-five countries of our sample. The focus of the paper is to provide evidence on the timing of the shifts; and estimates of the new long-run equilibrium relationship between exports and imports without investigating the reasons for the occurrences.

Economic theory[8] predicts that in a well-functioning economy without permanent productivity shock or policy distortion, the natural tendency is to move towards a long-run relationship between exports and imports for sustainable trade balance. In the event it does not, non-cointegration and unsustainable trade balance will be the outcome. Our results lend support to the view that the tendency of trade deficit is to converge zero in the long-run for the three ASEAN countries of our sample. Applying the Saikkonen and Lütkepohl (2000a, b, c) technique (which incorporates exogenous structural breaks), we find the existence of cointegration in the nominal trade balance only for the Indonesia, Myanmar and Thailand. However, IBC condition holds only for Myanmar. This implies that Indonesia, Myanmar and Thailand are somewhat well-functioning and their economies can adjust to shocks arising out of technological and policy distortions; something we captured using the cointegration equation with structural breaks. The economies of Malaysia and the Philippines do not adjust to the shocks. The test of IBC

Saikkonen and Lütkepohl cointegration test

Indonesia

Intercept {impulse: 1965 and shift: 1966} (2)			Intercept and trend {impulse: 1965 and shift: 1966} (1)			Orthogonal trend {impulse: 1965 and shift: 1966} (1)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	8.72	0.1883	0	21.11	0.0054	0	17.65	0.0017
1	0.46	0.5595	1	5.80	0.0842	–	–	–

Results:
$\beta_1 = 3.193^{***}(15.144)$;
Ho:$\beta_1 = 1$ is rejected

Malaysia

Intercept {impulse: 1972 and shift: 1998} (1)			Intercept and trend {impulse: 1972 and shift: 1998} (1)			Orthogonal trend {impulse: 1972 and shift: 1998} (1)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	3.17	0.8208	0	12.82	0.1436	0	3.92	0.4800
1	0.36	0.6101	1	1.53	0.6510	–	–	–

Intercept {impulse: 1974 and shift: 1974} (1)			Intercept and trend {impulse: 1974 and shift: 1974} (1)			Orthogonal trend {impulse: 1974 and shift: 1974} (1)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	5.12	0.5546	0	8.48	0.4929	0	6.25	0.2143
1	0.26	0.6686	1	0.93	0.8116	–	–	–

Myanmar

Intercept {impulse: 1987 and shift: 2000} (1)			Intercept and trend {impulse: 1987 and shift: 2000} (1)			Orthogonal trend {impulse: 1987 and shift: 2000} (1)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	29.98	0.0000	0	13.99	0.0961	0	13.10	0.0119
1	8.49	0.0042	1	0.28	0.9675	–	–	–

Results:
$\beta_1 = 0.997^{***}(13.230)$;
Ho: $\beta_1 = 1$ is accepted

Intercept {impulse: 1973 and shift: 1977} (1)			Intercept and trend {impulse: 1973 and shift: 1977} (1)			Orthogonal trend {impulse: 1973 and shift: 1977} (1)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	34.86	0.0000	0	9.60	0.3760	0	13.38	0.0105
1	9.70	0.0021	1	0.38	0.9469	–	–	–

Philippines

Intercept {impulse: 1969 and shift: 1970} (3)			Intercept and trend {impulse: 1969 and shift: 1970} (3)			Orthogonal trend {impulse: 1969 and shift: 1970} (3)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	8.34	0.2144	0	6.96	0.6673	0	5.70	0.2622
1	2.84	0.1086	1	2.47	0.4372	–	–	–

Intercept {impulse: 1974 and shift: 1974} (3)			Intercept and trend {impulse: 1974 and shift: 1974} (3)			Orthogonal trend {impulse: 1974 and shift: 1974} (3)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	7.05	0.3255	0	8.30	0.5128	0	6.76	0.1759
1	0.22	0.6992	1	1.08	0.7708	–	–	–

(*continued*)

Table III.
Results of cointegration analysis

Saikkonen and Lütkepohl cointegration test

Thailand

Intercept {impulse: 1974 and shift: 1975} (3)			Intercept and trend {impulse: 1974 and shift: 1975} (3)			Orthogonal trend {impulse: 1974 and shift: 1975} (3)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	23.25	0.0004	0	18.27	0.0183	0	17.46	0.0016
1	3.73	0.0637	1	1.71	0.6061	–	–	–
			Results: $\beta_1 = 2.908^{***}(3.586)$; Ho:$\beta_1 = 1$ is rejected					
Intercept {impulse: 1982 and shift: 1982} (3)			Intercept and trend {impulse: 1982 and shift: 1982} (3)			Orthogonal trend {impulse: 1982 and shift: 1982} (3)		
r	LR	*p*-value	r	LR	*p*-value	r	LR	*p*-value
0	16.12	0.0099	0	16.35	0.0398	0	8.92	0.0738
1	2.07	0.1768	1	2.02	0.5332	–	–	–
			Results: $\beta_1 = 11.957^{***}(3.214)$; Ho:$\beta_1 = 1$ is rejected					

Notes: "r" and "LR" denotes number of cointegrating relations/vectors and log likelihood ratio, respectively; values in () denotes the number of lag length used in cointegration analysis; we estimated coitegration equation as follows: $EX_t = \beta_0 + \beta_1 IM_t + u_t$, from the VAR model, where EX_t, IM_t and u_t are the exports of goods and services, the imports of goods and services (both expressed as percentage of GDP) and disturbance at time t, respectively; under the null hypothesis, in the economy that satisfies its IBC (i.e. for a sustainable current account deficit), it is expected that $\beta_1 = 1$ and u_t is a stationary process; hence, null hypothesis of $\beta_1 = 1$ will be tested for each case where we find evidence of one cointegration between exports and imports; for two cointegration cases we neither tested the null hypothesis of unit root nor reported value of β_1 because this has occurred due to misspecification of the model therefore, results will not be valid; finally, we reported results only for the most appropriate model, i.e. the model which includes constant and trend term both; in parenthesis with β_1 we reported *t*-statistic values; we reported final results of testing the null hypothesis of $\beta_1 = 1$ to preserve space however complete results can be accessed from the author upon request; notice that β_1 values are obtained from the estimating

Source: Author's calculation

Table III.

condition shows that the macroeconomic policies of Myanmar have been effective in leading exports and imports to the long-run steady sate equilibrium and thus sustainable relationship. For Indonesia and Thailand the macroeconomic policies are effective in leading exports and imports to the long-run equilibrium but are unsustainable. For Malaysia and the Philippines the macroeconomic policies are ineffective in leading exports and imports to the long-run equilibrium, although are sustainable. It is evident from Table I that Malaysia had favorable surplus in her trade account in most of the years but faced deficit; but The Philippines saw much fluctuation.

Based on the foregoing analysis we offer several observations about the ASEAN-five countries. First, the test shows that only Myanmar is not in violation of her IBC condition. Second, results suggest that for Indonesia, Myanmar and Thailand, the short-run imbalances are temporary and are sustainable in the long-run only for Myanmar. Third, imports and exports tend to converge toward zero in the long-run for Indonesia, Myanmar and Thailand due to sound macroeconomic policies. For Myanmar, policies have been

effective to the extent that shocks from technology or poor policy did not derail sustainable trade balance. The lack of cointegration for Malaysia and The Philippines seems to be the result of poor policies which failed to protect the economies from permanent productivity gap hypothesis, leading to long-run trade imbalances. Interestingly, macroeconomic policies of Indonesia and Thailand have been effective in forcing imports and exports to converge toward zero in the long-run; even though these economies do not satisfy IBC. The failure of the latter condition reflects serious coordination problems in macroeconomic policies. Fourth, since trade balance follows mean-reverting process in Indonesia, Myanmar and Thailand, policymakers can use the information to predict the future behavior of the balance, as needed. Fifth, within the framework of balance of payments (BOP)-constrained growth model, if cointegration between exports and imports does not exist, these countries are in effect exceeding "BOP equilibrium growth rate" for a long-time, which they cannot be continued forever. They will soon face BOP difficulties.

Notes

1. Trade balance is the resource balance (net export of goods and services) of a country, while a current account balance includes trade balance and net factor income from abroad. In this paper current account balance is viewed from the perspective of positive changes in the trade and service balance.
2. Some economists argue that current account deficit is not harmful to an economy because a country may be at a particular stage of development. At each stage of progress, the external imbalances situation will also improve. Temporary shocks will lead to new equilibrium as economy generates income through higher exports; and at the same time depends less on external financing, particularly borrowing. Large and persistent current account deficit can pose serious problems in the long-run. However, if foreign borrowings are used in productive investment with returns better than the cost of financing, a country can run current account deficit at a certain stage of development without too much concern. Specifically, large and persistent current account deficit tends to increase domestic interest rates relative to their foreign rates; in addition to imposing an excessive burden on future generations. That is, accumulation of larger debt can be inequitable and dynamically unsustainable; and lead to lower standard of living for future generations (Hakko, 1995). Matters get worse, if deficits are denominated in foreign currency; and even increase currency hazard making debt servicing difficult (Pitchford, 1992). Too high deficits are if financed through portfolio investment, e.g. borrowing a country may be forced to devalue its currency (Fischer, 1988). Large external debt is often cited as reason for currency crisis as was the case with Chile and Mexico (early 1980s), the UK and Nordic countries (late 1980s), Mexico and Argentina (mid-1990), and more recently in Asian fly of 1997.
3. He also developed a theoretical model to explain this phenomenon.
4. If real values of exports and imports are considered, the results may change. For policy purposes the results in this paper should be carefully examined.
5. Here, we took fixed largest lag length of 4 as the length of time is not adequate. We performed analysis in the JMulTi program developed by Lutkepohl and Kratzig, and is available online at: www.jmulti.de/
6. Acronyms such as SIC, AIC, and HQIC, respectively, denotes Schwarz Information Criterion, Akaike Information Criterion and Hannan-Quinn Information Criterion.
7. We present results from the second case, but interested reader may contact the author for results of the first case.
8. For example, elasticity approach considers the effects of the real exchange rate on the demand and supply of traded goods as the key factor, while the absorption approach asserts that total

expenditure is critical to understanding and correcting balance of trade (BOT) issues. The dynamics of the BOT is explained by agents' response to transitory and permanent shocks, e.g. productivity or arising from policy distortions. With favorable productivity or technological shocks, spurt in investment enhances output growth but may worsen external accounts if the country imports more goods with capital or technology content. Further, BOP-constrained growth model in its simplest version is based on the assumption that a current account deficit cannot be financed indefinitely and, hence in the long-term, the balance of payment equilibrium has to prevail (Hansen and Kvedaras, 2004). Thus, for the BOP-constrained growth model in the long-run, a country can grow at a rate consistent with current account balance. Because the growth rate of a country for any length of time is bounded from above, it will run into BOP difficulties, also known as the "BOP equilibrium growth rate". In other words, an increase in a country's growth rate, *ceteris paribus*, increases the growth of imports (import as a function of income); while export growth is determined, *inter alia*, largely by the growth of a country's overseas markets, still remains unaffected. Thus, the only effective way to reduce a growing current account deficit fast is to reduce the rate of GDP growth. A country is said to be "BOP constrained" if its actual growth rate is such that the current account is in balance in the long-run but below the growth of productive potential – the BOP equilibrium growth rate. For a fast sustained rate of growth without BOP problems, it is necessary to export goods for which world demand is increasing rapidly. And yet, a major problem of the developing countries is the inability to compete effectively on world markets. The consequences of having BOP problems are straightforward. If a country encounters a BOP problem before short-term full capacity utilization is reached, then demand is curtailed. Disguised and open unemployment will increase, and capital accumulation will be reduced (as will be embodied and induced technical progress). This will lead, in the long-run, to a relative deterioration of the country's export potential compared to its main competitors. This may produce a vicious cycle, further worsening the BOP problems. By contrast, if export growth is fast, import of necessary capital goods can continue; but may need a high rate of investment to allow rapid structural change as labor moves from low to high-productivity areas. Growth will take a "circular and cumulative causation".

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