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Sustainability of current account deficits in small states

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Abstract

This article applies the inter-temporal budget constraint framework and panel cointegration tests to examine the sustainability of current account deficits in 17 small states over the period 1980-2017. The findings show the existence of cointegration between real exports and real imports, but with the magnitude of the long-run coefficient being less than one, which support a "weak" form of current account sustainability in small states.

Keywords: current account deficits; intertemporal budget constraint; panel cointegration; small states
JEL Classification Codes: F30, F32, C23

1. Introduction

Many small states face a tremendous challenge in maintaining balanced current accounts. The five-year average (2013-2017) current account deficit for a group of small states was 5.1 percent of GDP, compared to a surplus of 2.7 percent of GDP for large advanced economies, according to data from the International Monetary Fund (IMF).[1] There is also significant heterogeneity in current account balances for small states where balances range from a deficit 28 percent of GDP to a surplus of 20 percent of GDP, with more than half of small states (23 out of 42 countries) recording current account deficits greater than 5 percent of GDP.[2] What makes small states different from their larger peers? Relative to their larger peers, small states have structural features that make them more vulnerable to external imbalances. Indeed, most small states are highly vulnerable to commodity price volatility because of concentrated exports and high import dependence, high trade costs due to weaker trade facilitation infrastructure, largely uncompetitive or stagnant export sectors, they face disproportionate impacts of natural disasters, low quality of economic institutions to support resilience, diseconomies of scale and restricted policy space due to high debt and fiscal challenges (Katusiime, 2018; Ruprah and

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[1] Small states are those countries with a population below 1.5 million.
[2] Milesi-Ferretti and Razin (1996) noted that current account deficits that exceed 5 percent of GDP are a cause for concern, and more so if the deficits are financed by short-term debt or foreign exchange reserves.

Sierra, 2016; IMF, 2015). Thus with those structural features, large and persistent current account deficits are more likely to trigger dramatic economic upheavals such as financial crises, exchange rate crises, accumulation of foreign debts that can become a challenge to service in the long-run and lead to adverse effects not only on net international investment positions but also on overall macroeconomic and socioeconomic performance of small states (Ganioğlu, 2013; Acevedo, Cebotari, and Turner-Jones, 2013; Alleyne, Ötker, Ramakrishnan, and Srinivasan, 2017). Therefore, from a policymaker's perspective it is important to assess the sustainability of current account balances in small states and determine what polices are appropriate for small states to ensure long-term current account sustainability.

In that regard, this paper undertakes an econometric assessment of current account sustainability in small states. The concept of current account sustainability being tested examines whether a country can fulfill its long-run inter-temporal budget constraint without undertaking dramatic policy adjustments. The model is based on the works of Hakkio and Rush (1991) and Husted (1992) and involves testing for the existence of unit roots and cointegration of real exports and real imports in a panel framework. The rest of this paper unfolds as follows: the next section briefly outlines the model, followed by the data, the empirical results and the conclusions.

2. The model

This section outlines the intertemporal budget constraint model of Hakkio and Rush (1991) and Husted (1992) to test for the sustainability of the current account balances for small countries. The conceptual framework assumes that an individual in a small open economy faces the following current-period budget constraint:

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

where C_0, Y_0, and I_0 represents current consumption, income and investment, respectively. B_0 is current international borrowing, and $(1 + r_0)B_{t-1}$ represent the initial external debt of the representative individual and r_0 is the world interest rate. As the budget constraint must hold for all periods, forward iteration of Eq. (1) yields the following inter-temporal budget constraint:

$$B_0 = \sum_{t-1}^{\infty} \omega_t (X_t - M_t) + \lim_{n\to\infty} \omega_n B_n, \quad (2)$$

where: the trade balance (TB) is defined as income minus domestic absorption

$$TB_t = (X_t - M_t) = (Y_t - C_t - I_t),$$

X_t = exports, M_t = imports, and

$$\omega_t = \prod_{s=1} \left(\frac{1}{1 + r_s}\right)$$

is the discount factor. When

$$\lim_{n\to\infty} \omega_n B_n$$

equals zero it implies that the amount that a country borrows (lends) externally is equal to the present value of future trade surpluses (deficits). Following Hakkio and Rush's (1991) assumption that the world interest rate is stationary with a mean of r, Eq. (2) can be written as:

$$M_t + rB_{t-1} = X_t + \sum_{j=0}^{\infty} \frac{\Delta X_{t+j} - \Delta Z_{t+j}}{(1+r)^{j-1}} + \lim_{j\to\infty} \frac{B_{t+j}}{(1+r)^{j-1}}, \quad (3)$$

where Δ is the first difference operator and

$$Z_t = M_t + (r_t - r)B_{t-1}.$$

If we subtract X_t from both sides of Eq. (3) we get the current account of the economy on the left hand side as:

$$M_t - X_t + rB_{t-1} = \sum_{j=0}^{\infty} \frac{\Delta X_{t+j} - \Delta Z_{t+j}}{(1+r)^{j-1}} + \lim_{j\to\infty} \frac{B_{t+j}}{(1+r)^{j-1}}. \quad (4)$$

Further, the assumption that

$$\lim_{j\to\infty} \frac{B_{t+j}}{(1+r)^{j-1}} = 0,$$

yields the following regression model to be estimated.

$$X_t = \alpha + \delta M_t^* + \mu_t, \tag{5}$$

where

$$M_t^* = M_t + r_t B_{t-1}$$

represents imports of goods and services plus unilateral transfers (net), X_t is exports of goods and services, μ_t is the error term. The necessary and sufficient condition (strong form) for sustainable current account deficits require that the error term (μ_t) should be stationary implying cointegration between X_t and M_t^*, and that the cointegrating coefficient δ be equal to one. On the other hand, a weak form of sustainability would exist if the error term is stationary but the cointegrating coefficient δ is less than one, while no cointegration between X_t and M_t^* implies failure of the country to satisfy the budget constraint implying that debt default is likely.

3. Data

In this paper we construct a panel data set for a sample of 17 small states from different regions in the world for the period 1980-2017 is used.[3] The variables are derived from the International Financial Statistics published by IMF. Following (Husted, 1992), exports is defined as exports of goods and services, while imports includes imports of goods and services plus net transfer payments and net interest payments. The variables are measured in real terms as a percentage of GDP, using each country's consumer price index (CPI) as a proxy for the national price level.

4. Empirical results

The long run relationship between real exports and real imports for a panel of small states is examined by firstly testing the variables for the presence of cross-sectional dependence and unit roots. Then, tests for cointegration is applied, followed by an estimation of the panel cointegrating vector using various panel cointegration techniques.

3.1. Cross-sectional dependence, panel unit roots and panel cointegration

Before undertaking panel unit root tests, both variables are examined for the presence of cross sectional dependence using the Pesaran (2004) cross sectional dependence (CD) test. The Pesaran CD test statistic is computed as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right)$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pairwise correlation of residuals from an Augmented Dickey Fuller (ADF) type regression, N is the cross-sectional dimension and T is the time dimension (Pesaran 2004). Cross-sectional dependence among units in a panel is influenced by common global factors and unobserved components such as commodity price shocks, the decisions and actions of economic agents that lead to interdependence among individuals, and financial, economic and market integration processes (De Hoyos and Sarafidis, 2006; Banerjee and Carrion-i-Silvestre, 2017; Hsiao, Pesaran and Pick, 2012). Some panel unit root tests (referred to as first generation tests) assume cross-sectional independence while others (second generation tests) assume cross-sectional dependence across country units (see Hurlin an Migon,

[3] Based on the availability of data, the countries included in this paper are: The Bahamas, Bahrain, Barbados, Belize, Republic of Cabo Verde, Cyprus, Dominica, Swaziland, Fiji, Grenada, Malta, Mauritius, Seychelles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Trinidad and Tobago.

2007). For empirical applications related to macroeconomic variables, the assumption of cross-sectional independence which underpins first generation tests are too restrictive and can result in strong size distortions and limited power when testing for unit roots (Banerjee et al., 2004; 2005; Hurlin and Migon, 2007; Lyhagen, 2000; O'Connell, 1998; Phillips and Sul, 2003). In this regard the Pesaran (2004) CD test is used to test for cross-sectional dependence. Table 1 below shows the results of the CD test statistics, probability values (*p-value*) and the average correlations of the variables among the cross-sectional units. The results show evidence of a strong rejection of the null hypothesis of cross-sectional independence (zero p-values), indicating significant cross-section dependence, which is also evident from the relatively high correlation values of 0.40 and 0.30 for real export and real imports, respectively.

Table 1. Pesaran (2004) tests for cross section independence small countries.

Variables (in % of GDP)	CD-test	P-value	Avg. |(pij)|
Real exports	11.08	0.00	0.40
Real imports	6.66	0.00	0.30

Source: Authors estimates.

With the presence of cross-sectional dependence, we do not employ first generation panel unit root tests and panel cointegration test, but instead the cross-sectionally augmented Im-Pesaran-Shin (CIPS) test by Pesaran (2007) and the error-correction-based tests for panel cointegration by Westerlund (2007), as both allow for cross-sectional dependence among the units in the panel. The CIPS test tests a null hypothesis of non-stationarity under a non-standard distribution and it has been shown to have satisfactory size and power even when the dimensions of N and T is small (see Pesaran 2007 for details). Table 2 reports the results of the CIPS tests for both variables in levels and first differences. The CIPS test statistics show that that both variables are non-stationary in levels (except real imports when a trend is included) but stationary in first differences, indicating that both variables are integrated to the order of one, i.e. I(1).

Table 2. First and second generation panel unit root tests.

Pesaran (2007)

	Levels	First differences	Levels	First differences
	Without trend		With trend	
Real exports	0.095	-5.135	-0.965	-2.69
	[0.538]	[0.000]	[0.167]	[0.004]
Real imports	-1.627	-5.341	-6.013	-3.59
	[0.052]	[0.000]	[0.006]	[0.000]

Source: Authors estimates.

The error correction based panel cointegration test of Westerlund (2007) is then applied to test for the presence of a long-run equilibrium relationship between real exports and real imports. The Westerlund test has a null hypothesis of no cointegration, treats with cross-sectional dependence of the panel units through bootstrapping, does not impose a common factor restriction as in the residual based tests of Pedroni (1999, 2004) and Kao (1999), and allows for unit-specific short-run dynamics and unit-specific trend and slope parameters. The Westerlund test has are four panel cointegration tests consisting of two sets of alternative hypotheses: (i) group mean tests (Gt and Ga) and (ii) panel tests (Pt and Pa). The alternative hypotheses of the group mean tests does not assume equality of the error-correction term across panel units while the panel tests assume that the error-correction term is equal for all panel units. Table 3 reports the results which shows strong evidence of cointegration between real exports and real imports at the 5 percent level of statistical significance. Monte Carlo simulations by Westerlund (2007) showed that the panel tests have the highest power among the four tests. Moreover, among the

group mean tests, Gt has the highest power. Based on these results, there is sufficient evidence to conclude that null hypothesis of no-cointegration can be rejected for our group of small states.

Table 3. Westerlund (2007) panel cointegration tests.

	Value	Z-value	P-value	Robust P-value
G_t	-1.72	-2.94	0.00	0.00
G_a	-6.86	-2.77	0.00	0.00
Pt	-7.26	-4.42	0.00	0.01
Pa	-6.57	-7.90	0.00	0.00

Source: Authors estimates. *Note*. 500 bootstrap replications are used to obtain Robust P-value. The bootstrapped versions of the error-correction tests are robust to the presence of cross-sectional dependence.

3.2. Estimation of the panel cointegrating vector

The mean group (MG) estimator, pooled mean group (PMG), common correlated effects mean group (CCEMG) estimator and the common correlated effects pooled (CCEP) estimator are used to estimate the long-run parameters $(\hat{\beta})$ and the error-correction term $(\hat{\alpha})$ of the cointegration regression. The MG estimator of Pesaran and Smith (1995) estimates a regression for each country in the panel and produces an unweighted mean of the coefficients over the N cross-sections by allowing for all parameters (intercepts, slope coefficients, and error variances) to vary across groups. One of the drawbacks of the MG estimator is that it is highly sensitive to outliers especially for small sample size (small N) and does not consider the possibility that parameters may be homogeneous across groups (see Pesaran and Smith 1995). An alternative approach, PMG estimator, developed by Pesaran, Shin and Smith (1999) is also used. The PMG estimator allows for heterogeneity in short run coefficients, the intercepts and error variances across groups but constrains the long-run coefficients to be homogeneous across country groups. We also apply common correlated effects (CCE) estimators to address the issue of cross section dependence. The CCE estimators uses the cross-section averages of all variables in the regression to approximate unobserved common factors and thus eliminate cross section dependence. Pesaran (2006) proposed two CCE estimators: the pooled and mean group CCE estimator. The homogeneity test of Hausman (1978) which tests a null hypothesis of non-systematic differences in parameters between PMG and MG, and between CCEP and CCEMG is used to determined which estimator produces more efficient and consistent results. Failure to reject the null hypothesis of the Hausman test implies that the PMG and CCEP estimators are favored over the MG and CCEMG estimators (see Pesaran et al. 1999; Hausman, 1978).

The results are shown in Table 4. In the first instance, the Hausman test fails to reject the null hypothesis at 5 percent significance level indicating that the PMG and CCEP estimators are more efficient under the null hypothesis than the MG and CCEMG estimators. Given the presence of cross section dependence, we focus on the parameter estimates of CCEP model. The error correction term ranges from -0.195 (CCEP) to -0.282 (MG) and is also statistically significant at all conventional levels of statistical significance and has the appropriate negative sign indicating a stable long-run relationship between real export and real imports. The magnitude of the error correction term indicates that the system corrects for any deviations in the previous period at a speed of 20 percent (CCEP) annually to revert to steady state. The long run coefficient of real imports has the expected positive sign, ranging from 0.479 (MG) to 0.660 (CCEMG) and is statistically significant at all conventional levels of statistical significance. The size of the long run coefficient of imports allows for the classification of current account sustainability as either "strong" or "weak". Strong form sustainability requires cointegration between exports and imports, and for the long run coefficient to be equal to one. However, in the case of small states, this study finds that the estimated long run coefficient (0.635, from the

CCEP estimator) to be less than one from all estimators considered, which implies a weak form of current account sustainability for small states.[4]

Table 4. Dependent variable: Real exports.

Explanatory variables	PMG	MG	CCEP	CCEMG
Real imports+	0.566	0.479	0.635	0.660
	[0.06]***	[0.13]***	[0.06]***	[0.128]***
Error correction term	-0.235	-0.282	-0.195	-0.277
	[0.03]***	[0.03]***	[0.10]*	[0.03]***
Real imports+ (t-1)	0.431	0.405	0.392	0.346
	[0.06]***	[0.06]***	[0.05]***	[0.06]***
Hausman test (MG vs. PMG)	0.53	***Hausman test (CCE-MG vs. CCE-PMG)***		6.59
Prob>chi2	[0.47]	***Prob>chi2***		0.09

Source: Authors estimates. *Note.* *** Statistically significant at the 1% level. ** Statistically significant at the 5% level. * Statistically significant at the 10% level.

5. Conclusion

This paper examined the issue of current account sustainability of small states within the framework of an inter-temporal budget constraint approach using panel unit-root and cointegration tests that allows for cross-sectional dependence. The empirical analysis found evidence of cointegration between real exports and real imports. However, the long-run coefficient is less than one indicating a "weak" form of current account sustainability for small states. While the econometric exercise examines a sufficient condition for sustainability, the results does not necessarily imply unsustainability. Rather, it shows that the external balances of small states have been and are still in a vulnerable position. The findings are particularly instructive to policymakers and suggests that going forward there is a need for sound macroeconomic policies and the strengthening of institutional features in small open economies to guard against their high levels of exposure to international trade and capital flows, and external shocks. Moreover, the findings suggest that further research into the underlying determinants of current account deficits is needed as it can help policymakers to better target policy measures to those areas that contribute to doubts about the long-term external solvency of small states.

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[4] When cross-section dependency is accounted for, the long run estimate of real imports coefficient shows a higher degree of current account sustainability but still significantly lower than unity.

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