Journal of Economic Cooperation and Development, **30**, 1 (2009), 1-16

An Empirical Investigation on the Sustainability of Balancing Item of Balance of Payment Accounts for OIC Member Countries

Tuck Cheong Tang[1] and Evan Lau[2]

This study aims to examine the sustainability of balancing item ('net errors and omissions') of balance of payment accounts for OIC (Organisation of the Islamic Conference) member countries. The series specific panel unit root test (SURADF unit root tests) suggests that 9 out of 23 sampled OIC member countries have their balancing item sustainable - Albania, Coted'Ivoire, Indonesia, Kuwait, Malaysia, Mozambique, Pakistan, Tunisia, and Uganda.

1. Introduction

The purpose of this study is to explore empirically the sustainability of balancing item or 'net errors and omissions' in the Organisation of the Islamic Conference (OIC)[3] members economies via various types of unit root tests, but more precisely using the series specific panel unit root test (Breuer et al., 2002, SURADF). Generally speaking, such a study of using a group of Islamic countries is limited. Tang and Wong (2008),

---

[1] School of Business, Monash University Sunway campus, Malaysia

[2] Faculty of Economics and Business, Universiti Malaysia Sarawak, Malaysia

[3]A total of 57 OIC member countries dating back to 1970 - Afghanistan, Albania, Algeria, Azerbaijan, Bahrain, Bangladesh, Benin, Brunei, Burkina Faso, Cameroon, Chad, Comoros, Côte d'Ivoire, Djibouti, Egypt, Gabon, Gambia, Guinea, Guinea-Bissau, Guyana, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyzistan, Lebanon, Libya, Malaysia, Maldives, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Senegal, Sierra Leone, Somalia, Sudan, Suriname, Syria, Tajikistan, Togo, Tunisia, Turkey, Turkmenistan, Uganda, United Arab Emirates, Uzbekistan , and Yemen.

and Tang and Lau (2008) both studies only cover five OIC member countries i.e. Bangladesh, Indonesia, Malaysia, Maldives, and Pakistan.

The existing literature that has considered the balancing item is limited in two groups. The first group is focusing primarily on the factors that explain variation in the balancing item such as the exchange rate, economic openness and the components of the balance of payments accounts (i.e. Duffy and Renton (1971) for United Kingdom; Fausten and Brooks (1996), Tombazos (2003), Fausten and Pickett (2004), and Tang and Hooy (2007) for Australia; and Tang (2005, 2006a, and 2006b) for Japan.

The second group, involves a small number of studies, has started to examine the sustainability of the balancing item through the application of unit root tests. Applying a non-linear unit root test proposed by Kapetanios *et al.* (2003), Tang *et al* (2008) found that the balancing item of the balance of payments accounts was sustainable for Japan. Tang (2007a) applied a unit root test with unknown level shift proposed by Lanne *et al.* (2002) and Saikkonen & Lutkepohl (2002), and found that the balancing item for the balance of payments was sustainable for France, Germany, Italy and Japan, but the results were at best mixed for the other three G7 countries. By the same token, Tang (2007b) applies rolling ADF unit root tests and find 19 out of 20 industrial countries have sustainable balancing item, but unstable. Furthermore, Tang (2008) studies the balancing item for 18 industrial countries, and the descriptive information reveals that the size of the balancing items for all the 18 industrial countries are *technically* ‘too big’. Again, the balancing items are sustainable for all countries except for, Iceland, Denmark, Japan, Italy, France, and Spain. Tang and Lau (2008) applied a series of unit root tests including panel unit root tests to the balancing item of the balance of payments in 13 Asian countries. They found that the balancing item of the balance of payments was sustainable for five Asian countries (Bangladesh, Indonesia, Korea, Malaysia and Singapore), but not the other eight (Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, and Thailand). Applying an unrestricted two-regime threshold autoregressive (TAR) model with an autoregressive unit root, Mishra, *et al*. (2008) found that the balancing item of the balance of payments for Australia is characterised by a non-linear but stationary – sustainable. Tang and Wong (2008) study the balancing item topic in Malaysia. As based on IMF’s guideline, the balancing item in Malaysia is not technically considered *too big*, and a battery of unit root and stationary tests confirm sustainability.

The next section discussed and demonstrates the conceptual framework for testing the sustainability of balancing items of balance of payment accounts via the *ex post* Balance of Payments (BoP) identity. Section 3 depicts the data and SURADF testing procedure, in brief. The empirical results of SURADF are reported in Section 4. The conclusion of this study is presented in Section 5.

2. Conceptual Framework

A country's balance of payments is defined as the record of transactions between that country's residents and foreign residents over a specified period. More precisely, each transaction is recorded in accordance with double entry book-keeping, meaning that entries occur on each of the two sides of the balance of payments accounts. Therefore, in principle, the sums on the two sides of the complete balance of payments accounts should be equal. However, it is always not the case in practice as total recorded debit is not equal to total recorded credit in the balance of payments accounts, i.e. 'adding up' problem. Consequently, a balancing item is added to make up the difference. The net balance of errors (transactions that are recorded incorrectly) and omissions (transactions that are not recorded at all) constitute the balancing item. Clearly, the balancing item (or 'net errors and omissions') is a value from the difference between total recorded credit transactions and total recorded debit transactions per time period (Fausten & Brooks, 1996).

Intuitively, as documented in the International Monetary Fund's Balance of Payment Manual, net errors and omissions are caused by imperfect source data, collection, and processing and are a usual feature of international accounts and other statistics. To certain extent, balancing item is an important indicator for both policymakers and investors as its size represents an indicator of the reliability and accuracy of a country's balance of payments statistics. Persistently large values in one direction, either negative or positive, may be taken as an indication of serious and systematic errors.[4] For example, a positive value of the balancing item

[4] As informed by the *International Monetary Fund's* Balance of Payments Manual, a balancing item is considered *too big* if it exceeds 5% of the sum of gross merchandise imports and exports.

over time suggests a systematic over-reporting of debit transactions or under-reporting of credit transactions and *vice versa*. Persistent large balancing items in the long run are often regarded as a signal of economic instability, calling for an appropriate adjustment or revision to macroeconomic policies.

While large balancing items are assumed to have an important role in the propagation of economic mismanagement, a small value on the balancing item does not necessarily mean that only small errors and omissions have occurred, given that large positive and negative errors may be offsetting (see *International Monetary Fund's* Balance of Payments Manual, 1993, line 148). In this relation, rather than focusing on the size of the balancing item, a preferable approach is to examine whether or not the balancing item is sustainable. Technically, the balancing item will be sustainable if the continuation of large errors and omissions (positive or negative) do not entail a need for a 'drastic' adjustment in the balance of payments recording system or policy shift due to 'inappropriate' policies because of unreliable balance of payments statistics in the long run.

Following the *ex post* BoP i.e. BoP = CA + KA +ΔIR ≡ 0 (where CA is current account, KA is capital account, and ΔIR is changes in international reserves), the relations between CA and KA can be re-written as:

$$\begin{aligned} CA &= -KA - \Delta IR \\ KA &= -CA - \Delta IR \end{aligned} \qquad (1)$$

Accordingly, the empirical counterpart to the conceptual BoP constraints should be written as $\overline{CA} + \overline{KA} + \overline{\Delta IR} - \overline{BI} = 0$, where the italized variables with over-bars denote measured magnitudes. Again, the equations (1) can be represented as below.

$$\begin{aligned} \overline{CA} &= -\overline{KA} - \overline{\Delta IR} + \overline{BI} \\ \overline{KA} &= -\overline{CA} - \overline{\Delta IR} + \overline{BI} \end{aligned} \qquad (2)$$

Equations (2) imply that BI will typically be a stationary series, *I*(0). Considering Engle and Granger's (1987) view of cointegration, if the BI series is stationary in levels i.e. *I*(0), CA (or KA), and -KA -ΔIR (or -CA -ΔIR) are said to be cointegrated (or converged in the long run). Hence, stationary BI series implies sustainable.[5] A conventional testing procedure is to examine whether the balancing item is sustainable is to test whether the balancing item is stationary via unit root or stationary tests such as ADF, PP, and so on.

3. Data and SURADF

3.1. Data

The balancing item (in current US$) (net errors and omissions) is obtained from the *World Development Indicators*, World Bank. Due to data unavailability problems (i.e. some data are discontinue and/or missing such as Algeria, Burkina Faso, Chad, and so on), and short time span (i.e. 70% of the 56 OIC member countries have 30 or less annual observations)[6], 23 out of the 57 OIC member countries are sampled in this study. The sample period covers annual series from 1980-2006 for countries comparison purpose, yielding 27 observations. Among the OIC member economies are Albania, Bahrain, Bangladesh, Cote d'Ivoire, Egypt, Indonesia, Jordan, Kuwait, Libya, Malaysia, Maldives, Mali, Morocco, Mozambique, Oman, Pakistan, Saudi Arabia, Sudan, Suriname, Syrian Arab Republic, Tunisia, Turkey, and Uganda.

In this sense, two concerns led to the application of SURADF testing procedure in this study. Firstly, conventional univariate unit root tests, such as Augmented Dickey Fuller (ADF) (Dickey and Fuller, 1979) and

---

[5]A similar conceptual framework but in a simplified version has been documented in early studies (see Tang *et al*, 2008; Tang, 2007a; Tang, 2007b; Tang and Lau, 2008; Mishra, *et al.*, 2008). Let, BI = C – D, where BI is the balancing item, C is total recorded credit and D is total recorded debit. In principle, BI can be considered as the residual term of two simple linear regression equations: C = aD + BI, and D = bC - BI where a, and b are the coefficient of D and C respectively which are restricted to be equal to one.

[6] A total of 56 OIC member countries' BI data is obtained from the *World Development Indicators*, and their frequencies of sample spans are summary as below:

Sample span	no.	%	Cumulative %
≤ 10 years	9	16%	16%
≤ 20 years	12	21%	38%
≤ 30 years	18	32%	70%
≤ 36 years	17	30%	100%

Phillips and Perron (1988) (PP tests), are well-known to be sensitive to small sample study (or short sample span) such as ours (see footnote 4). According to Shiller and Perron (1985), the power of ADF tests is low with short time spans. Secondly, a common feature of the panel tests such as Levin and Lin (1993), Levin *et al.* (2002), Im *et al*. (1997, 2003), Maddala and Wu (1999), Breitung (2000), Choi (2001) is that they maintained the null hypothesis of a unit root in all panel members. Therefore, their (non-) rejection indicates that at least one panel member is stationary, with no information about how many series or which ones are stationary.

3.2 SURADF - Methods

In addressing this issue, Breuer *et al.* (2002, SURADF)[7] developed a panel unit root test that involves the estimation of the ADF regression in a SUR framework and then test for individual unit root within the panel members. This procedure also handles heterogeneous serial correction across panel members. Importantly, the test minimized the possibility of the misleading conclusion of stationarity when only one panel member behave in a stationary manner. The SURADF test is based on the system of ADF equations that can be expressed as

$$\begin{aligned}
\Delta y_{1,t} &= \alpha_1 + \beta_1 y_{1,t-1} + \sum_{j=1} \varphi_j \Delta y_{1,t-j} + u_{1,t} \\
\Delta y_{2,t} &= \alpha_2 + \beta_2 y_{2,t-1} + \sum_{j=1} \varphi_j \Delta y_{2,t-j} + u_{2,t} \\
&\vdots \\
\Delta y_{N,t} &= \alpha_N + \beta_N y_{N,t-1} + \sum_{j=1} \varphi_j \Delta y_{N,t-j} + u_{N,t} \qquad (3)
\end{aligned}$$

[7] Development in the series based specific unit root test has inspired researchers to evaluate mean reverting properties of macro-variables such as real exchange rates (Holmes, 2001, Baharumshah and Borsic, 2008), current account (Lau and Baharumshah, 2005; Holmes, 2006a; 2006b; Chu *et al*., 2007), hysteresis hypothesis in unemployment (Chang *et al.*, 2005), energy consumption (Hsu *et al*., 2007), carbon dioxide emissions (Lee and Chang, 2008), per capita real GDP (Chang *et al.*, 2006; Zhang *et al.*, 2007), fiscal sustainability (Lau and Baharumshah, 2007), balancing items (Tang and Lau, 2008) and in micro level of testing the Gibrat Law in Taiwan electronics industry (Chu *et al*., 2008).

where $\beta_j = (\rho_j - 1)$, ρ_j is the autoregressive coefficient for series j and $t = 1,...,T$. This system is estimated by the SUR procedure with the null and the alternative hypotheses are tested individually as

$$\begin{aligned} &H_0^1 : \beta_1 = 0; \;\; H_A^1 : \beta_1 < 0 \\ &H_0^2 : \beta_2 = 0; \;\; H_A^2 : \beta_2 < 0 \\ &\vdots \\ &H_0^N : \beta_N = 0; \;\; H_A^N : \beta_N < 0 \end{aligned}$$

with the test statistics computed from SUR estimates of system (1) while the critical values are generated by Monte Carlo simulations. This procedure posed several advantages. First, by exploiting the information from the error covariances and allowing for autoregressive process, it produced efficient estimators over the single equation methods. Second, the estimation also allows for heterogeneous fixed effect, heterogeneous trend effects and heterogeneity in lag structure across the panel members. Third, the SURADF test allows us to identify how many and which member(s) of the panel contain a unit root.

As this test has non-standard distributions, the critical values of the SURADF test must be obtained through simulations. In the Monte Carlo simulations, the intercepts, the coefficients on the lagged values for each series were set equal to zero. In what follows, the lagged differences and the covariances matrix were obtained from the SUR estimation on the actual balancing items data from the sampled countries. The SURADF test statistic for each of these series was then computed as the *t*-statistic individually for the coefficient on the lagged level. Since the SURADF estimation takes into account of the error correlation (which will be different for different series) the critical values for SURADF will be different for each series. To obtain the critical values, the experiments were replicated 10000 times and the critical values of 1 percent, 5 percent and 10 percent are tailored to each of the panel members. For this study, the 23 OIC countries balancing items critical values were tailored individually.

4. Empirical Results

For comparative purpose, conventional univariate unit root tests such as ADF and PP, and nonSURADF panel unit root tests are carried out. The results of univariate ADF and PP unit root tests are reported in Appendix 1, and the results indicate 19 out of 23 OIC member countries have stationary balancing items (BI) ~ $I(0)$, except for Malaysia, Maldives, Oman, and Suriname. Conflicting results have also been observed between ADF and PP for the case of Bangladesh, Morocco, Pakistan, Saudi Arabia, Sudan, and Uganda. However, this ‘fantastic’ finding may be interpreted with caution since the conventional univariate ADF and PP tests are sensitive to small sample size (or short sample span).

Furthermore, the non SURADF panel unit root tests are documented in Appendix 2. As found by a set of panel unit root tests documented in Appendix 2 (Levin and Lin, 1993[8], ADF – Fisher chi-square, ADF – Choi, PP – Fisher chi-square and PP – Choi (Maddala and Wu, 1999; Choi, 2001), Breitung (2000), and Im et al. (2003), a panel of 23 OIC member countries’ balancing items are stationary (sustainable) over the period 1980-2006, except for Breituing t-statistic. As noticed, these panel unit root testing procedures fail to capture how many series or which ones are stationary.

Alternative testing procedure of resolving the ambiguity in the various unit root tests is to apply more powerful tests, in particular for small sample such as ours - series specific panel unit root (SURADF). Table 1 presents the results of SURADF tests. Of 23 OIC member countries, the null hypothesis of a unit root can be rejected over 9 countries, reflecting that the countries have their balancing item sustainable (stationary) - Albania, Coted’Ivoire, Indonesia, Kuwait, Malaysia, Mozambique, Pakistan, Tunisia, and Uganda. For the remaining countries (i.e. Bahrain, Bangladesh, Egypt, Jordan, Libya, Maldives, Mali, Morocco, Oman, Saudi Arabia, Sudan, Suriname, Syria Arab Republic, and Turkey), there is evidence that their balancing items series is unsustainable since the SURADF tests fails to reject the null hypothesis of a unit root. This is an interesting finding – only 9 out of 23 OIC member countries have their BI sustainable, while the conventional

[8] One may also refer to the revised version of their paper in Levin et al. (2002).

univariate ADF and PP results support the sustainability hypothesis for 19 out of 23 OIC member countries and nonSURADF panel tests depict stationary BI for all 23 OIC member countries.

Table 1: SURADF Results for Balancing Items

Country	Test Statistics	Critical Values			Test Statistics	Critical Values		
	SURADF (Constant)	0.01	0.05	0.10	SURADF (Constant & trend)	0.01	0.05	0.10
Albania	-4.300 (1)**	-5.642	-4.968	-3.609	-5.568 (1)**	-5.674	-4.732	-3.803
Bahrain	-2.718 (1)	-5.605	-4.931	-3.609	-2.673 (1)	-5.466	-4.681	-3.903
Bangladesh	-3.394 (1)	-5.724	-4.010	-3.651	-3.411 (1)	-5.870	-4.793	-3.518
Cote d'Ivoire	-4.269 (1)*	-5.303	-4.281	-3.710	-4.294 (1)*	-6.371	-4.712	-3.946
Egypt	-3.313 (2)	-5.844	-4.965	-3.625	-3.405 (1)	-5.281	-4.666	-3.994
Indonesia	-4.463 (2)*	-6.142	-4.512	-3.974	-4.358 (2)*	-5.558	-4.601	-3.701
Jordan	-2.637 (1)	-6.273	-4.716	-3.995	-2.672 (1)	-5.337	-4.733	-3.025
Kuwait	-4.531 (1)*	-5.127	-4.615	-2.923	-4.499 (1)*	-5.339	-4.635	-3.973
Libya	-2.529 (1)	-6.755	-4.640	-2.937	-2.840 (1)	-5.315	-4.712	-3.992
Malaysia	-4.554 (1)*	-5.697	-4.649	-3.907	-3.781 (1)	-5.451	-4.745	-3.971
Maldives	-0.250 (1)	-6.095	-4.705	-3.969	-0.416 (1)	-5.872	-4.619	-3.932
Mali	-3.132 (1)	-5.352	-4.730	-3.978	-3.071 (1)	-5.693	-4.734	-3.994
Morocco	-1.934 (2)	-5.926	-4.647	-3.969	-1.992 (2)	-5.339	-4.654	-3.898
Mozambique	-4.086 (1)*	-5.630	-4.988	-3.170	-4.124 (1)*	-6.230	-4.689	-3.013
Oman	-3.159 (1)	-5.450	-4.902	-3.544	-3.122 (1)	-5.491	-4.719	-3.984
Pakistan	-4.765 (1)**	-6.775	-4.719	-3.979	-4.691 (1)*	-5.188	-4.733	-3.985
Saudi Arabia	-2.777 (1)	-5.632	-4.720	-3.930	-3.393 (1)	-5.841	-4.787	-3.420
Sudan	-1.964 (2)	-5.753	-4.750	-3.712	-1.949 (2)	-5.557	-4.600	-3.937
Suriname	-1.923 (1)	-5.923	-4.987	-3.821	-2.886 (1)	-5.803	-4.671	-3.511
Syrian Arab Republic	-2.461 (1)	-6.067	-4.761	-3.714	-2.979 (1)	-5.350	-4.666	-3.606
Tunisia	-4.100 (1)*	-5.187	-4.562	-3.868	-4.174 (1)*	-5.733	-4.700	-3.986
Turkey	-2.747 (1)	-5.553	-4.611	-3.755	-2.894 (1)	-5.602	-4.675	-3.977
Uganda	-4.874 (1)**	-5.947	-4.634	-3.916	-4.730 (1)*	-5.844	-4.767	-3.723

Notes: The column of SURADF refers to the estimated Augmented Dickey-Fuller statistics obtained through the SUR estimation of the 23 balancing items' ADF regression. The estimated critical values are tailored by the simulation experiments based on 27 observations for each series and 10000 replications, following the work by Breuer *et al.* (2002). The error series were generated in such a manner to be normally distributed with the variance-covariance matrix given from the SUR estimation of the 23 countries panel structures for the period of 1980-2006. Each of the simulated balancing items was then generated from the error series using the SUR estimated coefficients on the lagged differences. ***, ** and * denotes statistically significance at the 0.01, 0.05 and 0.10 level. Figures in parentheses indicate the lag length. The estimations and the calculation of the SURADF were carried out in RATS 5.02 using the algorithm kindly provided by Myles Wallace.

5. Conclusion

The objective of this study is to examine the sustainability of balancing item (net errors and omissions) of balance of payments accounts for the OIC member economies by applying the so-called series specific panel unit root (SURADF) tests. For confirmatory analysis, non-SURADF panel unit root tests, and standard univariate unit root tests are computed. The non-SURADF panel unit root tests support stationary balancing item for 23 sampled OIC member economies, while the ADF and/or PP unit root tests find that the balancing item for 19 out of 23 OIC member economies is stationary (or sustainable). However, a more appropriate testing procedure - SURADF, in particular, for small sample such as ours confirms sustainable balancing item for only 9 out of 23 OIC member countries. They are Albania, Coted'Ivoire, Indonesia, Kuwait, Malaysia, Mozambique, Pakistan, Tunisia, and Uganda. It typically reflects the sensitivity of conventional unit root tests (i.e. ADF and PP), and the failure of non-SURADF panel unit root tests about the degree of integration, *I*(d) (or sustainability) of country-specific balancing item of balance of payments accounts, especially for the OIC member economies.

From the policy perspectives, the finding in this study suggests that the balancing item in a few (9) of the OIC member countries are mean reverting, implying that the continuation of large errors and omissions (positive or negative) do not entail a need for a 'drastic' adjustment in the balance of payments recording system or policy shift. However, in the other 14 countries, our findings suggest that serious challenges lie ahead for the majority of the selected OIC economies where the failure to reject the null hypothesis implies a nonstationary series where innovations in balancing items have permanent effects which regards to the condition of un-sustainability. And, it also confirms the complexity of panel data structure in drawing a single conclusion about the sustainability of balancing item from a panel of countries.

References

Breuer, J. B., McNown, R., and Wallace, M.S. (2002), "Series-Specific Unit Root Tests with Panel Data," *Oxford Bulletin of Economics and Statistics*, 64(5), 527-546.

Breitung, J., 2000, The local power of some unit root tests for panel data. In: Baltagi, B., T.B., Hill, R.C. (Eds.), Advances in Econometrics: Nonstationary Panels, Cointegration in Panels and Dynamics Panels, vol. 15, pp.161-178.

Baharumshah, A .Z. and Borsic, D. (2008), "Purchasing Power Parity in Central and Eastern European Countries," *Economic Bulletin*, 6(32), 1-8.

Chang T., Lee, K.-C., Nieh, C.-C. and Wei, C.-C. (2005), "An Empirical Note on Testing Hysteresis in Unemployment for Ten European Countries: Panel SURADF Approach," *Applied Economics Letters*, 12(14), 881-886.

Chang, T., Chang, H.-L., Chu, H.-P. and Su, C.-W. (2006). "Is Per Capita Real GDP Stationary in African Countries? Evidence from Panel SURADF Test," *Applied Economics Letters*, 13(15), 1003 – 1008.

Choi, I. (2001), "Unit Root Tests for Panel Data," *Journal of International Money and Finance*, 20(2), 249-272.

Chu, H.-P. Chu, Chang, T., Chang, H.-L., Su, C.-W. and Young Y. (2007), "Mean Reversion in The Current Account of Forty-Eight African Countries: Evidence from the Panel SURADF Test," *Physica A*, 384(2), 485 – 492.

Chu, H.-P., Sher, P. J. and Yeh, M.-L. (2008), "Revisiting Gibrat's Law using Panel SURADF Tests," *Applied Economics Letters*, 15(2), 137-143.

Dickey, D. A. And Fuller, W.A. (1979), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root," *Journal of the American Statistical Association*, 74(366), 427-431.

Duffy, M. and Renton, A. (1971), "An Analysis of The UK Balancing Item," *International Economic Review*, 12(3), 448-464.

Fausten, D.K. and Brooks, R. D. (1996), ”The Balancing Item in Australia’s Balance of Payments Accounts: An Impressionistic View,’ *Applied Economics*, 28(10), 1303-1311.

Fausten, D. K. and Pickett, B. (2004), “Errors & Omissions in The Reporting of Australia’s Cross-Border Transactions,” *Australian Economic Papers*, 43(1), 101-115.

Holmes, M.J. (2001), “New Evidence on Real Exchange Rate Stationarity and Purchasing Power Parity in Less Developed Countries,” *Journal of Macroeconomics*, 23(4), 601-614.

Holmes, M.J. (2006a), “How Sustainable are OECD Current Account Balance in the Long Run?,” *The Manchester School*, 74(5), 626 – 643.

Holmes, M.J. (2006b), “Do Latin American Countries Have an Incentive to Default on Their External Debt,” *Emerging Markets Finance and Trade*, 42(1), 33 – 49.

Hsu, Y.-C., Lee, C.-C. and Lee, C.-C. (2008), “Revisited: Are Shocks to Energy Consumption Permanent or Temporary? New Evidence from a Panel SURADF Approach,” *Energy Economics*, 30(5), 2314-2330.

International Monetary Fund (IMF), 1993, *International Monetary Fund’s* Balance of Payments Manual, 5th Edition, IMF. Accessed at http://www.imf.org/external/pubs/ft/bopman/bopman.pdf (6 October 2008)

Im, K. S., M. H. Pesaran, and Shin, Y. (2003), “Testing for Unit Roots in Heterogeneous Panels,” *Journal of Econometrics*, 115(1), 53-74.

Lau, E. and Baharumshah, A.Z. (2005), “Mean-Reverting Behavior of Current Account: in Asian Countries,” *Economics Letters*, 87(3), 367–371.

Lau, E. and Baharumshah, A.Z. (2007), “Assessing the Mean Reversion Behaviour of Fiscal Policy: The Perspective of Asian Countries,” *Applied Economics* (in press).

Lee, C.-C. and Chang, C.-P. (2008), "New Evidence on the Convergence of Per Capita Carbon Dioxide Emissions from Panel Seemingly Unrelated Regressions Augmented Dickey-Fuller Tests," *Energy*, 33(9), 1468 – 1475.

Levin, A., Lin, C.F. (1993), Unit Root Tests in Panel Data: New Results. University of California at San Diego (UCSD) Discussion Paper No. 56.

Levin, A., Lin, C. F. and Chu, C. S. J. (2002), "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties," *Journal of Econometrics*, 108(1), 1-24.

Maddala, G. S., Wu. S. (1999), "A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test," *Oxford Bulletin of Economics and Statistics*, 61(0), 631-652.

Mishra, V., Smyth, R., and Tang, T.C. (2008), "Is the Balancing Item for Australia Sustainable? Evidence from a Threshold Autoregressive Model with an Autoregressive Unit Root," *Australian Economic Papers*, 47(2), 190-198.

Phillips, P.C.B., and Perron, P. (1988), "Testing for a Unit Root in Time Series Regression," *Biometrika*, 75(2), 335-346.

Shiller, R.J. and Perron, P. (1985), "Testing the Random Walk Hypothesis: Power Versus Frequency of Observation," *Economics Letters*, 18(4), 381-386.

Tang, T. C. (2005), "Does Exchange Rate Volatility Matter for The Balancing Item of Balance of Payments Accounts in Japan? An Empirical Note," *RISEC, Rivista Internazionale DiScienze Economiche E Commerciali* (*International Review of Economics and Business*), 52(4), 581-590.

Tang, T. C. (2006a), "The Influences of Economic Openness on Japan's Balancing Item: An Empirical Note," *Applied Economics Letters*, 13(1), 7-10.

Tang, T. C. (2006b), "Japan's Balancing Item: Do Timing Errors Matter?," *Applied Economics Letters*, 13(2), 81-87.

Tang, T.C. (2007a), "Sustainability of Balancing Item of Balance of Payments Accounts: Fresh Empirical Evidence for G7 Countries," *Applied Economics Letters*, 14(4-6), 251-254.

Tang, T.C. (2007b), "Sustainability of Balancing Item of Balance of Payments Account for 20 Industrial Countries," *Empirical Economics Letters*, 6(5), 381-388.

Tang, T.C. (2008), "Sustainability of Balancing Item in 18 industrial Countries' Balance of Payments Accounts: An Empirical Study," *ICFAI Journal of Applied Economics*, 7(5), 15-25.

Tang, T.C. and Hooy, C.W. (2007), "The Asymmetric and Time Varying Volatility of Balancing Items in Australia's Balance of Payments," *International Journal of Management*, 24 (1), 76-81.

Tang, T.C. and Lau, E. (2008), "An Empirical Investigation on Sustainability of Balancing Item in Asian Countries," *Applied Economics Letters*, 15(2), 117-123.

Tang, T.C., Lim, K.P. and Liew, V.K.S. (2008), "Is Balancing Item of Balance of Payments Accounts Sustainable? Fresh Evidence from a Non-Linear Unit Root Test," *Finance Letters* (in press).

Tang, T. C., and Wong, H. T. (2008), Balancing item in Malaysia's balance of payments account, Chapter 8, in *Malaysia's International Trade Issues – An Impressionistic View*, Pelanduk Publications (M) Sdn Bhd: Selangor, Malaysia (p.79-92).

Tombazos, C. G. (2003), "New Light on the 'Impressionistic View' of the Balancing Item in Australia's Balance of Payments Accounts,' *Applied Economics*, 35(12), 1369-1378.

Zhang, N.-J., Lii, P., Huang, Y.-S. and Su, C.-W. (2007), "Is Per Capita Real GDP Stationary in China: Evidence Based on a Panel SURADF Approach," *Economics Bulletin*, 3(31), 1-12.

Appendix 1: ADF and PP Results for Balancing Items

	ADF Constant	Constant & Trend	PP Constant	Constant & Trend
Albania	0.403 [2] (0.97988)	-6.777 [0]*** (0.000)	-2.516 [2] (0.1233)	-6.777 [0]*** (0.000)
Bahrain	-6.025 [1]*** (0.000)	-5.883 [1]*** (0.000)	-12.945 [25]*** (0.000)	-12.407 [25]*** (0.000)
Bangladesh	-3.370 [5]** (0.0243)	-2.826 [5] (0.2039)	-2.446 [3] (0.1398)	-2.591 [3] (0.2867)
Cote d'Ivoire	-5.334 [0]*** (0.0002)	-5.315 [0]*** (0.0011)	-5.335 [1]*** (0.0002)	-5.333 [2]*** (0.0011)
Egypt	-4.950[0]*** (0.0005)	-4.975 [0]*** (0.0025)	-4.950 [0]*** (0.0005)	-4.975 [1]*** (0.0025)
Indonesia	-4.586 [2]*** (0.0015)	-4.654 [2]*** (0.006)	-3.701 [2]** (0.0105)	-3.652 [2]** (0.0454)
Jordan	-2.951 [0]* (0.0532)	-3.109 [0] (0.125)	-2.951 [0]* (0.0532)	-3.109 [0] (0.125)
Kuwait	-2.955 [0]* (0.0527)	-2.914 [0] (0.1745)	-2.988 [2]** (0.0493)	-2.953 [2] (0.1636)
Libya	-4.569 [0]*** (0.0013)	-4.654 [0]*** (0.0051)	-4.517 [2]*** (0.0015)	-4.567 [4]*** (0.0062)
Malaysia	0.494 [5] (0.9822)	-0.656 [5] (0.9635)	-2.374 [3] (0.1583)	-2.507 [4] (0.3222)
Maldives	-0.445 [1] (0.8864)	1.506 [6] (0.9999)	-1.644 [1] (0.4468)	-1.527 [1] (0.7937)
Mali	-5.569 [0]*** (0.0001)	-5.430 [0]*** (0.0009)	-5.560 [1]*** (0.0001)	-5.430 [0]*** (0.0009)
Morocco	-2.739 [6]* (0.0852)	-1.939 [6] (0.5975)	-0.715 [1] (0.8258)	-1.131 [1] (0.9039)
Mozambique	-3.263 [0]** (0.0275)	-3.243 [0]* (0.0983)	-3.283 [2]** (0.0263)	-3.256 [2]* (0.0959)
Oman	-2.022 [0] (0.2763)	-2.111 [0] (0.5163)	-1.941 [1] (0.3095)	-2.036 [1] (0.5556)
Pakistan	-1.526 [1] (0.5041)	-1.931 [1] (0.6088)	-3.690 [3]** (0.0105)	-4.674 [2]*** (0.0049)
Saudi Arabia	-2.715 [1]* (0.0856)	-2.845 [1] (0.1957)	-2.028 [1] (0.2739)	-2.142 [1] (0.5001)
Sudan	-1.668 [1] (0.4344)	-2.067 [1] (0.5383)	-3.430 [2]** (0.019)	-4.020 [2]** (0.0208)
Suriname	-1.629 [0] (0.4541)	-3.226 [0] (0.1014)	-1.629 [0] (0.4541)	-3.226 [0] (0.1014)
Syrian Arab Republic	-5.439 [0]*** (0.0001)	-1.991 [6] (0.571)	-5.415 [2]*** (0.0002)	-5.405 [1]*** (0.0009)
Tunisia	-3.906 [0]*** (0.0063)	-4.155 [0]** (0.0155)	-3.914 [1]*** (0.0062)	-4.120 [2]** (0.0168)
Turkey	-3.794 [6]** (0.0103)	-4.311 [6]** (0.0144)	-3.781 [3]*** (0.0085)	-3.634 [4]** (0.0462)
Uganda	-2.396 [4] (0.1542)	-3.191 [2] (0.1097)	-5.095 [1]*** (0.0003)	-5.209 [0]*** (0.0014)

Notes: The null hypothesis is a unit root for both ADF, and PP tests. The values enclosed in the parentheses are *p*-values, while the values in [.] are the optimal lag length suggested by AIC (maximum of 6 lags) and Newey-West Bandwidth using Bartlett kernel for ADF, and PP, respectively. ***, ** and * denotes statistically significance at the 0.01, 0.05 and 0.10 level.

Appendix 2: Group Unit Root Tests

Method	Individual effects	Individual effects & Individual linear trends
Null: Unit root (assumes common unit root process)		
Levin, Lin & Chu (2002) t	-5.212 (0.000)***	-4.476 (0.000)***
Breituing (2000) t-stat	-	-0.420 (0.3371)
Null:Unit root (assumes individual unit root process)		
Im, Pesaran & Shin (2003) W-stat	-8.196 (0.000)***	-6.882 (0.000)***
ADF – Fisher Chi-Square	182.426 (0.000)***	148.026 (0.000)***
PP – fisher Chi-square (Maddala and Wu, 1999 & Choi, 2001)	214.306 (0.000)***	273.863 (0.000)***

Notes: 23 OIC member countries as highlighted above are included for the sample period 1980-2006. The values enclosed in the parentheses are *p*-values. *** denotes significant at 0.10 level. A 5 lag length is suggested by AIC, and Newey-West bandwidth selection (using Bartlett kernel) for fisher tests.