J-CURVE DISPARITY IN THE GOODS AND SERVICES SECTOR IN THE PACIFIC REGION: EVIDENCE FROM DEVALUATION IN FIJI

Kushneel Prakash*[1], Dibyendu Maiti[2]

[1]School of Economics,The University of the South Pacific,
E-mail Address: kushneel.prakash@usp.ac.fj
[2]School of Economics,The University of the South Pacific,
Email Address: dibyendu.maiti@usp.ac.fj

Abstract

The J-curve phenomenon argues that currency devaluation leads to worsening of trade balance in the short run but gradually improves in the long run. The current paper attempts to empirically investigate this in the context of Fiji which has undergone devaluation four times during the last three decade. Using Vector Error Correction Model, we find evidence of J-curve phenomenon on goods trade, but not on services over the period 1975 to 2012. We argue that adjustment in the goods takes place gradually with domestic production, but not in exportable services.

Keywords: J-curve, devaluation, Fiji, trade balance, exchange rate

Address for Correspondence:
School of Economics
Faculty of Business and Economics
The University of the South Pacific
Laucala Campus, Private Mail Bag
Suva, Fiji

1. Introduction

The importance of international trade in an economy and in the economics literature has long been recognized and goes back at least to Adam Smith. In most countries, trade represents a significant share of gross domestic product and is one of the major sources of foreign exchange earnings among the countries. While trade allows countries to expand their product markets, it also exposes them to shocks in the global economy. The recent debate on the effects of global slowdown due to global financial crisis has forced both developed and developing economies to look for strategies to cushion its impacts on the domestic economy. This has given renewed interest to analyse trade imbalances and better understand the effect of exchange rates on international trade performances.

In spite of the plethora and increasing number of studies on the relationship between exchange rate and trade balance[1], the ultimate effect of exchange rate on trade performance is still an open and controversial issue. The literature shows that results are largely country specific and dependent on a number of internal and external factors. Countries over time as part of their exchange rate-based stabilization policies undertake devaluation or depreciation of their currencies to improve trade balances, restore foreign reserves and to achieve favourable gains on the economic growth. The issue of exchange rate misalignment and consequent currency devaluation has long been an important issue for discussion among Less Developed Countries (LDCs) and Pacific region is no exception. The countries in the South Pacific region by and large still follow fixed exchange rate[2] system and very often devalue their currency to improve international competitiveness and trade performance. One such example is the island country of Fiji which has devalued its currency on four occasions in little less than three decade.

1.1 The J-curve theory

Bahmani-Oskooee and Ratha (2004) note that it is due to time lag structure that devaluation initially worsens trade balance before improving it at a later stage resulting in a pattern that is similar to the letter J, which is known in the literature as J-curve phenomenon. Since the initial work by Magee (1973) on J-curve phenomenon of devaluation, many several studies have been attempted with

[1] See Bahmani-Oskooee and Ratha (2004) for a detailed review of the literature on the exchange rate and trade relationship.

[2] Out of the six island countries in the South Pacific region with independent currencies, five of these countries follow fixed exchange rate systems. These includes Fiji, Samoa, Solomon Island, Tonga and Vanuatu.

different techniques, models and countries to validate the presence of J-curve[3]. One explanation for the J-curve phenomenon is that the prices of imports rise soon after devaluation and depreciation but quantities take time adjust to the new condition. As such Junz and Rhomberg (1973) identified several lags such as recognition, decision, delivery, replacement and production lag which leads to J-curve effect after devaluation.

2. Literature Review

The issue of devaluation is a long studied literature in economics particularly in international trade theory. The dominant view up until the late 1970s that devaluation improves trade balance, remedies trade balance problems and consequently enhances employment and output has been challenged towards the end of 1970s (Acar, 2000). Therefore, after the post 1970's oil crisis an alternative line of approach has emerged which questions the existing literature and argues that devaluation could be contractionary especially in developing countries. The debate on the mixed role of demand and supply side factors to address the effectiveness of devaluation gained much attention since then. Bahmani-Oskooee and Ratha (2004) argue that understanding the relationship between the terms of trade and the trade balance is the key to a successful economic and trade policy.

Though there is presence of plethora of empirical studies on the nexus and validity of J-curve phenomenon, there is still considerable debate on the nexus between exchange rate and trade balance performance. Given the extensive empirical literature on J-curve phenomenon, we confine our review to some of the recent studies on J-curve effect carried out in the context of developing countries. Bahmani-Oskooee and Alse (1994) employ Engle-Granger cointegration technique to study the impact of real effective exchange rate on trade balance for nineteen developed and twenty-two less developed countries from the period 1971Q1 to 1990Q4 and test for the J-curve pattern. The study finds long run positive impact of devaluation on the trade balance for Brazil, Costa Rica and Turkey while negative impact for trade balance in Ireland. With regards to Canada, Denmark, Germany, Portugal, Spain, Sri Lanka, UK and the USA the study finds that there is no long run relation of exchange rate with trade balance. Nonetheless, the existence of J-curve pattern is only valid for Costa Rica, Ireland, Netherlands and Turkey.

[3] See Bahmani-Oskooee and Ratha (2004) for a detailed review of the studies validating J-curve phenomenon of currency depreciation or devaluation.

Lal and Lowinger (2002) also using Johansen's cointegration error-correction technique and impulse response analysis for seven East Asian countries over the period 1980Q1 to 1998Q4 finds J-curve in six out seven countries (Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand), except for Japan. Similar J-curve effect are also found by Narayan (2004) for New Zealand using aggregate trade data. Akbostanci (2004) for Turkey and Georgopoulos (2008) for Canada also using quarterly and monthly data, respectively fail to find any support for J-curve effect in their study. Bahmani-Oskooee and Gelan (2012) also fail to find any evidence of J-curve effect for nine African countries which includes countries of Burundi, Egypt, Kenya, Mauritius, Morocco, Nigeria, Sierra Leone, South Africa and Tanzania over the period 1971Q1 to 2008Q4. Recently, Wijeweera and Dollery (2013) disaggregate the trade account into its two major components of goods and services sector and finds support for J-curve only in the services sector while the goods sector provide a weak negative response in the long run.

To the best of our knowledge, there is only one study carried out on the validity of J-curve in the context of a Pacific island developing economy which is in the case of Fiji by Narayan and Narayan (2004a). This study in fact is the only study till to date on J-curve among the countries in the South Pacific region excluding Australia and New Zealand. The study attempts to contribute to the J-curve literature following the works of Rose and Yellen (1989) to develop a partial reduced form of trade balance model for Fiji. The aggregate trade balance is modeled as a function of real effective exchange rate, domestic income and foreign income over the 1970 to 2000[4] period. The study while finding insignificant impact of devaluation on trade balance for Fiji in the long run, also confirms the validity of J-curve effect using impulse response function analysis and short run coefficients. The study notes that as the devaluation shock is done in the economy; the trade balance deteriorates in the first two years followed by an improvement in the overall trade balance, thereby validating the J-curve effect phenomenon of currency devaluation in Fiji. This result was also supported by the studies short term results from the error correction model where it noted that the lagged variables of real exchange rate shows initial deterioration followed by favourable impact on trade balance.

[4] The authors in describing the data report that the sample period is from 1970-2002, however, in the result section it reports sample period being covered from 1970-2000.

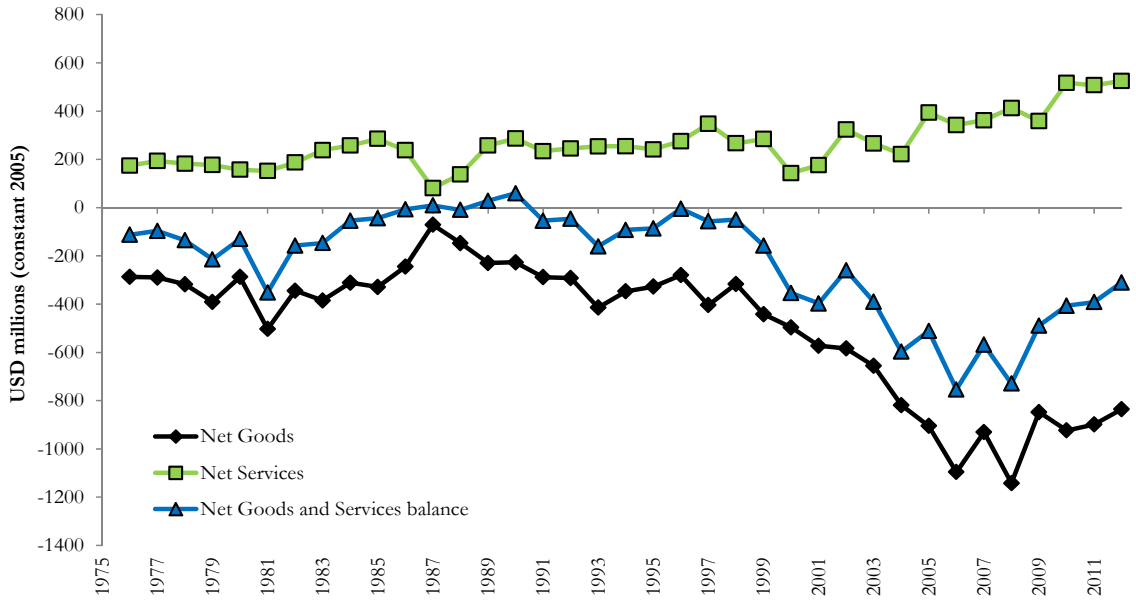
3. Brief overview of Fiji's economy

Fiji is one of the small developing Pacific island countries with a population of just over 800 thousand people. However, a little over the last two decades, Fiji's path to economic success has been disrupted by political instability following the first military coup in 1987 that toppled a democratically elected government. Following this, a coup culture has developed leading to coups in 2000 and 2006. This unforeseen political instability has created a difficult business climate. As a result, it has led to a sharp deterioration in investor confidence, fluctuating foreign investments, uncertain land ownership rights and has triggered a massive outflow of skilled labour force (Prasad, 2012a). Consequently, the growth in real GDP has not followed a stable path. Gounder and Prasad (2013) argue that Fiji's economic and social progress has also been severely hindered by the political uncertainty due to military coups which has subsequently resulted in increasing levels of poverty in the last two decades.

On the overall trade front, Fiji since independence has been troubled with negative trade balance of goods and services. Figure 1 below gives an overview of Fiji's trade performance over the last four decades disaggregated by goods and services sector. It is noted that the overall trade performance in Fiji for most of the years has been in deficit and the deficit is created as a result of continued deficit in the goods sector. It has continuously faced an increasing deficit problem with import of goods exceeding domestic export earnings. It is not surprising to note that imports have been expanding in Fiji, particularly in the past decade, given the country's shift towards trade liberisation. Trade balance in general has been negative and more recently has been much deteriorating. Some notable positive balances were seen in mid 1980s and 1990s for a short period of time when the economy experienced growth in manufacturing sector such as in sugar and garment sector as a result of Fiji's trade agreements. With increasing dominance of imports, the economy since the beginning of the millennium is experiencing increasing gap between imports and exports. Trade in services, on the other hand, is gaining momentum around the world and so it does in Fiji. Services trade performance in Fiji has been the biggest strength in terms of maintaining foreign reserves in the country by remaining in surplus balance for a long period of time. By and large, it has remained on a stable trend with some signs of modest improvements in its recent past. However, the service trade surplus has not been positive enough to offset the deficit created by goods sector in the economy resulting in the overall trade deficit in the economy. As is shows, the goods sector trade deficit has

been the main reason behind the country's overall trade deficit over the years. Though the relative share of service exports is rising, deficit created by goods sector is large in absolute terms which stand slightly above US$1 billion while service sector surplus have been slightly above US$600 million in 2012. This has resulted in overall goods and service trade deficit in 2012 of around US$400 million (FBOS, 2013).

Figure 1 **Goods and Services trade balance in Fiji, 1975-2012**

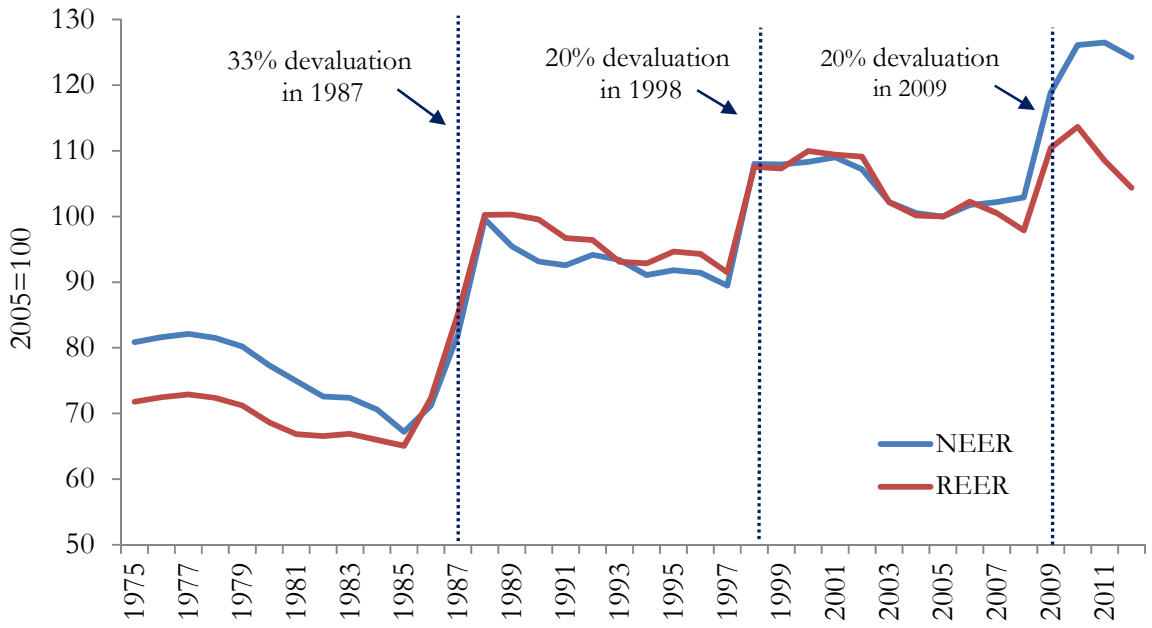


Notes: Net Goods/Services represents exports of goods/services minus imports of goods/services.
Source: Fiji Bureau of Statistics, Key Statistics (various years)

Hence, the economy coupled with the political instability, rising trade deficits and declining foreign reserves has devalued its currency by a total of 73 percent in its last 27 year history to correct the exchange rate misalignment (Figure 2). The currency was effectively devalued twice in 1987 by a total of 33 percent, in 1997 by 20 percent and more recently in 2009 by another 20 percent. Some scholars such as Chand (1998) and Jayaraman (1999) argued that the devaluation in 1987 were as a result of coups and loss of confidence in the economy and not as a result of any macroeconomic mismanagement. The 1998 devaluation was argued to be carried as a precautionary measure in response to the East-Asian financial crisis which was bound to affect Fiji's trade and capital flows.

However, Chand (1998) argued that the flow on impact of political uncertainty and the movement of financial ratios indicated unsustainability of the nominal exchange rate peg that triggered devaluation in 1998. His view was that the East-Asian financial crisis just provided an opportune moment for the devaluation and was not really the major reason for devaluation. Contrary to Chand (1998) and Jayaraman (1999), Dulare (2005) stated that the severe drought and the adverse weather conditions had serious impact on sugar production and exports which created pressure on foreign reserves and ultimately led to devaluation. This view was supported by Narayan and Narayan (2009) who argued that the devaluation was carried out to effectively boost Fiji's struggling foreign reserve position. Similar reasons were also given for 2009 devaluation as the RBF in its press release stated that the devaluation was done to cushion the severe effects of the Global Financial Crisis on the domestic economy (RBF, 2009).

Figure 2 **Real and Nominal Exchange Rate index in Fiji, 1975-2012**



Source: IMF's International Financial Statistics database (2013), online database

Hence, the impact of currency devaluation on Fiji's exchange rate is represented in the movement of trade weighted nominal effective exchange rate (NEER) and real effective exchange rate (REER) of

against the major trading partner country's currencies (Figure 2). The sharp increases in both the indexes in 1987, 1998 and 2009 points out to the years of devaluation in the country.

4. The Model

We now present the parsimonious trade balance model to be used in this study. Since the focus of our study is to investigate the impact of real exchange rate on trade balance and validate the J-curve pattern, the model is similar to the one presented in equation 4. Hence, we base our trade balance model on the works of Rose and Yellen (1989) which has been subsequently applied in many other studies in the literature (see Gupta-Kapoor and Ramakrishnan (1999); Lal and Lowinger (2002); Narayan and Narayan (2004); Georgopoulos (2008); Bahmani-Oskooee and Gelan (2012) and Wijeweera and Dollery (2013); among others).

Therefore, the trade balance model employed in this study directly relates a measure of trade balance to domestic real income, foreign real income and real effective exchange rate as expressed below:

$$TB_j = f(E^r, Y, Y^f) \tag{1}$$

Similar to Wijeweera and Dollery (2013) and in an attempt to further advance the exchange rate and trade balance literature along with literature on J-curve phenomenon in the PICs, we model trade balance, TB_j in three ways. Hence, j represents measure for trade of goods (TBG), trade of services (TBS) and then one for a combined trade balance for trade of goods and services $(TBGS)$. The trade balance measure is defined as the ratio of Fiji's exports over her imports with the rest of the world. This measure of trade balance as argued by Bahmani-Oskooee and Brooks (1999) makes the trade balance unit free, reflects either real or nominal trade balance and also ensures it to be specified in log-linear form. Furthermore, Y relates to real GDP in Fiji while Y^f represents the trade-weighted real income[5] of the trading partners. E^r represents Fiji's real effective exchange rate (REER). This is defined in a way that increase in REER indicates devaluation of the Fijian dollar against the currency of its trading partners. The above model (1) for the empirical analysis is being expressed in log-linear form as follows:

[5] See Appendix 1 for data description on the calculation of trade-weighted trading partner income.

$$\ln TB_t = \beta_0 + \beta_1 \ln E_t^r + \beta_2 \ln Y_t + \beta_3 \ln Y_t^f + \varepsilon_t \quad (2)$$

As far as the priori signs of the variables are concerned, it is expected that devaluation of the currency will encourage exports and discourage imports leading to expected positive sign of β_1. However, signs for β_1 can also be negative indicating that devaluation may actually worsen trade balance. In fact, the impact of devaluation on trade performance is expected to ultimately depend on whether devaluation is able to boost exports and in doing so how much of the increased export is due to contribution from domestic sectors of the economy rather than been imported. Moreover, the sign of β_2 which is the coefficient of Fiji's real GDP is expected to have a negative sign implying that an increase in Fiji's GDP will result in an increase in demand for its imports thereby reducing the trade balance. Though, equally possible contrasting argument states that if the increase in Y is due to an increase in the production of import-substitute goods, then Fiji may ultimately import less as its income increases. This might in turn lead to positive β_2. As such the relationship of Fiji's GDP with trade balance (β_2) can either be positive or negative. On the other hand, demand for Fiji's exports is likely to increase with the growing income levels in its trading partner countries resulting in a positive β_3. However, in a similar scenario to that of imports, if Fiji's trading partner countries experience rising GDP due to rise in production of those goods and services typically produced by Fiji, this would ultimately lead to negative β_3.

We also model related export and import demand equations in relation to each trade balance models being analysed in the study in order to investigate the underlying sources of impact on the respective trade balances. The export and import demand equations in consistent with trade balance equation 1 is modeled as follows:

$$EXP_j = f(E^r, Y^f) \quad (3)$$

$$IMP_j = f(E^r, Y) \quad (4)$$

where EXP represents total real exports of Fiji while IMP represents total imports of Fiji. In particular, the export equations being modeled are for export of goods ($EXPG$), export of domestic exports ($DOMEXP$), export of services ($EXPS$) and export of goods and services ($EXPGS$). The exports demand equation is being modeled as a function of real effective exchange rate, E^r and foreign income, Y^f. For the import equation, similarly import of goods ($IMPG$), import of services ($IMPS$) and import of goods and services ($IMPGS$) are being modelled. The imports demand equation is being modeled as a function of real effective exchange rate, E^r and domestic income, Y.

Hereafter, following the works Johansen (1988) and Johansen and Juselius (1990), we proposes to use the vector error correction model (VECM) to test the long run and short run relationship among the variables in our models. The testing procedure involves three steps of testing for the existence of unit root, cointegration test followed by estimating the short and long run relationship among the variables in the trade balance model specification. Since the trade balance model in equation 1 represents the long run relationship between trade balance and its determinants, in an effort to test for the J-curve phenomenon which is a short run concept, we must include the short run dynamics into the long run model. Hence, the easiest way to do so is to express equation 1 in an error-correction modelling format as below in equation 5.

$$\Delta \ln TB_t = \beta_{11} + \sum_{i=1}^{n} \beta_{12} \Delta \ln TB_{t-1} + \sum_{i=1}^{n} \beta_{13} \Delta \ln E^r_{t-1} + \sum_{i=1}^{n} \beta_{14} \Delta \ln Y_{t-1} + \sum_{i=1}^{n} \beta_{15} \Delta \ln Y^f_{t-1} + \sum_{i=1}^{n} \beta_{16} ECT_{t-1} + \varepsilon_t \quad (5)$$

where ECT_{t-1} is the error correction term lagged one period. The sign and size of the coefficient will reflect the direction and speed of adjustments in the dependent variable to deviations from the linear long run relationship. The lagged difference term describes the effects of n past values on the dependent variable. Hence, the lagged change in independent variables can be interpreted as representing the short run causal impact while the error correction term provides the adjustments between the dependent and independent variables towards their respective long run equilibrium.

5. Empirical Result Discussion

The empirical work begins with the test of unit root on the variables. We hereby utilise the widely used Augmented Dickey Fuller tests (ADF) to conduct unit root tests. All the variables are first transformed in its log-linear form and by including intercept term in the test equation for the ADF tests and using the Schwarz Info Criterion (SIC) optimal lag selection criteria, unit root tests are carried out. The major finding from the test is that we are not able to reject the unit root hypothesis at the conventional levels of significance however, when the variables are taken in its first difference form, we are able to reject the unit root null hypothesis. These results suggest that all the variables employed in the study are integrated of order one, that is they are I(1) in nature.

Table 1: Unit Root Tests (using the Schwarz Info Criterion; SIC)

Variables	ADF statistic		p-values	
	Level	First Difference	Level	First Difference
$\ln TBGS$	-2.133 (0)	-8.972 (0)	0.234	0.000
$\ln TBG$	-1.944 (0)	-8.126 (0)	0.309	0.000
$\ln TBS$	-2.737 (0)	-5.593 (1)	0.078	0.000
$\ln REER$	-1.505 (1)	-4.095 (0)	0.520	0.003
$\ln Y$	-1.312 (1)	-8.626 (0)	0.613	0.000
$\ln Y^f$	-1.386 (1)	-9.307 (0)	0.578	0.000
$\ln EXPGS$	-1.227 (0)	-6.691 (0)	0.652	0.000
$\ln EXPG$	-1.557 (0)	-6.691 (0)	0.494	0.000
$\ln DOMEXP$	-1.758 (0)	-6.511 (0)	0.395	0.000
$\ln EXPS$	-1.289 (0)	-5.845 (1)	0.624	0.000
$\ln IMPGS$	-1.384 (0)	-6.536 (0)	0.580	0.000
$\ln IMPG$	-1.202 (0)	-7.010 (0)	0.663	0.000
$\ln IMPS$	-2.280 (0)	-4.615 (0)	0.184	0.001

Note: The critical values including intercept in the test equation are based on MacKinnon (1996) which at 1%, 5% and 10% significance levels have values of -3.627, -2.946 and -2.612 respectively. The null hypothesis for ADF tests is that a series has a unit root (non-stationary). Lag lengths includes in the test are given in parenthesis. Therefore, the results show that the null hypothesis is rejected at the 5% level of significance and thus all the variables are I(1) in nature.

Since all the variables to be employed in the equations are integrated of order 1, this depicts possibility of long run relationship among the variables in the respective trade equations. We

therefore, move on to carry out cointegration tests using Maximum-Eigenvalue method. The finding from the test reveals that there is existence of at least one cointegrating equation suggesting the presence of co-movements among the variables and indicating long run stationarity in all our models.

Table 2: Cointegration Tests (using the Max-Eigen Statistics)

Null hypothesis $r = 0$ / **Alternative hypothesis** $r = 1$	$r \leq 1$ / $r = 2$	$r \leq 2$ / $r = 3$	**Conclusion on cointegration rank**
Goods and Services trade	36.806	15.428	8.990	1
Goods trade	39.974	13.212	9.931	1
Services trade	28.457	11.723	7.747	1
Goods and Services export	25.105	13.365	1.991	1
Goods export	30.209	11.728	1.219	1
Domestic export	31.495	7.340	0.346	1
Services export	22.946	11.888	3.374	1
Goods and Services import	24.888	10.462	1.167	1
Goods import	21.673	12.962	1.736	1
Services export	53.607	13.128	5.295	1

Note: r denotes the number of cointegrating vectors; Trend assumption: linear deterministic trend. The 5% critical values are based on MacKinnon-Haug-Michelis (1999). For trade balance models with four variables, the 5% critical values at r=0 is 27.584; r=1 is 21.132; r=2 is 14.265; r=3 is 3.841 while for export and import models with three variables, their 5% critical values at r=0 is 21.132; r=1 is 14.265; r=2 is 3.841. Hence, the results show that there is atleast 1 cointegration vector in the models.

5.1 Results of Long run elasticities

The long run elasticities for the goods, services and a combined for total goods and services trade are reported in Table 3. The coefficient of our main variable of interest; E^r in the goods trade and service trade balance model indicates different long run impacts. On the goods trade sector balance, the coefficient of E^r suggests that currency devaluation in Fiji leads to significant improvement in the goods trade balance while for the services trade sector, it indicates that Fijian currency devaluation tends to significantly worsen services trade performance in the long run. However, when these two sectors are taken together to model goods and services sector trade balance, the impact of E^r turns out to be significantly positive in the long run.

In particular, the regression results suggest, *ceteris paribus* 10 percent Fijian currency devaluation leads to significant improvement in the goods trade balance by about 30 percent while the same causes significant worsening of the services trade balance by approximately around 36 percent in the long run. On the combined model it indicates, *ceteris paribus* that 10 percent currency devaluation in Fiji significantly improves overall goods and services trade balance by approximately around 5 percent in the long run. Further analysis into the dynamics of separate goods sector trade reveals that the positive response of goods trade balance to currency devaluation stems from its favourable impact on the domestic goods export sector (Table 4). It is noted that the exports of goods has been significantly and positively influenced by devaluation in Fiji. This favourable impact on goods exports when further analysed shows that it is the domestic exports which has responded highly significantly and positively to devaluation in the country. However, the import goods sector has also responded positively to devaluation implying that currency devaluation has led to significant increase in total imports of Fiji but to a lesser extent.

To the best of our knowledge, the long run relationship estimate of exchange rate with service trade performance has not been empirically tested in any earlier studies in the context of Fiji. We argue that the significant and negative impact of currency devaluation on service industry in Fiji is largely due to the industry being import oriented in a sense most of its inputs it uses are imported such as food items and tourist luxury products, among others. We contend that though the absolute tourism numbers in Fiji has generally increased in recent years, most of the tourism related activities are highly import intensive such as food, fuels and recreational activities. Hence, rising cost of importable products has consequently led to worsening of service trade balance in the long run via the imported input cost channel. Additionally, Fiji as such do not hold much comparative advantage as other neighbouring Pacific counterparts which also boasts similar climatic conditions which continues to provide stiff competition to Fiji's tourism industry. The rising fuel costs coupled with devaluation has also risen costs of providing transportation services which all have combined together to result in overall negative impact of devaluation on service trade balance performance. As well, service sector imports such as travelling overseas for education, medical reasons, among others after devaluation appears not to have significantly declined resulting in rise in total service import bill and consequently adversely affecting service trade balance performance. Our findings are also supported by the recent IMF study carried out by Culiuc (2014) who studies on the determinants of

tourism in most of the countries in the world based on their data availability. The study results suggests that tourism which makes up a significant portion of service trade in small island countries including Fiji is less sensitive to changes in the country's real exchange rate and the effect is approximately close to zero. The study argues that this is largely as a result of higher import denominated food for tourists than the use of locally produced food. They also add that since most of tourists to the island countries depend on packaged vacations for which the prices are usually set in foreign currency by tour operators, the tourists often do not tend to benefit from these real exchange rate movements directly. On the contrary, the study shows that flow of tourism to small island countries benefit more as a result of additional direct flights to these countries than due to exchange rate movements.

Table 3: **Estimates of Long run coefficients of Trade Balance Models**

Trade Balance	E^r	Y	Y^f	Constant
Goods Trade Balance				
TBG	2.963***	-1.809***	-0.820*	30.187
	(0.571)	(0.427)	(0.415)	
Services Trade Balance				
TBS	-3.571***	0.171	1.859**	-25.631
	(0.812)	(1.117)	(0.861)	
Goods and Services Trade Balance				
TBGS	0.548***	-1.423***	0.013	0.018
	(0.162)	(0.417)	(0.114)	

Notes:
1. Standard errors are given in parenthesis.
2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.

Hence, we ascertain that the positive impact of devaluation on goods trade outweighs the negative contribution of devaluation on services trade balance in the long run. This result is in the same direction as to the findings of Narayan and Narayan (2004a) who also found positive but insignificant impact of Fiji's devaluation on its trade performance. It is therefore argued that since this study includes data till 2012 incorporating 2009 devaluation episode which appears to be

favourably influencing many trade sectors. Thus, our results are consistent with the arguments of Yang et al. (2011) and Gounder and Prasad (2013) who also argue that 2009 devaluation seems to have benefitted the service industry and in particular the tourism sector resulting in insignificant positive impact to turn out to be significantly positive. The regression results also show that the impact of devaluation is larger on the export of goods and services than the import of goods and services, which is causing the resultant favourable impact on the goods and service trade balance. Hence, we argue that though the 1987 and 1998 devaluation might have been having weak impact to some extent on overall trade performance, devaluation in 2009 when incorporated in the analysis makes the overall impact on trade performance to be significantly favourable in the case of Fiji. Therefore, devaluation as a policy tool to boost overall trade performance in Fiji has been effective in the long run.

Furthermore, the impact of domestic income variable is noted to behave in the expected manner as it is found to be significantly negative with a magnitude of -1.4 for the goods and service trade performance. This coefficient suggests that, *ceteris paribus* a rise in domestic income by 10 percent leads to significant increase in import demand and ultimately adverse impact on the trade balance by 14 percent in the long run. Similarly, when analysing the goods import demand function separately, shows that rise in domestic income leads to significant increase in imports implying contrary impact on goods trade balance. This is not surprising as Fiji being a highly import dependent economy, a rise in economic activity consequently leads to increase in production which ultimately means increase in demand for capital and intermediate goods which are largely imported. However, the impact of domestic income on service trade performance is insignificant. This suggests that rising income level in the country does not necessarily mean that people opt for services imports or particularly for tourism activities outside of the country. Since import of goods make up a significant share of total imports at around 80 percent, the subsequent positive impact on goods imports being translated into positive impact on the combined goods and services imports seems to be justified. Nonetheless, the positive impact of domestic income on import of goods and services are also supported by the findings of Narayan and Narayan (2004a), Narayan and Narayan (2005) and Singh (2006) in the context of Fiji.

Table 4: **Estimates of Long run coefficients of Export and Import Models**

Trade	E^r	Y	Y^f	Constant
Goods Trade				
EXPG	2.651***		-0.759***	17.671
	(0.360)		(0.205)	
DOMEXPG	4.712***		-1.890***	32.265
	(0.631)		(0.349)	
IMPG	0.289*	1.162***		-4.438
	(0.156)	(0.130)		
Services Trade				
EXPS	0.456*		0.793***	-5.676
	(0.262)		(0.152)	
IMPS	3.850***	-1.484**		17.189
	(0.762)	(0.676)		
Goods and Services Trade				
EXPGS	1.332***		0.133	5.203
	(0.244)		(0.140)	
IMPGS	0.372***	1.233***		-5.557
	(0.133)	(0.115)		

Notes:
1. Standard errors are given in parenthesis.
2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.

Moreover, the impact of trading partner income appears to have positive but insignificant impact on the overall goods and services trade balance for Fiji in the long run. The underlying export of goods and services also reveal similar insignificant impact of trading partner income which seems to result in neutral impact on overall trade. However, the same variable is found to be significantly positive for the service trade balance but is significantly negative for the goods trade balance for Fiji in the long run. The negative and significant impact of foreign income on Fiji's trade performance, we argue is possibly due to the nature of Fiji's goods exports which are largely agricultural products to these trading partner economies which is viewed as inferior products in these trading partner economies. Hence, with rising income in these countries, they tend to reduce consumption of traditional agricultural exports from Fiji and even switch to other cheaper trading partner countries

than Fiji. For the services trade performance, the impact is significantly positive as expected which suggests that rising income in Fiji's major tourist source countries induces increased in flow of visitors for tourism purpose in the country. Hence, the different impacts of trading partner income on goods and services sector results in the overall positive yet insignificant impact on overall trade performance in Fiji. The positive impact of trading partner income on export on goods and services and ultimately on trade performance has also been supported by the findings of Asafu-Adjaye (1999), Narayan and Narayan (2004a), Narayan and Narayan (2004b), Singh (2006) and Kumar (2009) in the context of Fiji.

Therefore, based on the empirical evidence it is established that currency devaluation is an effective tool to boost overall trade performance for Fiji in the long run. However, as far as the individual goods and services trade performances are concerned, impact of devaluation on goods trade is estimated to be positive but the unfavourable impact on the services trade performance could make the overall impact on trade to be undesirable or the magnitude of the impact being minimized in the long run. These long run results in this section however, do not shed any light on the short run dynamics among the trade balance models in our study. Hence, in the next section, we attempt to discuss how the goods and services trade components respond to Fiji's currency devaluation in the short run in order to test the J-curve phenomenon.

5.4 Results on Short run elasticities

In order to assess the short run impacts and the validity of the J-curve phenomenon, we summarise and present here the short run coefficients of only the real effective exchange rate variable in the models being estimated using the VECM. At the outset, it is important to mention that all the short run error-correction models are statistically well behaved. The error-correction term $ECT(-1)$, which measures the speed of adjustment to restore equilibrium in the dynamic model, has negative sign, is statistically significant and ranges between 0 and -1 in all the cases ensuring that the series are non-explosive and that long run equilibrium are attainable. The coefficient of $ECT(-1)$ in the goods trade balance is estimated at -0.53, service trade balance model at -0.15 while for the combined goods and services trade balance, it is estimated at -0.72 ensuring that following a shock, convergence to equilibrium is relatively swift.

The short run regressions results suggest that the impact of currency devaluation in Fiji is again different for the two components of the trade account as evidenced even earlier for the long run results. As far as the exchange rate variable in the goods sector is concerned, the estimates indicate that currency devaluation, though insignificant at most lags, causes initial worsening of goods trade ratio from lags one to three followed by improvement at lag 4 (Table 5). Favourable response of currency devaluation at longer lags are also supported by the long run results of goods trade balance which as discussed earlier has been found to have positive and significant. It is also estimated that similar impact in the short run is experienced by the goods exports in the country (Table 6).

With regards to the exchange rate variable in the service trade balance model, the regression results indicate that currency devaluation, though insignificant improves service trade performance at least in the short run (Table 5). This argument is even supported by the short run coefficients of exchange rate from the service export equation which shows significant positive impact at least at lag 3. This result however is in contrast to the long run results whereby it has been estimated that currency devaluation tends to deteriorate service trade balance in the long run. However, this is not surprising in the short run, particularly as devaluation immediately does give an incentive to tourists to come and visit Fiji when the Fijian currency becomes weak. Also it creates a disincentive for locals to visit foreign country as the cost of travel immediately rises. This however, is not expected to be the case indefinitely for a very long period of time.

Hence, following the short run impacts of devaluation on goods and services sector, we find that the impact of exchange rate on the overall goods and services trade performance indicates that currency devaluation has negative impact but the impact is insignificant at all lags in the short run (Table 5). As discussed earlier, though the short run impact is deterioration in the overall trade performance, empirical evidence suggests that the currency devaluation significantly improves goods and services trade balance in the long run. However, this result is expected in the short run, particularly as Fiji being highly import dependent economy, will continue to import as it has been doing prior to devaluation though the imports become expensive soon after devaluation. The lag effect certainly sets in for the case of Fiji as exporters and importers take time to realize that devaluation has taken place and that exports have become cheaper while imports have been expensive. This in fact

consequently leads to the short run worsening of trade balance followed by improvement in the long run.

Table 5: Short run coefficient estimates of real exchange rates in trade balance models

Short-run results	**Goods and Services sector**	**Goods sector**	**Services sector**
$\Delta \ln E^r_{t-1}$	-0.050	-0.953	0.410
	(0.253)	(0.940)	(0.512)
$\Delta \ln E^r_{t-2}$	-0.165	-2.392*	0.447
	(0.231)	(1.193)	(0.454)
$\Delta \ln E^r_{t-3}$		-1.209	
		(0.892)	
$\Delta \ln E^r_{t-4}$		0.088	
		(0.828)	
coup	-0.046	0.117	-0.284***
	(0.038)	(0.077)	(0.074)
Diagnostics			
ECT_{t-1}	-0.723*	-0.527*	-0.150*
	(0.360)	(0.300)	(0.081)
R^2	0.754	0.842	0.557
$Adjusted\, R^2$	0.648	0.640	0.373
σ	0.074	0.135	0.107
X^2N	0.615	0.559	0.609
	[0.735]	[0.756]	[0.737]
X^2Het	14.370	26.650	20.647
	[0.762]	[0.483]	[0.357]
$LM\ Test(SC)$	20.282	13.246	23.392
	[0.208]	[0.655]	[0.104]

Notes:

1. Standard errors are given in parenthesis.
2. Optimal lag lengths are chosen by SIC method.
3. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.
4. ECT_{t-1} represents the error correction terms, σ is the standard error of equation; diagnostics are Jarque-Bera statistics for normality (X^2N) and chi-squared for heteroskedasticity tests ((X^2Het), and LM Test statistics for serial correlation (SC). The p-values are in brackets and a value greater than 5% indicates, the model passing the particular diagnostic test.

Table 6: Short run coefficient estimates of real exchange rates in export and import models

Short-run results	**Goods and Services export**	**Goods export**	**Domestic Goods export**	**Service exports**	**Goods and Services import**	**Goods import**	**Service imports**
$\Delta \ln E^r_{t-1}$	0.006	-0.110	0.419	0.438	0.033	0.022	0.015
	(0.295)	(0.585)	(0.534)	(0.278)	(0.399)	(0.461)	(0.319)
$\Delta \ln E^r_{t-2}$	-0.224	-0.823		-0.129	0.484		
	(0.384)	(0.724)		(0.332)	(0.329)		
$\Delta \ln E^r_{t-3}$	0.098	-0.545		0.683**			
	(0.324)	(0.577)		(0.328)			
$\Delta \ln E^r_{t-4}$							
coup	-0.055	-0.056	0.022	-0.082**	-0.084*	0.005	-0.036
	(0.033)	(0.058)	(0.054)	(0.040)	(0.041)	(0.044)	(0.044)
Diagnostics							
ECT_{t-1}	-0.818***	-0.620***	-0.144**	-0.939***	-0.890***	-0.632**	-0.104**
	(0.200)	(0.212)	(0.066)	(0.200)	(0.310)	(0.256)	(0.048)
R^2	0.681	0.577	0.268	0.682	0.561	0.314	0.240
$Adjusted\, R^2$	0.521	0.366	0.145	0.522	0.426	0.200	0.113
σ	0.070	0.116	0.144	0.081	0.081	0.114	0.091
X^2N	2.007	0.090	0.423	1.158	0.913	0.355	2.020
	[0.367]	[0.956]	[0.809]	[0.561]	[0.633]	[0.837]	[0.364]
X^2Het	18.139	27.946	13.792	17.150	8.673	6.692	9.672
	[0.640]	[0.142]	[0.130]	[0.702]	[0.894]	[0.669]	[0.378]
$LM\ Test(SC)$	9.583	9.102	10.350	16.079	4.275	6.827	2.242
	[0.385]	[0.428]	[0.323]	[0.065]	[0.892]	[0.655]	[0.987]

Notes:

1. Standard errors are given in parenthesis.
2. Optimal lag lengths are chosen by SIC method.
3. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.
4. ECT_{t-1} represents the error correction terms, σ is the standard error of equation; diagnostics are Jarque-Bera statistics for normality (X^2N) and chi-squared for heteroskedasticity tests ((X^2Het), and LM Test statistics for serial correlation (SC). The p-values are in brackets and a value greater than 5% indicates, the model passing the particular diagnostic test.

We also incorporate a dummy variable *COUP* to capture the impact of political instability on Fiji's trade performance. The results show that the political instability has significant and negative impact atleast on the service trade sector in Fiji. The results show that the political crisis in the country severely affects the service exports, particularly the export of tourism services. It is ascertained that

the series of political instability creates loss of investment confidence and tends to negatively affect visitor arrivals in the country. This in turn is likely to reduce investment levels in the service oriented export sector mainly tourism. The largest service industry which is the tourism sector is very likely to be severely affected by an unstable economy which tends to create loss of confidence on the economy among citizens and potential visitors willing to visit the country[6]. However, its impact on goods trade balance is found to be insignificant.

A number of diagnostic tests are also applied to the various models employed in the study to ensure model appropriateness and stability. We find that all our models pass diagnostic tests including tests of autocorrelation, normality and heteroskedasticity. The adjusted R-squared for the goods trade balance model is also relatively strong at 64%, service trade balance model is at 37% while for the combined goods and services trade balance it is at 65%.

5.5 Testing for the J-Curve phenomenon

Having discussed the long run and short run relationship among the variables in the respective trade balance models, we now turn to validate the presence of J-curve phenomenon in each of these trade models in the context of Fiji. The economics literature on the J-curve phenomenon has in fact identified three definitions to assess the presence of J-curve which is discussed below:

1. *The Traditional Definition (old)*

Using this old definition, the presence of J-curve is confirmed by analyzing the short run coefficients of real exchange rate variable at different lag levels. Therefore, initial negative real exchange rate coefficients at shorter lags followed by positive coefficients at longer lags confirm the J-curve phenomenon under this traditional method. The negative coefficients followed by positive ones suggests that currency depreciation or devaluation reduces trade balance at initial stages (negative coefficient) after which it helps to improve trade balance (positive coefficient).

2. *The New Definition*

Following the works of Rose and Yellen (1989), another way of representing J-curve is done by relying on negative short run real exchange rate coefficient combined with positive and significant

[6] For studies on the impact of political instability in Fiji see for example (Kumar and Prasad, 2002; Narayan and Prasad 2003, Prasad, 2012).

long run real exchange rate coefficient. The new definition suggests that currency depreciation or devaluation reduces trade balance in the short run (negative coefficient) after which it helps to improve trade balance in the long run (positive coefficient).

3. The Impulse Response Functions

Some studies such as Lal and Lowinger (2002) and Narayan and Narayan (2004), among others did not rely much upon the specific coefficient results but rather focused on the impulse response functions (IRFs) which shows the behavior of a variable of interest over a period of time after a shock to other variables in the system. Thus, the time path of the trade balance after a shock to the real exchange rate can be studied in this context and confirmed if the path it follows after the shock resembles a J shape. Though there are many methods of carrying out impulse response functions, the use of generalized IRF of Pesaran and Shin (1998) has been popular in the literature as it controls for intermediate effects and is insensitive to the ordering of the variables in the model. Therefore, the use of IRF has simply been used to assess the graphical pattern of trade balance variable to shock (innovation) in the real exchange rate variable.

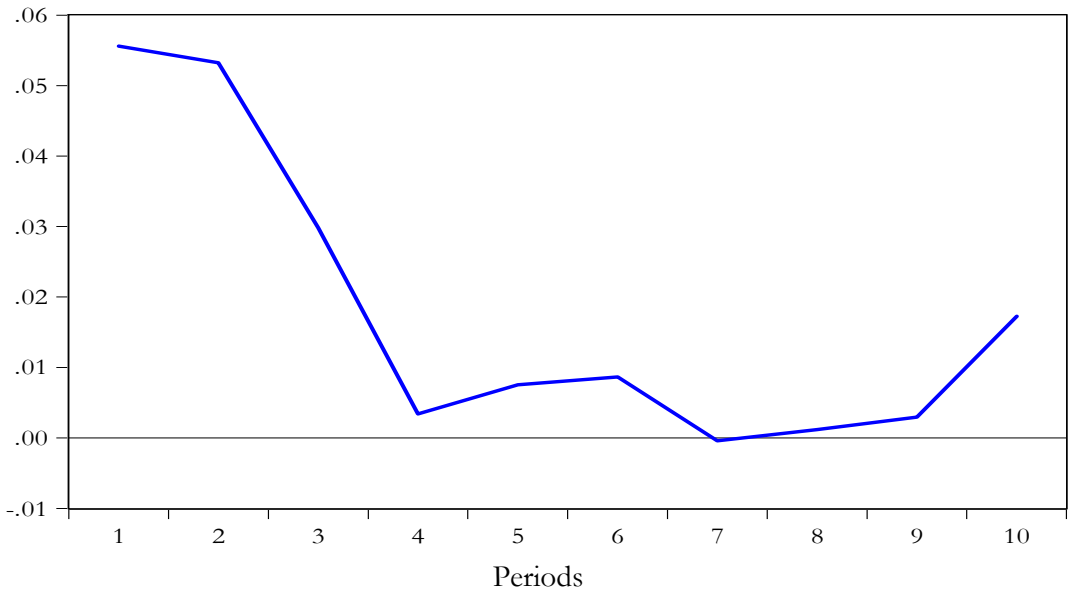
Based on the three definitions of assessing J-curve phenomenon, we hereby attempt to use all these three methods to test whether J-curve effect is being identified by either of the methods in the context of currency devaluation in Fiji.

1. *Goods trade balance*

Using the coefficient results under old and new definition, we are able to find evidence in support of J-curve effect phenomenon for the goods sector in Fiji. The empirical evidence shows that currency devaluation leads to short run deterioration in goods trade balance followed by long run improvement, indicating J-curve effect. Turning to the third definition of J-curve using impulse response function, we utilize the generalized impulse to show the response of goods trade balance to generalized one standard deviation innovation in the real exchange rate. The graphical representation of the shock in real exchange rate or currency devaluation reveals that goods trade balance actually declines for the first 4 years followed by slight improvement till year 6 (Figure 3). Thereafter, the goods trade balance continues to decline with some improvement noted after year 9. As such, the graphical representation shows slight presence of J-curve phenomenon using the IRF and gathering

support from the other two methods; we confirm the presence of J-curve phenomenon for the goods sector trade in Fiji.

Figure 3 **Response of Goods Trade Balance to Generalized One standard deviation innovation in the Real Exchange Rate**

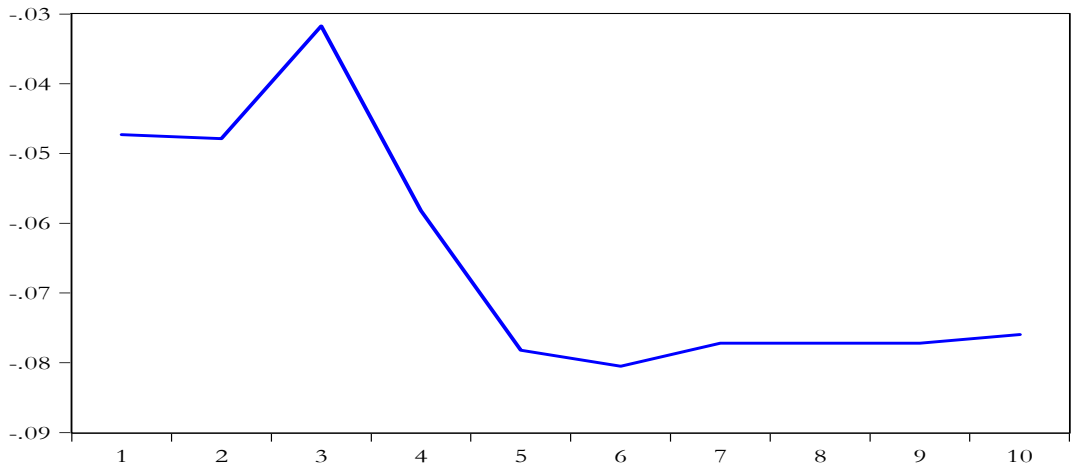


2. *Services trade balance*

We shall now use the same procedures as carried out for the goods trade balance to investigate the presence of J-curve phenomenon in the context of service sector trade in Fiji. Using the coefficient results under old and new definitions, we are unable to find evidence in support of J-curve effect phenomenon for the services sector in Fiji. The empirical evidence shows that currency devaluation in the short run helps to improve services trade balance but in the long run it leads to subsequent deterioration in the services trade performance. Similarly, using the new definition we note that the short run coefficients of real exchange rate are positive which are followed by negative and significant long run real exchange rate coefficients implying evidence of inverse J-curve effect for the services sector in Fiji. Additionally, using the generalized impulse response function, the graphical representation of the shock in real exchange rate or currency devaluation reveals that services trade balance after a shock in real exchange rate stays unmoved for the first 2 years followed by slight improvement in year 3 (Figure 4). Thereafter, the service trade balance tends to drastically decline in the later years. As suggested by method 2, the time trend path of services trade balance even using

IRF to some extent also shows evidence of inverse J-curve effect as well. Therefore, we conclude that using new definition and IRF to assess J-curve, we find evidence of inverse J-curve for service sector trade in Fiji.

Figure 4 **Response of Services Trade Balance to Generalized One standard deviation innovation in the Real Effective Exchange Rate**

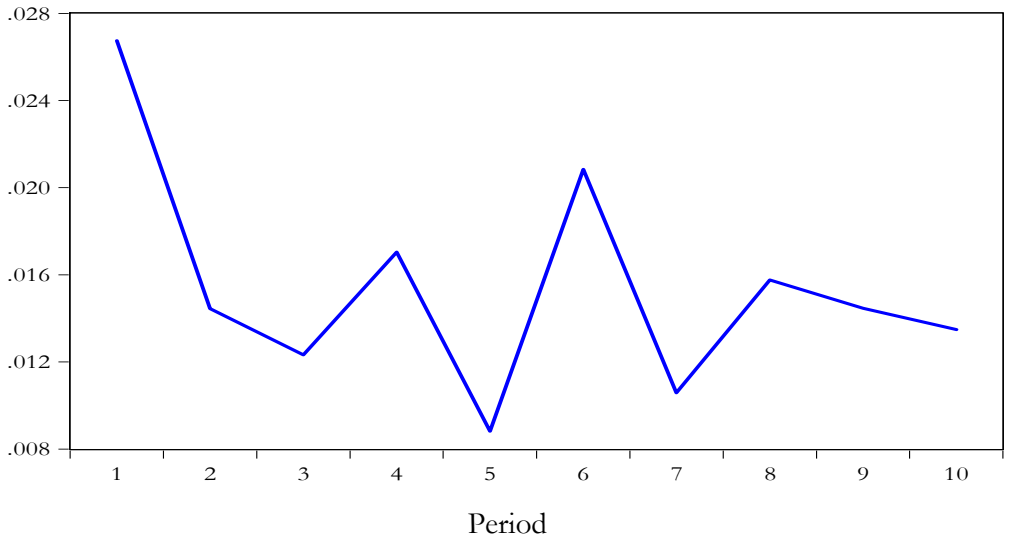


3. *Goods and Services trade balance*

We now proceed to investigate the presence of J-curve phenomenon for the combined goods and services sector trade in Fiji. Using the coefficient results under the old definition, we are unable to find evidence in support of J-curve phenomenon for the goods and services sector in Fiji. The short run coefficients of the real exchange rate variable are found to be negative suggesting that currency devaluation in the short run leads to deterioration of the goods and service trade balance. However, in assessing the J-curve effect under the new definition, we find evidence of J-curve phenomenon in the context of combined goods and services trade balance in Fiji. The empirical evidence estimates negative short run real exchange rate coefficients which are followed by positive and significant real exchange rate coefficients in the long run. These results suggest that currency devaluation in the short run leads to deterioration of goods and services trade balance but subsequently in the long run, it helps to improve overall trade balance performance. Additionally, using the generalized impulse response function, the graphical representation of the shock in real exchange rate reveals that goods and services trade balance after a shock in real exchange rate declines for the first 3 years followed

by improvement in year 4 (Figure 5). Thereafter, the trade balance tends to fluctuate with improvements and deterioration in the trade balance performance over the time period. Though not clearly, IRF to some extent also shows evidence of J-curve as proposed under the new definition. Therefore, we conclude that we have obtained strong empirical evidence in support of J-curve for the goods and services trade for Fiji using new definition for assessing the J-curve phenomenon. This result is also consistent with the only J-curve literature in Fiji by Narayan and Narayan (2004a) which also finds evidence of J-curve phenomenon for trade balance in Fiji.

Figure 5 **Response of Goods and Services Trade Balance to Generalized One standard deviation innovation in the Real Effective Exchange Rate**



6. Conclusion and Policy implications

In this paper, we utilize vector error correction model to examine short and long run relationship of real effective exchange rate on major components of trade account - goods and services - for Fiji. We further extend our analysis to examine the presence of J-curve phenomenon using three alternative methods. In particular, three separate trade equations - one for goods, services and the other for a combined goods and services trade balance - are structured as a function of real effective exchange rate, domestic income and trading partner income. The empirical results support a

favourable and significant impact of devaluation on the combined goods and services trade balance in the long run. While disaggregated the overall trade balance into goods and services sector, it shows that the impact of devaluation has significant and positive impact on the goods trade balance whereas its impact on services trade sector has been statistically significant and negative. The results suggest that overall impact has appeared to be positive on trade balance because of its favourable impact on the goods.

The methods provide largely consistent findings on the J-curve phenomenon. Therefore, the study supports the existence of J-curve phenomenon of currency devaluation on the overall trade balance, largely due to the goods sector adjustment in Fiji. The services trade, in fact, exhibits inverse J-curve relationship, but is unable to negate the favourable effect on good sector. In other words, the currency devaluation has been effective in the economy during the last three decades.

From a policy perspective, it provides an effective instrument for government to deal with the recessionary phase while the other policy instruments are either exhausted or could be counter-productive due to the existence of fixed exchange regime.

7. References

Acar, M. (2000). Devaluation in Developing Countries: Expansionary or Contractionary? *Journal of Economic and Social Research, 2*(1), 59-83.

Akbostanci, E. (2004). Dynamics of the Trade Balance: The Turkish J-Curve. *Emerging Markets Finance and Trade, 40*, 57-73.

Asafu-Adjaye, J. (1999). Exchange rate variability and export growth in Fiji. *Asia Pacific School of Economics and Management Working Papers #99/4, Australian National University*.

Bahmani-Oskooee, M. (1986). Determinants of international trade flows: The case of developing countries. *Journal of Development Economics, 20*, 107-123.

Bahmani-Oskooee, M., & Alse, J. (1994). Short run versus long run effects of devalution: error correction modeling and cointegration. *Eastern Economic Journal, 20*(4), 453-464.

Bahmani-Oskooee, M., & Gelan, A. (2012). Is there J-Curve effect in Africa? *International Review of Applied Economics, 26*(1), 73-81.

Bahmani-Oskooee, M., & Ratha, A. (2004). The J-curve: A literature review. *Applied Economics, 36*, 1377-1398.

Chand, S. (1998). Exchange rate and financial management: some lessons learnt for and from Fiji.. *Pacific Economic Bulletin, 13*(1), 36-46.

Culiuc, A. (2014). Determinants of International Tourism. *IMF Working Paper, #WP/14/82*, 1-46.

Dulare, C. (2005). *Monetary and Exchange Rate Policy in Fiji.* Suva: Fiji Institute of Applied Studies.

FBOS. (2012). Key Statistics. *Fiji Bureau of Statistics, Suva.*

Georgopoulos, G. (2008). The J-curve revisited: An empirical analysis for Canada. *International Atlantic Economic Society, 36*, 315-332.

Gounder, N., & Prasad, B. (2013). Economic Growth, Investment, Confidence and Poverty Reduction in Fiji: Semi-Rational Exuberance? *Development Policy Centre Discussion Paper #31, Crawford School of Public Policy, The Australian National University, Canberra.*

Gupta-Kapoor, A., & Ramakrishnan, U. (1999). Is there a J-curve? A new estimation for Japan. *International Economic Journal, 13*(4), 71-79.

IMF. (2013). *International Financial Statistics database.* Retrieved December 21, 2013, from International Monetary Fund: https://elibrary-data.imf.org/

Jayaraman, T. (1999). Is there a case of freely floating exchange rate in Fiji? *Pacific Economic Bulletin, 14*(1), 93-100.

Johansen S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12,* 231-254.

Johansen, S. and Juselius, K. (1990). Maximum likelihood estimation and inferences on cointegration – with applications to the demand for money. *Oxford Bulletin of Economics, 52(2)*: 169-210.

Junz, H. B., & Rhomberg, R. R. (1973). Price-competitiveness in export trade among industrial countries. *American Economic Review, 63*(2), 412-418.

Kumar, S. (2009). Estimating export equations for developing countries. *The Icfai University Journal of Applied Economics, 8*(2), 17-28.

Kumar, S., & Prasad, B. (2002). Fiji's Economic Woes: A natio in search of development progress. *Pacific Economic Bulletin, 17*, 1-23.

Lal, A., & Lowinger, T. (2002). The J-curve: evidence from East Asia. *Journal of Economic Integration, 17*, 397-415.

MacKinnon, J. G. (1996). Numerical Distribution Functions for Unit Root and Cointegration Tests. *Journal of Applied Econometrics, 11*(6), 601-618.

MacKinnon, J., Alfred, H., & Leo, M. (1999). Numerical Distributional functions of likelihood ratio tests for cointegration. *Journal of Applied Econometrics, 14*, 563-577.

Magee, S. P. (1973). Currency contracts, pass through and devaluation. *Brooking Papers on Economic Activity, 1*, 303-325.

Narayan, P. K. (2004). New Zealand's trade balance: evidence of tje J-curve and granger causality. *Applied Economics Letters, 11*, 351-354.

Narayan, P., & Narayan, S. (2004a). The J-curve; evidence from Fiji. *international Review of Applied Economics, 18*(3), 369-380.

Narayan, P., & Narayan, S. (2004b). Determinants of demand for Fiji's exports: An empirical estimation. *The Developing Economies, 42*(1), 95-112.

Narayan, P., & Narayan, S. (2005). Estimating income and price elasticities of imports for Fiji in a cointegration framework. *Economic Modelling, 22*(3), 423-438.

Narayan, P., & Narayan, S. (2009). Understanding Fiji's declining foreign reserve position. *Pacific Economic Bulletin, 24*(2), 95-112.

Narayan, P., & Prasad, B. (2003). Fiji National Budget 2003: Building a resilient economy? *Pacific Economic Bulletin, 18*(2), 91-107.

Pesaran, M., & Shin, Y. (1998). Generalised impulse response analysisin linear multivariate models. *Economic Bulletin, 58*(1), 17-29.

Prasad, B. (2012a). Fiji Economy: Muddling Through. *The Round Table: The Commonwealth Journal of International Affairs, 101*(6), 557-573.

Prasad, B. C. (2012b). Why Fiji is not the "Mauritius" of the Pacific? Lessons for Small Island Nations in the Pacific. *Development Policy Centre Discussion Paper #25, Crawford School of Public Policy, The Australian National University, Canberra.*

RBF (2009). *Press Release #16/2009: Reserve Bank announces the following monetary policy changes.* Suva: Reserve Bank of Fiji.

Rose, A., & Yellen, J. (1989). Is there a J-curve? *Journal of Monetary Economics, 24*, 53-68.

Singh, R. (2006). Cointegration tests on trade equation: Is devaluation an option for Fiji. *School of Economics Working paper series, The University of the South Pacific #2006/18*.

Wijeweera, A., & Dollery, B. (2013). J-curve disparity between the goods sector and the service sector: evidence from Australia. *Applied Economics Letters, 20*, 452-456.

Yang, Y., Chen, H., Singh, S., & Singh, B. (2013). The Pacific Speed of Growth: How Fast Can It Be and What Determines It? *IMF Working Paper , #WP/13/104*, 1-43.

8. Appendix: Data Description

The data used in the study are annual data series covering the period from 1975 to 2012 spanning over a 38 year time period. All the variables are also transformed into its log-linear form to allow the coefficients from the regression results to be interpreted as elasticities. All the data used in the regression models are compiled from several publically available sources including:

a. International Monetary Fund's International Financial Statistics (IFS) online database.
b. World Bank's World Development Indicators (WDI) online database.
c. Fiji Bureau of Statistics, Key Statistics (various years).
d. Fiji Bureau of Statistics, Overseas Merchandise Trade Statistics (various years).

i. Price deflator data (P)

Since all the values used in the study are taken in terms of US dollars, GDP price deflator used to deflate nominal values into real values are derived by using current and constant GDP for Fiji measured in terms of US dollars at 2005 prices obtained from source (b). All the other relevant indexes are also expressed at year 2005. Therefore, using this price deflator, all the nominal values is converted to real values before proceeding with the regression estimation.

ii. Export data (EXP)

Data on aggregate export of goods and services are obtained from source (d). Since the data is in terms of Fiji dollar, these are converted to US dollar using the period end US and Fiji exchange rate obtained from source (a). These values are then using variable (i) converted to real values before proceeding with the analysis.

iii. Import data (IMP)

Data on aggregate level import of goods and services are obtained from source (d). Again, since the data is in terms of Fiji dollar, these are converted to US dollar using the period end US and Fiji exchange rate obtained from source (a) before using variable (i) to convert to real values.

iv. Trade balance (TB_j)

Data on trade balance is derived from the export (ii) and import (iii) data for the respective goods and service trade performance. The measurement of trade balance follows the generally used

method in the literature to define trade balance as exports of goods and services divided by imports of goods and services.

v. Fiji's income (Y)

Measure of Fiji's income is represented by the GDP values of Fiji obtained from source (b). The variable is expressed in terms of constant US dollars based on 2005 prices.

vi. Trading partner income (Y^f)

Trade weighted trading partner income variable employed in the aggregate trade balance models has been calculated based on the formula used in Bahmani-Oskooee (1986). The variable construction hence follows the below formula specification.

$$Y^f = \sum a_i YP_i \quad \text{where} \quad \sum a_i = 1,$$

where a_i is the weight of trading partner i in Fiji's total trade and YP_i is the GDP of the respective trading partner obtained from source (b). The trading partners considered are based on those against which Fiji's fixed exchange rate is pegged to. These include Australia, New Zealand, Japan, the USA and the UK. The weights of each trading partner in Fiji's trade have been obtained from source (d).

vii. Real Exchange Rate (E^r)

The data on real effective exchange rate is obtained from source (a) whereby the real effective exchange rate is divided by one to represent REER in a way that an increase reflects currency devaluation.

viii. Coup $(COUP)$

This variable is taken as a dummy variable capturing the impact of political instability in 1987, 2000 and 2006 in Fiji. This is denoted by value 1 in the year of coup with the rest of the years taking a value of 0.