Sustainability of current account deficit in Fiji Islands: An empirical analysis

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Abstract

This study examines the sustainability of the current account deficit in the Fiji Islands. The empirical analysis is conducted utilizing the recent time series quantitative technique and annual data over the 1980 to 2013 period. This is of a significant concern because the convergence of national export and national import in the long run would ensure that the current account deficit is sustainable. It is found that while exports and imports for the Fiji Islands are cointegrated, the estimated coefficient of export is less than unity. These findings demonstrate that Fiji Islands only fulfills the necessary condition of intertemporal budget constraint and that the current account deficit is weakly sustainable. We propose that government shall take apposite policy actions to achieve sustainable current account position.

Key Words: export; import; current account; sustainability, Fiji Islands

JEL Classification: F32, F41, F43

1. Introduction

Global imbalance is described as the distortions in the external position of an economy particularly existence of relatively large current account deficits (Chinn 2013). It is not a recent trend as they have been present ever since 18th century (Haldane 2010). Global imbalances raised several concerns including global economy, financial stability and potential adverse contractionary effect for small developing economies. Subsequent to the great global financial crisis economists and researchers such as Krugman (2009), Bernanke (2009), Obstfeld and Rogoff (2009) have argued that financial crisis and global imbalance are interconnected. From a policy perspective the developments of these ideas have opened a troubling situation and renewed interest between researchers and policymakers in understanding the sustainability of current account deficits. Therefore, global imbalances have become one of the most recent controversial issues and are at the forefront of international economics.

After the Global Financial Crisis (GFC) many developed and developing economies experienced a declined in current account deficit. However, regions like Latin America, Europe, Caribbean and Africa experienced deterioration of current account deficit (World Economic Outlook, 2013). Pacific Island Countries (PICs) including Fiji islands also

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observed the worsening of the current account deficit. For instance, in the period 2000-2010 current account deficits in Fiji was in excess 10% percent of GDP. The GFC put substantial economic challenge on Fiji Islands by slowing economic growth, low demand for Fiji Islands export, resulting worsening of current account deficit situation, shrinking FDI, rising external debt and rise in unemployment and poverty (Colmer and Wood, 2012). As such, the potential for Fiji Islands to generate current account surplus in future and meet its foreign debt obligation successfully has become vital issue of concern to researchers and policy makers. Many developed and developing economies have brought reforms and amendments to their economic policies to sustain the rising current account deficit situation in their economies.

Like other developing countries, Fiji Islands since the beginning of its reforms in the 1980s has been undertaking numerous policy and structural measures to grow its economy and sustain the current account deficit situation. These policy measures involve liberalising policies for international trade and investment, offering tax incentives for FDI and increasing domestic export capacities, opening up individual sectors of the economy for foreign investments such as in tourism and manufacturing sectors (MITT, 2014)[2]. However, the current account deficit situation of the economy has not reduced substantially over the last three decades. An investigation of the sustainability of current account deficit in the Fiji Islands is essential for couple of reasons. One, since the current account deficit could have negative impact on the economic growth of a country, evaluating the sustainability of current account deficit is vital involving what the policy makers could do to sustain the increasing current account deficit. Two, during the last three decades, the Fiji Islands has introduced various policy reforms aimed to increase the economic growth and reduce current account deficit which has serious implications for the local and the international community, especially in regards to capital flows and international trade and investment. Three, from policy point of view, the resulting evidence from empirical analysis would assist policy makers to determine the appropriate policy in priority and relevant development areas to curb increasing current account deficit. This study utilizes the recent time series quantitative techniques to assess the sustainability of current account deficit in the Fiji Islands.

The remainder of the paper is arranged as follows: A survey of literature of sustainability of current account deficit is discussed in section 2. The theoretical framework and model specification to investigate the sustainability of current account deficit is presented in section 3. The model utilised in this paper uses total export and import of goods and services series. The model further examines cointegration between export and import and estimates the long run elasticity and error correction reaction model. Section 4 talks about data and methodology applied in the analysis. Section 5 provides the estimation results and finally section 6 provides conclusion.

2. Current Account Deficit Sustainability: Literature Review

One of the heavily discussed topics in area of international economics in recent times is the sustainability of current account disequilibrium. Prior to at least past two decades, there were only few notable theoretical and empirical frameworks on dynamics of current account. For instance, the conceptual framework developed by Sachs (1981) on open economy macroeconomic and particularly on intertemporal model on current account dynamics. Since then much of the work in the literature has been on the basis of Sachs (1981) framework. However, over the last decade several theoretical and empirical frameworks have been

[2] MITT is abbreviation for Ministry of Industries, Trade and Tourism.

developed to assess current account imbalance. Examples of this growing literature include the unit root test approach by Trehan and Walsh (1991), Cointegration approach by Husted (1992), Structural and operational indicators framework by Milesi-Ferretti and Razin (1996) and Roubini and Wachtel (1999), Debt sustainability framework by World Bank and IMF (2005) and error correction framework by Bohn (2007).

Trehan and Walsh (1991) unit root and Husted (1992) cointegration frameworks gave basis for majority of the empirical analysis on current account and public debts since 1990s. Trehan and Walsh (1991) apply standard unit root test to assess current account sustainability. For long term budget constraint to stand, the current account series must be stationary. Acceptance of stationary implies that the ratio of external debt to GDP are constant and present value of debt converges to zero indicating that intertemporal budget constraint hold and current account deficit is sustainable. Husted (1992) designed another method which involves long run cointegration association-ship among series of export and import for current account deficit to be sustainable. The null hypothesis of this method is that intertemporal budget constraint is satisfied in the economy. Hence, for intertemporal budget constraint to hold, export and import should be co-integrated – a necessary condition for sustainability of current account deficit. Further, the estimated slope (β) statistically close to one also implies sustainability of current account deficit.

Milesi-Ferretti and Razin (1996) questioning the conventional threshold of above 5 percent level of current account deficit as a red light to economy, developed a framework that take into consideration the structural and macroeconomic characteristics of an economy in analysing viability of CAD. In addition to intertemporal solvency Milesi-Ferretti and Razin (1996) argue the notion of willingness to pay and lend in analysing current account deficit sustainability is important. They suggest operational indicators such as export base, competitiveness, domestic savings, financial markets and political situation, openness, economic growth, exchange rate, fiscal and monetary policy, and expectation of market in analysing CAD. Roubini and Wachtel (1999) suggest that there is no single rule to measure when current account deficit is sustainable. However, they also outline theoretical criteria for assessing sustainability of current account. They highlight the critical assessment of sources of CAD, composition of current account, size of capital inflows, foreign reserves, exchange rate and political situation in analysing current account deficit.

As part of the MDG, World Bank and IMF in 2005 jointly proposed a debt sustainability framework for benefit of donors and low income countries to finance their development needs and at the same time avoid excessive external debt rise. The analysis conducted on regular basis which include economy's projected debt for over 20 years and take in consideration the external and policy shocks. It also assesses the risk of debt distress on debt burden which depends on country's institutions. Additional element of this framework is that it presents recommendations for lending and borrowing which limits the risks of future default (IMF, 2014).

In an important study Bohn (2007) shows why traditional unit root and cointegration approach are not reliable and sufficient condition for sustainability. He argues that intertemporal budget constraint can hold even if export and import series are not co-integrated and if deficit has unit root (Bohn, 2007, pp1840-1843). According to Bohn (2007) for intertemporal solvency, there need to be an error correction reaction among trade balance and net foreign assets. Unlike other framework, error correction framework allows one to understand the adjustment process of economic units saving and investment decision to any

changes in net foreign asset and react to external debt (Durdu, Mendoza and Terrones, 2013). The coefficient of error correction term indicates the speed of adjustment. Countries with large negative and significant error correction term are likely to react faster to changes in net foreign assets (Durdu, Mendoza and Terrones, 2013). While this framework provides very useful and improved method of assessing current account sustainability, its application in the context of small open developing countries is not yet done.

Empirical studies on current account sustainability, using these methods found conflicting results. Wu and Fountas (1999) found that United States export and import series for the period 1967-1989 and 1967-1994 are not co-integrated and that US current account is not sustainable. Greeks current account sustainability tested by Apergis et al., (2000) over the period 1960-1994 was found to sustainable. Bahmani-Oskooee (1994) tests the current account sustainability for Australia. He shows the evidence of long run cointegration among export and import and concluded that Australia is satisfying its intertemporal budget constraint. Tang (2003) applying autoregressive distribute-lad model examine the current account of sample of ASEAN countries. His results indicate that only in case of Malaysia and Singapore, the export and import are co-integrated in the long term. Arize (2002) investigate the sustainability of current account for fifty OECD and developing economies. He found the evidence of long run cointegration among export and import for 35 countries and out of this 35, only 31 countries has positive coefficient.

Using Husted (1992) approach, Hamori (2009) and Wu, Chen and Lee (2001) found mixed evidence on G7 countries. Similarly on Latin American countries, Kevin, Carlos and Alvon (2011), Huseyin and Ilhan (2010) and Herzer and Nowak-Lehmann (2006) found conflicting results. Mohammad (2008) show evidence of current account sustainability in India, Korea, Sri Lanka Thailand and Pakistan. While Tiwari (2012) focusing on Indonesia, Malaysia, Myanmar, Thailand and Philippines, found that current account is only sustainable in case of Myanmar. Studies on African countries have shown that current account deficit is mostly unsustainable (Narayan and Narayan, 2005; Sissoko and Sohrabji, 2012; Hashiguchi and Hamori, 2012). Thus, the sustainability of current account deficit is not clear using Husted (1992) framework except for African economies.

The findings of the above study appear to be different from the works that have utilised Trehan and Walsh (1991) framework to analyse current account sustainability. For example in case of African countries, Tang and Smyth (2008); Chu et al., (2007); Holmes (2003) using unit root properties of trade balance to assess sustainability, found conflicting results. In case of Latin American countries, Geogios, George and Merih (2004); Donoso and Martin (2013) and Holmes (2006) employing unit root test approach generally found that the current account is sustainable. Studies on Asian economies such as Baharumshah, Lau and Zubaidi (2005), Kim et al. (2009), and Lau, Baharumshah and Haw (2006) also found mixed results. Chen (2011,) applied Trehan and Walsh's (1991) approach found mixed result of sustainability and suggested that sustainability of current account can change in different periods. Focusing on OECD countries, Huseyin (2006) and Wu (2000) employing panel unit root approach present mix results of current account sustainability. Hence, it appears that there is no conclusive empirical work on current account sustainability.

There are few things that clearly stand out from literature. First, majority of empirical studies on current account deficit sustainability has increasingly applied Trehan and Walsh (1991) and Husted (1992) methodological framework. Solely depending on these approaches to evaluate current account sustainability could be questionable because findings could be

susceptible to the selection of particular method. Secondly, evaluating sustainability predominantly using cointegration and unit root test does not give robust result Bohn (2007). Bohn (2007) claims that cointegration and unit root frameworks are not complete analysis of current account sustainability because intertemporal budget constraint can hold even if there is no cointegration among export and import and non-stationary of current account deficit.

In the case of Fiji Islands there are only few studies in the extant literature that evaluates current account sustainability. Arize (2002) focusing on Fiji and Papua New Guinea (PNG) and employing data from 1972-1997and 1973-1994 respectively established that there is cointegration between export and import in Fiji but not in PNG. After that Narayan and Narayan (2004) covering the period 1960-2000 established cointegration between export and import in Fiji and in comparison to Arize (2002) they established cointegration of import and export in PNG and conclude that current account deficit is feebly sustainable. While the findings from these studies generally imply that current account deficit is sustainable in Fiji, the findings from these two studies are not likely to hold true. First, the sample size and period in these two studies ended in year 2000. Secondly, since 2005 exchange rate has been appreciated, external debt has increased, political environment worsened and Fiji has faced difficulty in achieving better economic growth from slow and low growth rates. Further these studies also experience same drawbacks of the extant literature as stated above. Hence, from the academic and policy perspective there is very limited study and knowledge regarding sustainability of current account in Fiji islands.

3. Theoretical framework and model specification

In this section the empirical and theoretical frameworks to evaluate current account deficit sustainability are discussed. The sustainability of current account deficit is evaluated with different approaches. These include the Cointegration approach by Husted (1992), error correction reaction method of Bohn (2007) and standard unit root test of Trehan and Walsh (1991). Examining sustainability of current account using multiple methods prevents sensitivity to choice of theoretical and empirical framework as pointed out in the literature as well as for robust outcome. The specification of each framework is outlined step by step in the following sections.

3.1. Cointegration Approach

Considering a representative consumer in a small open economy that is able to produce and export composite goods in the absence of government sector, Husted (1992) designed as simple and useful testable model. The consumer has access to international markets for borrowing and lending with given world interest rate. The consumer also maximises her utility given the budget constraint. The resource endowments include output and reallocated profit from firms which is used for consumption and savings. The budget constraint for current-period of the representative consumer is expressed as:

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

Here: C_0 is present consumption, Y_0 is level of output, I_0 is investment, B_0 is the overseas borrowing, it could be either plus or minus, r_0 is one period world interest rate $(1 + r_0)B_{-1}$ represent previous debt level of consumer and correspond to foreign debt level of country.

Given that equation (1) must stand for all time period, the period-on period budget constraints of all consumers can be summed up to obtain the intertemporal budget constraint for whole economy. Iterating (1) further, the budget constraint can be stated as:

$$B_0 = \sum_{t=1}^{\infty} \mu_t TB_t + \lim_{n\to\infty} \mu_n B_n \qquad (2)$$

Here: TB_t (trade balance) = $X_t - M_t$ which is (= Y_t - C_t - I_t), (income less domestic absorption) in period *t*. X_t is export and M_t is import. μ_t is discount factor labelled as product of first t values of λ, where: $\lambda = 1/(1+r_o)$.

If the last term on right of Equation (2) is zero, than the economy's international borrowing (lending) is same (equal) to the present value of future trade surpluses (deficit). If this is not the position and B_0 is non-negative, the country is bubble financing it international debt. If B_0 is negative and limit is not zero the economy is taking Pareto-inferior decisions. The welfare can be enhanced by lending less.

To derive a testable econometric model, equation (1) is rewritten with the assumption that world interest rate is stationary with conditional mean of r. Thus equation (1) is expressed as:

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

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

Iterating (3) forward following Hakkio and Rush (1991) and Husted (1992) to obtain:

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

Here: λ is equal to $1/(1+r)$ and Δ is operator for difference. The terms on left side of equation (4) includes spending on imports and interest payment (receipt) on net foreign debt (assets). Subtracting X_t from both sides of equation (4), and multiplying it by negative-one, the left side of equation represent economy's current account.

Further, taking that X and Z are non-stationary processes in levels and order of integration is one or I (1), then:

$$X_t = \alpha_0 + X_{t-1} + \varepsilon_{0t} \qquad (5)$$

$$Z_t = \alpha_1 + Z_{t-1} + \varepsilon_{1t} \qquad (6)$$

Here: α_0 and α_1 are drift parameters and possibly zero. ε_{0t} and ε_{1t} are stationary process. Thus, equation (4) is re-expressed as:

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

Here: $\alpha = [(1+r)^2 / r](\alpha_1 - \alpha_0)$; $\quad MM_t = M_t + r_t B_{t-1}$;

$\varepsilon_t = \sum \lambda^{j-1}(\varepsilon_{1t} - \varepsilon_{0t})$.

Assuming the limit term in equation (7) is zero, than equation (7) can be rewritten as standard regression model:

$$X_t = \alpha + \beta * MM_t + \varepsilon_t \qquad (8)$$

Where: X_t refers to export and MM_t is import. α is constant and β is a parameter to be estimated. ε_t is error term.

Several empirical studies are guided by Husted's (1992) theoretical framework[3]. This framework takes in consideration the long run association among export and import and has several useful advantages. One, the Husted (1992) framework enables to come to solid conclusion on current account sustainability. For example, one can decide and conclude clearly whether current account deficit is sustainable or not. Two, this theoretical approach is uncomplicated to understand and make use of. Three, and very important, this framework enables to distinguish weak-form of sustainability from strong-form of sustainability.
The weak-form, necessary condition for the country to hold its intertemporal budget constraint is for error term (ε_t) to be stationary process. In case if this condition do not stand, it would point out that the country in question is not functioning well, unsuccessful in satisfying its intertemporal budget constraint and therefore, likely to default its foreign debt obligations (Hakkio and Rush, 1991). Such results are interpreted as support against the sustainable current account deficit. On the other side, the strong-form, both the necessary and sufficient condition to hold country's intertemporal budget constraint is when $\beta = 1$ and ε_t is stationary. In other words, if export and import are cointegrated and estimated coefficient is unity then in the long term country is construed to satisfying its intertemporal budget constraint. Thus, it follows that equation (8) presents an ideal framework to assess the sustainability of current account deficit (surplus). It is important to be clear that deficit sustainability in weak-form implies that export and import series are cointegrated – in long run moving together, however the coefficient of import (MM_t) given by β in regression equation (8) is not necessary equal to 1. Similarly, country's imports exceed one dollar in order to generate one dollar worth of exports. The amount of exports generated by one dollar increase in imports is measured by β in equation (8). Hence, given the series of export and import are cointegrated (move together in the long run) and the more closer is the estimated coefficient is to unity (1), the stronger is the sustainability of current account. Further, if β turns out to be greater than 1, than current account deficit is weakly sustainable (Quintos, 1995). Hakkio and Rush (1991) also demonstrate this condition (β >1), suggesting that while it is consistent with stringent interpretation of country's intertemporal budget constraint, it may be not regular to the situation that debt to GDP must be finite and it may not be consistent with country's capacity to sell its external debt. Leachman et al., (2005) show that if β is greater than one, it implies that spending outpaces receipts and government is likely to engage in a Ponzi gamble that involves spending cut in bad state of nature or tax increase.

The null hypothesis: That the Fiji Islands is obeying its intertemporal budget constraint and we would expect that β is unity and ε_t is stationary.

3.2. Error Correction Reaction Function

Bohn (2007) claims that assessing sustainability using unit root and cointegration approach is not reliable since questions beyond intertemporal budget constraint cannot be answered by this approaches. He argues that despite export and import are not cointegrated and deficit is non-stationary, intertemporal budget constraint can hold. For intertemporal solvency condition to hold there should be error-correction-reaction relationship among trade balance and net foreign assets. The error correction association, compared to other frameworks, allow

[3] See Hamori (2009), Wu, Chen and Lee (2000). Kevin, Carlos and Alvon (2011), Huseyin and Ilhan (2010), Herzer and Nowak-Lehmann (2006), Narayan and Narayan (2005), Sissoko and Sohrabji (2012), Hashiguchi and Hamori (2012).

one to know the speed at which trade balance adjusts to any changes in external position. Durdu, Mendoza and Terrones (2013) suggest the presence of error correction indicate how economic units adjust their investment and savings decision in line with changes in net foreign asset position hence reacting to external debt. As a reaction function, error correction term (ECT) has natural economic explanation in relating the behaviour of the unit being examined. Durdu, Mendoza and Terrones (2013) claim that highly significant and negative value of ECT is indicative of rapid adjustments of trade balance to changes in external position. The error correction representation model can be obtained by rewriting equation (8) in terms of the lagged levels and the first difference of X_t and MM_t . Therefore, taking priori knowledge that export would be dependent variable than error correction model is expressed as:

$$\Delta InX_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta InX_{t-1} + \sum_{i=0}^{n} \delta_i \Delta InMM_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \qquad (9)$$

Here: Δ is difference operator. i = 0, 1…., n is lag orders and t refers to years. α , β_i and δ_i are the parameters to be estimated in relation to the short run dynamics of the models that convergence to normalcy while λ measures the adjustment speed.

4. Data and Empirical Methodology

This section provides information on data and methodology applied to assess the sustainability of current account deficit. The time series annual observation for Fiji islands over the period 1980-2013 is utilised to estimate the specified models. The methodology applied includes test for time series properties of data, autoregressive distributed-lag (ARDL), Phillip and Hansen's (1990) fully modified ordinary least square (FMOLS) and Johansen cointegration procedure.

4.1. Data

The data use to analyse sustainability of current account deficit are on two main economic variables- export and import. The main data source for this study is World Development Indicator (2014), Asian Development Bank's Key Economic Indicators (2014) and Reserve Bank of Fiji Islands various Quarterly Review. The data on export and import are in constant prices and includes aggregate export and import of goods and services.

4.2. Empirical Methodology

The empirical methodology involves finding the cointegration relationship, estimating long run and error correction reaction using time series observation of export and import of good and services to assess the sustainability of current account deficit. Granger (1981) first introduced the cointegration procedure. It was later extended by Engel and Granger (1987) in their seminal work and formalised. Cointegration portrays the presence of stationarity or equilibrium relationship at least between two time series variables, which individually are non-stationary. The benefit of cointegration procedure is that it is possible to integrate long run and short run dynamics among variables in combined framework. More essentially, the existence of cointegration between series rules out the specious regression result when estimated. The bounds F test of cointegration within the autoregressive distributed-lag (ARDL) framework proposed by Pesaran and Shin (1998) and FMOLS of Phillips and Hansen (1990) is used. The basis for applying ARDL procedure is that this method allows determining both the long run cointegration and error correction reaction among the variables regardless of the order of integration of the concerned variables. ARDL method also

introduces lagged levels and difference of the dependent and independent variables as explanatory regressors to enhance the impact (Gujarati and Porter, 2009).

However, before undertaking any analysis, it is vital to verify the nature of distribution and stationary properties of data used. Gujarati and Porter (2009) emphasis that in cointegration and model estimation, the series are unbiased and consistent only if there distribution is normal and they are stationary or there is no unit root problem. Proper time series checks are undertaken to prevent specious regression result. The test employed involves the Augmented Dickey Fuller (ADF), Kwiatowske, Phillips, Schmidt and Shin (KPSS) and Phillips and Perron (PP).

4.3. Unit Root Test

To ensure the stationary properties of time series data, Granger and Newbold (1974) suggests the testing of unit root before using it in a regression analysis. The standard Augmented Dickey Fuller (ADF) test is undertaken as a primary check for unit root in levels and first difference of the variables. Phillip and Perron (PP) unit root test, a nonparametric improvement of autocorrelation is alternative to Augmented Dickey Fuller. It is robust to general forms of heteroscedasticity in error term Newey-West (1987). Phillip Perron involves running following regression analysis: $\Delta y_t = \alpha + \beta Y_{t-1} + \varepsilon_t$. Here: Y is the variable under study, t is time trend, α is constant, β represent coefficient, Δ difference operator and ε_t is the error term. The null hypothesis tests if the variable contains unit root without trend and with constant and trend[4].

4.4. Estimation methodology

The bounds F-test to cointegration steps within the ARDL framework of Pesaran and Shin (1998) are followed to examine the long run cointegration between the variables. The two step procedure involves; (1) establishing the presence of long run cointegration and (2) estimating coefficient of long run relationship. To investigate the existence of long run cointegration in equation (8), the following unrestricted error correction (UEC) equations are tested where export and import are treated as dependent variable one at a time.

$$\Delta \ln X_t = \alpha_{0x} + \sum_{i=1}^{n} \phi_{ix} \Delta \ln X_{t-i} + \sum_{i=1}^{n} \phi_{ix} \Delta \ln MM_{t-i} + \beta_{1x} \ln X_{t-1} + \beta_{2x} \ln MM_{t-1} + \varepsilon_{1t} \qquad (10)$$

$$\Delta \ln MM_t = \alpha_{0m} + \sum_{i=1}^{n} \phi_{im} \Delta \ln MM_{t-i} + \sum_{i=1}^{n} \phi_{im} \Delta \ln X_{t-i} + \beta_{1m} \ln MM_{t-1} + \beta_{2m} \ln X_{t-1} + \varepsilon_{2t} \qquad (11)$$

X_t is export, MM_t is import, α_0 represent drift, β represent long run multipliers, Δ is difference operator and t is time.

It is important to note that bounds F test procedure to cointegration have additional benefit of informing which series would be dependent variable among all the series in the equation. Thus, we move on from a priori specification of dependent variable. However, it is also important to note that irrespective of which variable turns out to be dependent variable, the analysis in relation to current account sustainability stays intact. For example, in Baharumshah et al., (2003) export was dependent variable and in Arize (2002) import was dependent variable. The null of no long run cointegration ($H_o : \beta_{1x} = \beta_{2x} = o$) is rejected if the calculated F-statistics stands above the upper band of the critical value, supporting the evidence of cointegration. If the calculated F-statistics is below the lower band of critical

[4] The null hypothesis is accepted if ADF hypothesis states that a variable contain a unit root or support against it (Phillips and Perron, 1998)

value, the null hypothesis of no long run cointegration cannot be rejected[5]. The critical bounds values for small sample study are obtained from Narayan and Narayan (2005). Once the cointegration test is confirmed, F-test will indicate which variable to normalise on and then using that, long run coefficient is estimated. This also involves taking appropriate order of lags using lag selection criteria such as Schwartz Bayesian Criteria (SBC) to lower the serial correlation intensity in residuals[6]. Further, the study also attempt to employ error correction reaction function suggested by (Bohn, 2007) to look at the adjustment process of investment and saving decision of economic agent in evaluating current account deficit sustainability. To this end a step forward is taken to estimate the error correction term (ECT). The error correction representation model takes the form of:

$$\Delta InX_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta InX_{t-1} + \sum_{i=0}^{n} \delta_i \Delta InMM_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad (12)$$

$$\Delta InMM_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta InMM_{t-1} + \sum_{i=0}^{n} \delta_i \Delta InX_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad (13)$$

Here: Δ is difference operator. $i = 0, 1\ldots., n$ is lag orders and *t* refers to years. α , β_i and δ_i are the parameters to be estimated in relation to the short run dynamics of the models that convergence to normalcy while λ measures the adjustment speed.

4.5. Johansen Cointegration

To establish the robustness of the cointegration the study also employs Johansen (1988) and Johansen and Juselius (1990) maximum-likelihood method in assessing the cointegrating relation among export and import series in current account. Johansen test procedure is testing the long run association among series of identical order of integration in the course of cointegration regression. Johansen (1988) shows the determination of cointegrating vectors and as well as estimating the distinctive relationships. This is similar to testing the linear regression residuals for stationary. Thus, generalising to *n* number of variables can be expressed as:

$$\Delta y_t = c + \gamma_1 y_{t-1} + \ldots\ldots + \lambda_p y_{t-i} + \varepsilon_t \quad (14)$$

Here y_t and ε_t are (n x 1) vectors of variables and disturbances respectively; γ_i is *n x n* matrix of parameters of *n* variables; and *c* is constant. Given if each element of γ is zero, y_t is a first order vector auto regression (VAR) process same as $\Delta y_t = \varepsilon_t$.

Further, by imposing cointegration constraint, equation (14) can be reformulated in the form:

$$\Delta y_t = \mu + \sum_{i-1}^{p-1} \Gamma_i \Delta y_{t-i} + \Pi y_{t-p} + \varepsilon_t \quad (15)$$

Here: $\Pi = \sum_{i=1}^{p} A_i - I$ and $\Gamma_i = \sum_{j=i+1}^{p} A_i$

[5] The result is inconclusive when the F-test statistics set within the lower and upper bound critical values (Pesaran and Shin, 1998; Pesaran et al., 2001)

[6] See Yin and Hamori (2011, p.4)

If the rank of a coefficient matrix Π, has reduced to $r < p$, then there exist $p \times r$ matrices α and β each with rank r so as to $\Pi = \alpha\beta'$ and $\beta' y_t$ are stationary. Here, r is cointegration relations; α denotes adjustment to disequilibrium; and β represents cointegrating vector. Johansen approach estimate the matrix (Π) from unrestricted VAR model and tests if the restrictions imposed by the reduced rank of a matrix (Π) could be rejected[7].

To obtain the cointegrating relationship, there are two forms of statistical tests (Johansen and Juselius, 1990; and Johansen, 1995). The first form is trace test given as $\lambda_{trace}(r) = -T\sum_{i=r+1}^{n}\ln(1-\hat{\lambda}_t)$ and second test is Max test given as $\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1})$.

Here, $\hat{\lambda}_t$ represents the estimated Eigen value and T is the sample size. Trace test looks at linear combinations of r for a given value. So starting with zero, null would be (H0: r = 0) versus the alternative hypothesis (H0: r > 0). Similarly, the maximum eigenvalue test has the null hypothesis of number of cointegrating vector as r for a given value; however, the difference is in alternative hypothesis of r +1. Thus starting with r = 0 and rejecting the null hypothesis in both the tests means there is only one linear combination of variables yielding stationary process.

5. Empirical Findings

This section discuss the empirical findings obtained from cointegration and estimated equations. To undertake meaningful statistical analysis and evidence based policy inferences, the standard descriptive statistics of data is examined. The data distribution appears to be normally distributed (see Appendix Table A1). Similarly, the unit root time series properties of the variables under study are examined and addressed by Augment Dickey Fuller (ADF), Phillip Perron (PP) and Kwiatowske, Phillips, Schmidt and Shin (KPSS) tests. To determined the long run cointegration among the variables bound test and Johansen Trace and Max test are employed. The autoregressive distributed-lag model is selected by Schwarz Information Criterion (SIC). The findings for unit root test, long run cointegration and elasticity and error correction reaction are discussed in the following sections.

5.1. Unit Root test Results

The results of unit root test of ADF, KPSS and PP for variables under study are presented in Table 1. The ADF, KPSS and PP tests are carried out for two sets; for constant and time trend and for constant and no time trend. For each of the unit root tests, variables tested in levels as well as in the first difference. The null hypothesis in ADF and PP is that the variable has a unit root versus alternative that the variable is stationary. The KPSS test contains the null hypothesis that series is stationary while the alternative has a unit root. The Variable ε_t is stationary in levels with ADF and PP as well as in the first difference under all the tests. Generally, the ADF, KPSS and PP indicate that when all the variables are in the first difference form, they are integrated order of I (1). The stationary process of residuals (ε_t) indicate that export and import series are cointegrated in long term and that intertemporal budget constraint holds, implying that current account deficit is sustainable (Trehan and Walsh, 1991)[8]. However, as discussed above this is only necessary condition (implying

[7] See Johansen (1995)

[8] Trehan and Walsh (1991) stressed that sufficient condition for budget constraint to hold is that current account deficit should be stationary. When current account deficit is stationary, present discounted value of total debt converges to zero, intertemporal budget constraint holds, implying that deficit is sustainable.

current account deficit is weakly sustainable) and not necessary sufficient condition. For sufficient condition the analysis travels further for specific cointegration test and long run coefficient assessment in relation to export and import series. Hakkio and Rush (1991) and Husted (1992) show that cointegration or stationary properties indicate only necessary condition (weak form) that economy is satisfying its intertemporal budget constraint. For necessary and sufficient condition (strong form) it requires that the export and import series be cointegrated and the cointegration coefficient equals to unity then economy is known to satisfying its long term intertemporal budget constraint.

Table 1: Unit Root test Results

Variables	Constant and without Trend			Constant and with Trend		
Variables in levels	ADF	KPSS	PP	ADF	KPSS	PP
X	0.69	0.68	1.98	-2.59	0.12	-2.54
MM	2.38	0.67	2.28	-0.98	0.21*	-1.27
ε_t	-5.47*	0.14	-5.47*	-5.35*	0.14	-5.33*
Variables in first difference						
X	-6.71*	0.25	-6.76*	-7.03*	0.13	-7.47*
MM	-7.47*	0.45	-7.45*	-8.59*	0.06	-8.77*
ε_t	-5.45*	0.11	-21.45*	-5.32*	0.04	-22.16*

Note: * and ** represent one and five percent significance level. Critical value of constant without trend for ADF test is -3.65 at one percent and -2.95 at five percent significance level. Critical values for constant with trend for ADF test is -4.26 at one percent and -3.55 at five percent significance level. The lag length based on Schwarz information criterion is 2 in ADF. Phillip-Perron has critical value of 3.64 for constant without trend and 4.24 for constant with trend. The critical value of constant without trend for KPSS is 0.73 at one percent. The critical value for KPSS for constant with trend is 0.21 at one percent significance level. Newey-West criterion determined the truncation lags in KPSS unit root test.

5.2. The Cointegration Results

The bounds F-test within ARDL procedure first ascertain the presence of single long run cointegration relationship amongst the variables in equation (8), using equations (10) and (11). Given the study uses annual data, the maximum lag in unrestricted error correction model was set to 2. The result of the estimated bounds F test is provided in Table 2. The result indicates that there is a long-run cointegration relationship among export and import. For equation (10) where export is a dependent variable, the F-statistics is 1.42. It is less than lower bound critical value of 2.58; hence, the null hypothesis of no cointegration cannot be rejected. For equation (11) the F-statistics of 4.26 is higher than the upper bound critical value 3.86 at five percent significance level. Here the null of no cointegration is rejected, implying that there is single cointegration long run relation among the variables. Bounds test also informs precisely which variable to be normalise on in the planned model. Therefore, the results suggest only one significant cointegration long run relation between export and import and that when imports are taken as a dependent variable in the model.

Table 2: Bounds F- Statistics for Cointegration

Model	K	Bounds Critical Value (90%)		Estimated F Statistics	Pass/fail
		LowerBound	UpperBound		
Equation 10	4	2.622	3.506	1.42	Fail
Equation 11	4	2.622	3.506	4.26**	Pass

Note: K – Degrees of freedom. Critical values are extracted from Narayan and Narayan (2005). ** represent significance level at five percent.

The Johansen cointegration test result is provided in Table 3. For equation (8) the trace statistic while testing the null hypothesis of none (no cointegration) is estimated to be 19.54 which is higher than 5 percent critical value of 15.49. The findings from maximum eigenvalue statistics which is also reported corroborate with those of trace statistics test. The estimated maximum eigenvalue statistics of 16.35 exceeds the critical value of 14.26 at 5 percent level. Thus, the trace and Maximum eigenvalue statistics together provides a strong basis to conclude that there is a single long run cointegration relationship among export and import. The cointegration result is an initial indication of necessary condition for intertemporal budget constraint to hold, implying that current account deficit is "weakly" sustainable. The "strong" form of current account sustainability requires that export and import are co-integrated and the estimated long run coefficient of export is equal to one.

Table 3: Johansen Cointegration Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value	Prob.**
None *	0.454412	19.54928	15.49471	0.0116
At most 1	0.111443	3.190236	3.841466	0.0741
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value	Prob.**
None *	0.454412	16.35904	14.2646	0.023
At most 1	0.111443	3.190236	3.841466	0.0741
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

5.3. Long run and Error correction Results

Having confirmed the long term cointegration relation among the variables in equation (11), equation (8) is estimated to obtain the coefficient of β using the following ARDL model. Subsequently the short run error correction reaction function (equation 13) is estimated.

$$MM_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 MM_{t-i} + \sum_{i=0}^{n} \beta X_{t-i} + \varepsilon_t \qquad (16)$$

The estimated results of long run cointegration and error correction reaction function are presented in Table 4. The long run findings shows that the coefficient (β) of export is amusingly more than unity (one). The export coefficient of 0.68 suggest for every dollar earned in exports, imports increases by \$0.68[9]. A step further is taken to test the null hypothesis that estimated coefficient of X_t is equal to one (H0: β =1). The Chi-squared value estimated by the Wald test for coefficient restrictions indicate that export elasticity is

Table 4: Long Run Coefficient and Error Correction Results

Dependent Variable : Import (*MM*)

ARDL estimates				FMOLS estimates			
Variables	Long-Run coefficient	ECT (short-run) coefficient		Variables	Long-Run coefficient	ECT (short-run) coefficient	
	(5.16)		(5.13)		(5.16)		(5.13)
MM_{t-1}	0.61	ΔMM_{t-1}	0.56	MM_{t-1}	0.67	ΔMM_{t-1}	0.32
	(4.62)*		(3.20)*		(7.06)*		(2.04)**
X	0.68	Δ X	0.61	X	0.82	Δ X	0.80
	(4.31)*		(3.86)*		(6.98)*		(5.26)*
X_{t-1}	0.26	ΔX_{t-1}	0.21	X_{t-1}	0.46	ΔX_{t-1}	0.12
	(1.12)		(0.93)		(2.69)**		(0.79)
Constant	-0.59	Δ constant	-1.06	Constant	-0.92	Δ Constant	-0.018
	(-1.41)		(-2.68)**		(-2.84)*		(-0.722)
		ECT_{-1}	-0.38			ECT_{-1}	-0.27
			(-2.93)*				(-2.54)*
R-squared	0.99			R-squared	0.65		
DW	1.86			DW	1.68		
F-statistics	12.18			F-statistics	8.611		
$SCx^2(1)$	0.373			$SCx^2(1)$	0.142		
$FFx^2(1)$	0.152			$FFx^2(1)$	0.814		
$NNx^2(2)$	0.127			$NNx^2(2)$	0.439		
$Hx^2(1)$	0.809			$Hx^2(1)$	0.219		

Note: T-ratios are written below the coefficients in brackets. *, **, *** refers to significant level at one, five and ten percent correspondingly. Legend: DW is Durbin Watson's Statistics, SC is Breusch-Godfrey LM test for serial correlation, FF is Ramsey test for functional form, NN is the Jarque-Bera test for test of normality and H is White test for heteroscedasticity.

not equal to one. Based on the associated p-value we are able to reject the null hypothesis[10]. Again this implies that the coefficient of export is not equal to one (unity). On whole, the result shows that there is a cointegration relation between import and export and the

[9] See Leachman et al., (2005) for they suggest that if β is greater than one, it implies that spending outpaces receipts and government is likely to engage in a Ponzi gamble that involves spending cut or increase in taxes.

[10] The null hypothesis of $\beta = 1$ has Chi-squared Wald Statistics of 4.08 with p-value of 0.043 while the null hypothesis that $\beta = 0$ has Chi-squared Wald Statistics of 18.58 with p-value of 0.000.

estimated coefficient of export is less than one as indicated in the long run regression result. Therefore, in Fiji Islands there is evidence that only one, the necessary condition (weak form) for its intertemporal budget constraint to hold is satisfied, implying that current account deficit is weakly sustainable in the long run.

Although the import and export have long run equilibrium relation, the result shows that this relation is temperated by persistently large income relative to expenditure[11]. There appears to be no serious concern that the current account deficit may possibly explode in the near future. However, on policy perspective it is worth to mention that since Fiji Islands has assumed excessive borrowing strategy, any failure to address this could lead to complete violation of its intertemporal budget constraint. The deficits and debt accumulation over the study period have been the norm in Fiji Islands[12]. The budgeting process seems to exhibit a lot of debt accumulation and inconsistent with the requirement that would allow them to control or sustain such debts with respect to the economic situations. Thus, it is likely that Fiji Islands lack appropriate policy response to persistent debts and deficits or the policy response are simply inadequate in addressing these issues. Furthermore, it is worrying that any adverse impact on the country, such as political instability, will affect exports, escalating the estimated parameter from 0.68. From economic standpoint, the advantageous provision for Fiji Islands is to have stable political and economic environment. Previous experiences with unstable political and economic climate have shown that exports fall while imports rise to meet the increasing local demand. However, the magnitude by which the parameter of 0.68 will grow due to an adverse impact such as political instability will be subject to the intensity of the impact. Given the indecisiveness about the intensity of an adverse impact, the policy makers in Fiji Islands should be concerned regarding the current account deficit sustainability.

Furthermore, with the view that the long term cointegration result with the ARDL estimator presents a sturdy evidence of the weakly sustainable current account deficit and the resulting implications for appropriate policy actions that it carries, it is vital to ascertain that the results are robust and comparable across the different estimators to bring confidence in the policy decisions. As such the study also applies Phillip and Hansen's (1990) FMOLS (fully modified ordinary least square) estimator. The FMOLS procedure is not only designed to produce consistent long run parameters but it also takes into consideration the inherent issues of endogeneity of the regressors and serial correlation[13]. Table 4 also reports the long run parameters based on the FMOLS estimator. As anticipated, the long term elasticity of the import with respect to export is positive and less than unity. The coefficients attain using the FMOLS estimator is similar to that attained from the ARDL estimator. The sizes of the

[11]At the same time it is also important to note that Fiji Islands is heavily dependent on import of products such as consumption goods and services, transport equipments, machinery, capital and other intermediate inputs. For example, in 2016 total value of imports stand at FJD4839.2 million. Relative to 2015 imports increased by FJD82.4 million (1.7 percent). The export in 2016 is recorded at FJD1936.6 million, a decrease of FJD122.6 million (6 percent) relative to 2015. As a result trade deficit increase to FJD2902.6 million in 2016 compared to FJD2697.6 million in 2015.

[12] The government debt increased by about FJD$1.136 billion between 2006 and 2014. The debt to GDP ratio stands more than 50 percent. The total debt raised from FJD3.7 billion in 2015 to an estimated FJD$4.4 billion in 2016.

[13] See Phillips and Hansen (1990) and Agbola (2013) among others, and Chapter six for full details on FMOLS procedure.

coefficients emerge plausible. Generally, the analysis show statistically significant effect of export on the long term import and results appear to be robust to the different estimation procedures.

The result of error correction reaction function or error correction term (ECT) that reflects the adjustment process in saving and investment decision towards equilibrium in short run model carry correct sign (negative) and it is significant statistically in both estimators, indicating that long term equilibrium is reachable. The estimated coefficient of -0.38 in ARDL approach and -0.27 in FMOLS indicates that any divergence from long-run level of spending (imports) in the existing period is adjusted by about 38 percent and 27 percent respectively in the following period or on average by about 33 percent. It also indicates that if once strike by any shock, the amendment towards the long-run equilibrium is rather slow. The sign and significance of the error correction term is also equal to the test of cointegration. The negative and statistical significance of lagged ECT in both ARDL and FMOLS estimator corroborates with the earlier findings of bounds F-test and Johansen cointegration test that the variables under study (export and import) are cointegrated in the long run.

Besides estimating the long run cointegration and error correction reaction function, the regression analysis is generally well modelled. Diagnostic checks are applied to error correction model (See Table 4). The Breusch-Godfrey LM test provides no evidence of serial correlation in the residuals. The errors appear to be normally distributed as the model succeeds the Jarque-Bera normality test. The model is properly specified as indicated by Ramsey RESET test of functional form. The test for heteroscedasticity indicates regressors are independent and errors are homoskedastic. The R-square is relatively high signifying good explanatory power of the model and F-statistics are significant statistically at one percent level. The cumulative sum of squares (CUSUMSQ) and cumulative sum (CUSUM) of recursive residual are used check the stability of the estimated coefficient (Brown et al., 1975). It is clear that regression equation is stable given that the test statistics of CUSUM and CUSUMSQ does not surpass the critical bound at 5 percent level of significance (See Appendix Figure A1 and A2).

6. Conclusion

This paper provides empirical evaluations of sustainability of current account deficit in Fiji Islands. The empirical result shows that import and export are cointegrated. However, the estimated coefficient of export is not equal to unity. This indicates intertemporal budget constraint in Fiji Islands is only partially satisfied. Long term cointegration relation demonstrate that current account deficit is weakly sustainable. Strong form of current account deficit sustainability requires both cointegration between export and import and estimated coefficient of export to be equal to unity. This is not the case in Fiji Islands. The cointegration relationship is temperated by large income relative to expenditure. The findings illustrate that every dollar earned in exports, imports increases by $0.68. This may not be consistent with country's capacity to sell its external debt all the time. The short run error correction reaction model that represents adjustment process of saving and investment decision towards equilibrium is negative and significant however, the speed of adjustment is somewhat slow. The error correction model also confirms the cointegration relation among the variables.

This also could be the scenario in other Pacific Island Countries with large persistent current account deficits. However, Fiji Islands has a different position since its growth and

development process is closely associated with export, import, government fiscal policy as well as investments. Based on these findings we shall recommend that Fiji Islands should attract more FDI particularly in export and manufacturing sector to increase its revenue base. This is could be done through building confidence in the domestic economy through political stability and corporation with relevant stakeholders based on mutual benefits which will ultimately boost confidence of investors, legislative reforms to better protect the investors and their investments and upgrading the existing infrastructure to improve the connectivity and communication within country and across the region. Like China, Fiji Islands should also attract foreign Fijian businessmen and entrepreneurs to come back and invest as this could be the steady base for FDI and sustainable current account. In addition, while imports are crucial for developing economies at initial stage of development and particularly if imports are more of capital goods and intermediate inputs, Fiji Islands should ensure efficient use of imported capital goods and reduce reliance on imported consumption goods that has potential to be produced domestically.

Appendix A

Table A1: Descriptive Statistics, equation 8 (1980-2013)

	MM	X
Mean	2.15E+09	1.90E+09
Median	1.76E+09	1.86E+09
Maximum	5.51E+09	4.32E+09
Minimum	5.19E+08	4.54E+08
Std. Dev.	1.40E+09	1.14E+09
Skewness	0.558949	0.435033
Kurtosis	2.283343	2.27167
Jarque-Bera	2.497997	1.823928
Probability	0.286792	0.401735
Sum	7.29E+10	6.47E+10
Sum Sq. Dev.	6.47E+19	4.27E+19
Observations	34	34

Figure. A1: Cumulative Sum of Recursive Residual

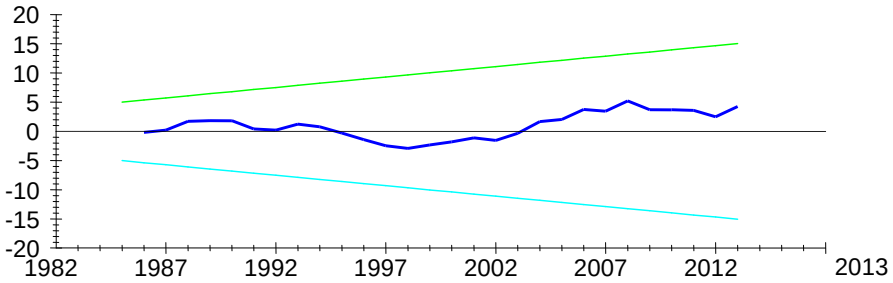
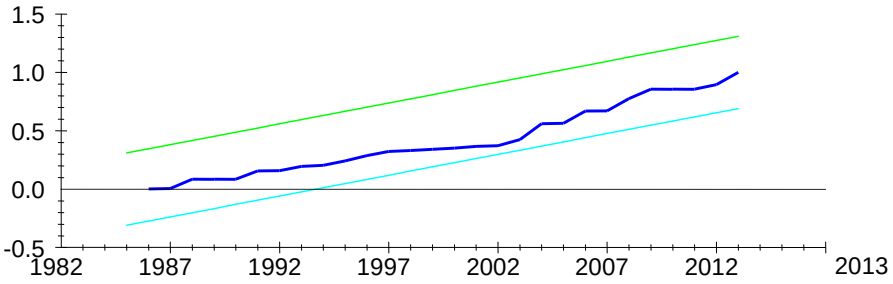


Figure. A2: Cumulative Sum of Squares of Recursive Residuals



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