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Kushneel Prakash

University of the South Pacific

and

Dibyendu Maiti

Delhi School of Economics

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Contact:

School of Economics | The University of the South Pacific
Private Mail Bag, Laucala Campus, Suva, Fiji Islands
Ph:(679) 32 32931 Fax : (679) 32 32 522
Email: s.o.economics@usp.ac.fj Website: www.usp.ac.fj/economics

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Does devaluation improve bilateral trade relations of small island economies with its major and emerging trade partners? The case of Fiji

Kushneel Prakash^{1*} and Dibyendu Maiti²

¹ School of Economics, The University of the South Pacific

E-mail Address: kushneelprakash@gmail.com

² Delhi School of Economics, Delhi University

E-mail Address: mdibyendu@yahoo.com

Abstract

By and large, developed countries with well-developed market systems use floating exchange rate regimes while developing and transition economies, including most Pacific island developing economies such as Fiji, favour fixed exchange rate regimes. Maintaining fixed exchange rate regimes often requires subjected countries to devalue their currencies once in a while. Studies overtime have attempted to analyse impact of devaluation on aggregate trade balance but have often ignored the issue of aggregation bias in those analysis. This paper attempts to persuade this issue and analyse the impact of devaluation for a small island Fijian economy with her ten trading partner countries. The econometric analysis shows currency devaluation has long-run significant bilateral trade improvement with New Zealand and the USA while there is significant worsening of the bilateral trade performance with Australia, the UK, Singapore, Malaysia, India, Hong Kong and China over the 1975-2012 periods. However, the evidence of the J-curve phenomenon is only obtained for trade with New Zealand, Japan, the UK and the USA. This result reinforces that not all the trade partners are affected in the same manner as a result of devaluation in an economy after removing the aggregation biasness.

Key words: bilateral trade, Fiji, devaluation, J-curve phenomenon

****Address for Correspondence:***

School of Economics

Faculty of Business and Economics

The University of the South Pacific

Laucala Campus, Private Mail Bag

Suva, Fiji

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1. Introduction

In the twenty-first century, where economies are opening themselves to a wider range of international markets, a country's trading with the rest of the world plays an integral part in its development. As goods and services leave national boundaries, the issue of exchange rates becomes of paramount importance. Very often, countries around the globe are faced with the dilemma into thinking whether their chosen exchange rate system is serving the economy with best outcomes or something other than the current regime would do better. As a result, countries opt to have different exchange rate systems to suit their trade, investment and growth objectives. By and large, developed countries with well-developed market systems use floating exchange rate regimes while developing and transition economies favour fixed exchange rate regimes. To this, most Pacific island developing economies such as Fiji is no exception. Maintaining fixed exchange rate regimes often requires subjected countries to devalue their currencies once in a while which has impact on their trade and growth patterns. More than often, the impact of devaluation has been found to be adverse and minimal, mainly on the trade, current account and on fiscal balances in those economies. A number of studies have already documented the relationship between exchange rate and trade balance¹; however, the ultimate impact of changes in the value of the currency on trade performance is still a subject of debate. Over time, studies have not only upheld the traditional view that devaluation improves trade balance and output but also found that devaluation could be contractionary.

For the last few decades, numerous studies have investigated the relationship among currency devaluation or depreciation, trade balance and economic growth. In recent years, studies have attempted to deal with the issue of aggregation biasness² which exists by the use of aggregate data for analysis, to use bilateral level data to analyse the same. As Bahmani-Oskooee and Ratha (2004) explain that due to time lag structure; devaluation initially worsens trade balance before improving it at a later stage. This movement in the trade pattern is known as the J-curve phenomenon in the

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

² The aggregation biasness occurs as the changes in the exchange rate could cause deterioration in the bilateral trade balance with one country and improvement with another but the impact could be cancelled off at the aggregate front.

economics literature. The empirical literature on the J-curve phenomenon is vast; however, the general consensus is that the response of trade balance to currency devaluation or depreciation does not always follow any specific pattern.

This issue of currency devaluation has often been a major point of discussion on the economic and political agendas of Less Developed Countries (LDCs, hereafter). The Pacific region as well is no exception as most of the countries³ in the region, still follow the fixed exchange rate system. A number of studies in the context of PICs particularly for Fiji have analysed the effect of devaluation on its aggregate trade performance (see for example, Reddy, 1997; Singh, 2006; Narayan and Narayan, 2004; 2007) but have not really paid attention to the issue of aggregation biasness. Similarly, the recent study by Prakash and Maiti (2016) that study the impact of devaluation on Fiji's trade balance only disaggregate total trade by goods and services sectors. Hence, it is quite clear that the Pacific region has received little attention in establishing on how currency devaluation plays a role on bilateral trade relations. Moreover, the existing studies ignored the effect of dominant currency trading on the dynamics of bilateral trade (see Casas et al., 2016). It is expected that terms of trade with the currencies on which a particular currency is pegged would differently be affected than those currencies that are not pegged. As a result, the effect of devaluation seems to be differential. The extent of the difference would definitely depend on the country size, products traded, price stickiness at the domestic level and weightage given on the exchange rate pegging etc. We are not developing any formal framework to understand the degree of different in presence of those factors. But, this paper simply is interested to investigate empirically whether the devaluation follows a uniform pattern across all trading partners.

The remainder of the paper is organised as follows: the next section presents a brief survey of the literature along with related studies in Fiji. The third section presents a brief overview of Fiji's economy and bilateral trade patterns. In the fourth section, we discuss the empirical methodology employed and the results obtained from the analysis. The final section concludes with policy implications.

³The South Pacific countries with independent currencies that still follow fixed exchange rate regimes are Fiji, Samoa, Tonga, Solomon Islands and Vanuatu.

2. Literature Review

A number of scholars including Rose and Yellen (1989), Bahmani-Oskooee and Brooks (1999) and Bahmani-Oskooee and others (2005) argue that despite the overall response of currency devaluation or depreciation on the country's overall trade balance, the impact at the bilateral level trade could be very different. They reason that this is because the changes in the exchange rate could cause deterioration in the bilateral trade balance with one country and improvement with another. In fact, the overall trade balance, which is simply an aggregation of bilateral trade balances, tends to be influenced by changes in the bilateral trade performance. Hence, in this section, some of the studies that have significantly contributed to the bilateral trade literature evolving around the J-curve phenomenon⁴ are reviewed.

Rose and Yellen (1989) are probably the earlier scholars that attempted to analyse the J-curve phenomenon using bilateral data for the USA with her six trading partners, namely Canada, France, Germany, Italy, Japan and the UK over the 1960–1985 period. However, the study fails to find any substantial evidence of the long-run relationship and the J-curve phenomenon on the trade balance for USA with its major trade partners. Bahmani-Oskooee and Brooks (1999) utilise a model similar to Rose and Yellen (1989) and revisit the countries under study but with the use of a different technique. The study does not find specific short-run pattern and hence, no evidence of the J-curve phenomenon. However, the long-run results suggests that real depreciation of the US dollar has a favourable effect on the USA's trade balance with at least four (France, Italy, Japan and the UK) of her trading partners. However, Bahmani-Oskooee and Ratha (2004) provide support for the J-curve phenomenon in the case of USA's trade with the Netherlands using the traditional definition. However, when the results of the other eighteen⁵ trading partners are subjected to the new definition of assessing the J-curve phenomenon, the study finds evidence of the phenomenon

⁴ The assessment of the J-curve phenomenon in the literature has been categorised in three different approaches. (i) the *traditional definition approach*- the phenomenon is confirmed by negative real exchange rate coefficients at shorter lags followed by positive coefficients at longer lags in a trade balance model (see Bahmani-Oskooee and Ratha (2004), Wang et al. (2012)); (ii) *new definition approach*- negative short-run combined with positive long-run real exchange rate coefficient in a trade balance model (see Arora et al. (2003), Bahmani-Oskooee and Harvey (2012)); (iii) *impulse response function analysis*- use of impulse response functions to trace the effect on trade balance after a shock in the real exchange rate variable (see Lal and Lowinger (2002), Narayan (2006)).

⁵ The eighteen trading partner countries of USA in the study by Bahmani-Oskooee and Ratha (2004) are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland and the UK.

with ten of USA's trading partners over the 1975Q1–2000Q2 periods. These trade partner countries include Austria, Denmark, France, Germany, Ireland, Italy, Japan, New Zealand, Sweden and Switzerland.

Arora and others (2003) using the traditional definition does not find any evidence of the bilateral J-curve phenomenon but find support in four cases using the new definition. Similarly, Bahmani-Oskooee and others (2005) find support for the bilateral J-curve phenomenon for Australia's trade with Denmark, Korea and New Zealand using the new definition. Moreover, Narayan (2006) finds that currency depreciation in China improves its trade balance with the USA both in the short- and in the long-run. Hence, the study shows no evidence of the J-curve phenomenon using the new definition and IRF analysis. Even Bahmani-Oskooee and Wang (2006) find similar results on the exchange rate and trade balance relationship of China with the USA. Further studies by Celik and Kaya (2010) for bilateral trade of Turkey, Bahmani-Oskooee and Harvey (2012) for Singapore, Wang and others (2012) for China, Dash (2013) and Bahmani-Oskooee and Xu (2013) for India find mixed responses of currency depreciation for various bilateral trade relations in their study.

The brief studies reviewed on the effectiveness of currency depreciation and devaluation on the bilateral trade performance along with those on the validity of the J-curve phenomenon try to provide a remedy of the aggregation bias problem. It is argued that analysing the relationship of exchange rate with trade balance in the presence of this biasness, misrepresents the role of exchange rates on the country's trade performance. The results, however, have been confined to the country context. Additionally, there have been no superior methods of assessing the J-curve phenomenon and as a result all the three methods (traditional definition, new definition, IRF analysis) have been used widely in the literature.

With regard to studies in the context of Pacific region and in particular, Fiji's economy, there is also one study on the bilateral trade and exchange rate relationship by Kaufmann (2008). The study attempts to estimate export and import demand equations of Fiji with Australia, New Zealand and the European countries⁶ over the 1976–2006 periods. The study finds that the M-L

⁶The European countries included in the study are Belgium, Denmark (only import equation), France, Germany,

condition⁷ for Fiji's trade with Australia and New Zealand is not been achieved. The estimates show that the sum of the relative import and export price elasticities is less than one, indicating that a real devaluation in Fiji worsens its trade performance with Australia and New Zealand in the long-run. Furthermore, with respect to Fiji's trade with the EU countries, the export and import demand equations show that besides the UK, Fiji has strong trade relationships with Belgium, Denmark, France, Germany, Italy and the Netherlands. Nonetheless, this study did not progress further to investigate the J-curve phenomenon at the bilateral level.

As presented, the literature involving bilateral level trade and exchange rate relationship is very thin in the context of PICs and for that matter in the context of Fiji's economy. The only study in the case of Fiji, though appreciative of its attempt, is clearly very narrow and has ignored some of the other major and emerging trade partners of Fiji. This study can certainly be improved upon. Firstly, Fiji's currency has been devalued by another 20% in 2009 after the study was undertaken. Hence, this is very likely to have established new bilateral trade and exchange rate relationship in the economy. Secondly, Fiji's bilateral trade flows with Japan and the USA could have also been included. This is because Fiji's fixed exchange rate is not only determined based on the currencies of Australia, New Zealand and the UK but it also includes the currencies of Japan and the USA. Thirdly, besides only these five major trade partners and the EU countries, Fiji also engages in a significant amount of trade with some emerging Asian trading partner countries. Bilateral trade analysis with Asian trade partners such as China, Hong Kong, India, Malaysia and Singapore has not been included in any other previous study in the context of Fiji but provides significant trade opportunities in the current time. Therefore, it is the modest attempt in this paper to add significantly to this area of knowledge in the context of a Pacific island developing economy, Fiji.

3. Brief Overview of Fiji's Economy

Italy (only import equation), the Netherlands and the UK.

⁷ The Marshall-Lerner condition states that an exchange rate devaluation or depreciation will only cause a balance of trade improvement if the absolute sum of the long-run export and import demand elasticities is greater than one.

More than half of Fiji's domestic exports find their way to markets in Australia, the UK and the USA (Appendix 1). Other important exporting destinations include New Zealand (5%), China (4%) and Japan (4%). It is also important to highlight that trade with countries in Pacific region are also important as Kiribati, Samoa, Tonga and Vanuatu are ranked among Fiji's top ten exporting destinations. These island countries together make up around 11% of Fiji's domestic exports. Furthermore, Fiji's imports mainly originate from Singapore, Australia, New Zealand and China.

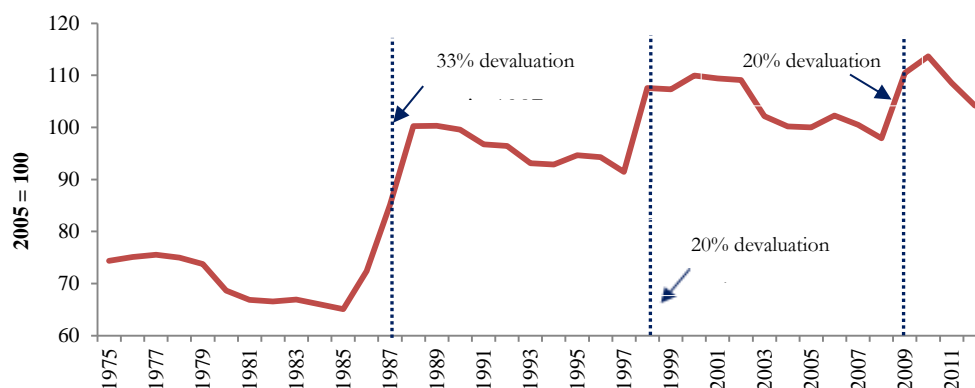
The most important and obvious importing destination for Fiji is Singapore which makes up around 20% of its total imports mainly because of the imports of mineral fuels. In a similar manner to Fiji's exports, Australia is also one of the important partners for Fiji's import demand. Fiji, while also increasing its economic relations with one of the world's fastest growing economies, China imports around 15% of its total imports from them. Other important importing sources in 2015 include Japan (5%), USA (3%), Thailand (3%), Hong Kong (2%) and Malaysia (2%). In addition to this, it is also a net importer to most of its Asian trade partners.

Moreover, Fiji's trading partner countries considered in this study is purely based on the availability of consistent time series data on bilateral goods trade. These countries include Australia, China, Hong Kong, India, Japan, Malaysia, New Zealand, Singapore, the UK and the USA. The trading partner countries are categorised into two different categories. Trade with 'Major Trade Partners' which includes trade with Australia, Japan, New Zealand, the UK and the USA account for around 41% of total trade. On the other hand, trade with 'Emerging Asian Trade Partners' which includes China, Hong Kong, India, Malaysia and Singapore, makes up another 33% of total trade in 2012 (FBOS, 2013a). Fiji's trade performance with its major and emerging trade partners shows mixed trend paths (Appendix 2 and 3).

Moreover, the four currency devaluations within the last three decade make Fiji the classic example for studying the impact of devaluation on trade performance in the Pacific islands context. The two devaluations in 1987 totaled 33%, that in 1998 a further 20% and in 2009 a further 20% (see Figure 1). Fiji's real exchange rate is represented in the movement of trade weighted nominal effective exchange rate adjusted to domestic and foreign price levels. The sharp

increases in the indexes in 1987, 1998 and 2009 points out to the years of devaluation in the economy.

Figure 1 **Real effective exchange rate (E^r) index in Fiji, 1975–2012**



Source: IMF's International Financial Statistics database, 2015

4. Empirical methodology and Data description

4.1 A simple 'before-after' approach: Bilateral trade response to devaluation

In this section, we develop a simple 'before-after' approach gain preliminary understanding on the bilateral trade performance to devaluation in Fiji. In particular, we analyse the response of bilateral trade balance with respect to changes in exchange rate some periods before and after. In particular, we analysed the effect of 1% devaluation on trade balance for 1 period before and after devaluation and similarly for 3 and 5 periods. It is also important to mention here that to capture the impact of devaluation on bilateral trade performance, real effective exchange rate is used in all the cases except for Australia, Japan, New Zealand and the USA where we have used real bilateral exchange rates for the analysis.

The real bilateral exchange rate of Fiji with its major trade partners has experienced immediate improvement in international competitiveness after each devaluation episode (Table 1). However, after a lapse of three to five years, it has noted decline in competitiveness. The most favourable impact on the competitiveness has been noted for the 1987 devaluation. This is because the gain in competitiveness has been higher than the rate of devaluation in almost all the cases except with the USA. While most of the major trade partners experienced mixed responses on their trade

components, imports from Australia, Japan and the UK experienced decline after all the different devaluation episodes at different time periods.

Table 1 Response of Bilateral trade performance with major trade partner countries to 1% devaluation in Fiji

| Devaluation Years | 1987 | | | 1998 | | | 2009 | | |
|------------------------------|------|------|---------|------|------|------|------|--------|------|
| | 1 | 3 | 5 | 1 | 3 | 5 | 1 | 3 | 5 |
| AUSTRALIA | | | | | | | | | |
| Real Bilateral Exchange Rate | 39.9 | 46.5 | 38.9 | 14.5 | 9.6 | 9.2 | 38.9 | 28.1 | 26.8 |
| Total Exports | 0.7 | 2.5 | 3.4 | -1.6 | 0.7 | -1.7 | 0.2 | 1.1 | 0.1 |
| Total Imports | -0.6 | -0.1 | 0.0 | -1.4 | 0.7 | -2.6 | -0.3 | -0.4 | -0.6 |
| Trade Balance | 1.3 | 1.0 | 0.9 | 1.1 | -0.6 | -5.2 | 0.5 | 0.9 | 1.0 |
| NEW ZEALAND | | | | | | | | | |
| Real Bilateral Exchange Rate | 72.9 | 85.9 | 70.5 | 11.1 | 1.1 | 4.3 | 34.6 | 13.9 | 10.4 |
| Total Exports | 0.1 | 2.0 | 2.4 | -1.7 | -6.7 | -0.4 | 0.0 | 0.6 | 1.3 |
| Total Imports | -0.2 | 0.2 | 0.4 | -1.0 | 5.0 | 4.2 | -0.2 | -0.6 | -1.0 |
| Trade Balance | 0.2 | 0.3 | 0.1 | 0.8 | -8.3 | -5.4 | 0.2 | 0.8 | 1.3 |
| USA | | | | | | | | | |
| Real Bilateral Exchange Rate | 23.5 | 18.4 | 17.9 | 23.2 | 35.5 | 39.4 | 5.1 | 0.1 | -3.8 |
| Total Exports | 1.4 | 0.6 | 2.6 | -0.8 | 0.8 | 1.3 | -4.8 | -176.8 | 4.8 |
| Total Imports | -0.1 | 1.3 | 5.7 | 2.3 | -0.8 | -1.0 | -9.4 | -76.0 | 0.2 |
| Trade Balance | 2.7 | -4.6 | -2588.0 | -6.4 | 32.4 | 15.6 | 22.3 | -620.2 | 12.3 |
| UK | | | | | | | | | |
| Real Effective Exchange Rate | 17.6 | 40.4 | 43.0 | 17.6 | 15.8 | 16.5 | 12.8 | 10.6 | 9.0 |
| Total Exports | 1.1 | 1.0 | 1.7 | -3.6 | -2.2 | -1.3 | -1.1 | -3.3 | -3.7 |
| Total Imports | -0.3 | -0.2 | -0.2 | -0.8 | -2.6 | -2.8 | -4.5 | -1.9 | -1.8 |
| Trade Balance | 1.4 | 1.4 | 2.4 | -4.2 | -2.1 | -1.0 | -0.5 | -3.5 | -3.9 |
| JAPAN | | | | | | | | | |
| Real Bilateral Exchange Rate | 54.4 | 65.3 | 71.6 | 38.2 | 34.4 | 19.9 | 1.7 | 18.7 | 10.6 |
| Total Exports | 2.1 | 3.5 | 4.4 | -0.9 | -1.2 | -1.4 | 17.5 | 2.7 | 5.2 |
| Total Imports | -0.5 | -0.2 | -0.1 | -0.7 | -0.3 | -1.1 | -5.9 | -1.3 | -3.1 |
| Trade Balance | 0.7 | 0.5 | 0.5 | 0.4 | -1.1 | 0.8 | 89.6 | 9.1 | 14.8 |

Source: Author's calculation

On the other hand, the emerging Asian trade partner countries have also experienced mixed results on their trade relations with Fiji after each devaluation episodes except for China (Table 2). This simple analysis reveals that following currency devaluation in Fiji, trade balance performance with Australia, New Zealand, India, Japan and the UK seems to be improving while it appears to be deteriorating with China, Hong Kong, Malaysia, Singapore and the USA. However, these are just crude estimates and care needs to be taken in their interpretation. A more detailed econometric analysis is carried out in the next section to evaluate the effectiveness of devaluation at the bilateral level.

Table 2 Response of bilateral trade performance with emerging Asian trade partner countries to 1% devaluation in Fiji

| Devaluation Years | 1987 | | | 1998 | | | 2009 | | |
|---------------------------------|-------------|----------|----------|-------------|----------|----------|-------------|----------|----------|
| | 1 | 3 | 5 | 1 | 3 | 5 | 1 | 3 | 5 |
| Real Effective Exchange Rate | 17.6 | 40.4 | 43.0 | 17.6 | 15.8 | 16.5 | 12.8 | 10.6 | 9.0 |
| SINGAPORE | | | | | | | | | |
| Total Exports | 2.6 | 0.2 | -0.5 | -4.3 | -4.7 | -1.4 | -0.3 | -2.0 | -9.5 |
| Total Imports | 11.2 | 1.2 | 0.8 | 0.4 | -0.1 | 0.2 | -3.0 | -1.6 | 0.1 |
| Trade Balance | -11.3 | -1.2 | -1.1 | -0.7 | -0.3 | -0.3 | 3.0 | 1.6 | -1.0 |
| CHINA | | | | | | | | | |
| Total Exports | 5.6 | 2.3 | 0.4 | 82.9 | -5.4 | -5.1 | 20.4 | 16.8 | 22.7 |
| Total Imports | 0.3 | 1.0 | 1.4 | -2.1 | 0.9 | 1.4 | 0.1 | 6.4 | 11.8 |
| Trade Balance | 6.9 | -0.2 | -2.6 | 2.3 | -2.6 | -2.5 | 0.4 | -6.0 | -11.3 |
| MALAYSIA | | | | | | | | | |
| Total Exports | 2.2 | 0.3 | 0.9 | -3.8 | -5.9 | -5.8 | -1.4 | 17.6 | 58.4 |
| Total Imports | -1.4 | 2.3 | 4.3 | -1.6 | 0.6 | 2.1 | -0.7 | 1.6 | 4.0 |
| Trade Balance | 2.6 | 0.1 | 0.7 | -2.6 | -16.6 | -12.8 | 0.7 | -1.5 | -3.7 |
| INDIA | | | | | | | | | |
| Total Exports | 23.4 | 2.5 | 1.0 | -0.6 | 4.2 | 4.6 | -0.5 | 26.0 | 49.3 |
| Total Imports | -1.2 | -0.4 | 0.1 | -0.9 | 0.8 | 2.2 | -4.3 | -2.9 | -1.9 |
| Trade Balance | 1.6 | 0.5 | -0.1 | 0.9 | -0.8 | -2.2 | 4.4 | 3.2 | 2.5 |

HONG KONG

| | | | | | | | | | |
|---------------|-----|------|------|------|------|------|------|-----|-----|
| Total Exports | 7.7 | 5.8 | 7.4 | -1.2 | 1.9 | 5.9 | 2.0 | 5.3 | 6.2 |
| Total Imports | 0.1 | 2.2 | 2.9 | -0.9 | 2.7 | 2.8 | -1.3 | 0.0 | 1.1 |
| Trade Balance | 1.1 | -1.7 | -2.4 | 0.8 | -2.9 | -2.0 | 2.1 | 2.0 | 0.9 |

Source: Author's calculation

4.2 Empirical model

The empirical model employed in this study is built on the works of several studies including Narayan (2004), Bahmani-Oskooee and Harvey (2012), Bahmani-Oskooee and Xu (2013) and Prakash and Maiti (2016). In this study, the bilateral trade balance model is expressed as a function of real effective exchange rate, real domestic income and real foreign income. The model to investigate the impact of devaluation on the bilateral trade balance in the economy is modeled as follows:

$$NX_j = f(E_j^r, Y, Y_j^f) \quad (t=1975-2012)$$

(1)

where, NX is defined as the ratio of Fiji's bilateral exports over her bilateral imports with the trade partner (j). A priori, it is expected that devaluation will encourage exports and discourage imports leading to expected positive sign of the coefficient of the exchange rate (E^r) variable on the bilateral trade balance. Fiji's GDP is captured by (Y) which is expected to have a negative sign implying that an increase in Fiji's income will result in an increase in its imports thereby reducing the trade balance. On the other hand, Fiji's exports are likely to increase due to increasing demand for goods and services as a result of increasing income levels in its trading partner countries (Y^f). This will results in a positive coefficient for respective foreign income variable. We also include a dummy variable to capture the impact of political instability (*COUP*) 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.

The variable description of the data series which have been collected over the 1975–2012 periods are given in Appendix 4. 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 International Monetary Fund's International Financial Statistics (IFS) online database, World Bank's World Development Indicators (WDI) online database, Fiji Bureau of Statistics, Overseas Merchandise Trade Statistics (various years) and Fiji Bureau of Statistics, Key Statistics (various years). All the values are taken in real terms at 2005 US dollars. Hereafter, we use the vector error correction model (VECM) to test the long-run and short-run relationship among the variables in our models.

4.2.1 VECM analysis

The testing procedure involves three steps for the tests of unit root, cointegration test followed by estimating the short- and long-run relationship. Using the widely applied Augmented Dickey Fuller tests (ADF), we find all the variables to be of $I(1)$ in nature (Appendix 5). This depicts possibility of long-run relationship among the variables. The result of maximum Eigenvalue method suggests that there exists at least one cointegrating equation (Appendix 6), suggesting the presence of co-movements among the variables indicating long run stationarity in all our models.

The long-run elasticities of the 'Major Trade Partners' are discussed and reported first in Table 3 followed by the results of the 'Emerging Asian Trade Partners' in Table 6. The variable of interest, E' , which captures the impact of devaluation, is noted to have a significant relation with trade balance for nine out of the ten bilateral trade partner countries analysed in this study. The only exception with an insignificant relation is with Japan. Out of these significant relations, only the exchange rate relationships with New Zealand and the USA are found to be significantly positive. This implies that devaluation only has significant and favourable impact on the trade balance for these two countries.

A closer look into the long-run coefficient reveals that out of the five major trading partner countries, trade with the USA benefits the most from devaluation in Fiji. The results suggest that, *ceteris paribus*, 1% currency devaluation significantly improves Fiji's trade position with the USA by 6% in the long-run. This is argued to be as a result of greater influence of devaluation on Fiji's exports to the USA than on its bilateral imports (Appendix 7). The results also suggests that Fiji's traditional exports to the USA which primarily consist of mineral and aerated bottled water, tuna,

sugar, garments, lumber and mahogany appear to have benefitted in the midst of currency devaluation in Fiji. However, there is also evidence that imports from the USA, which primarily include petroleum bitumen used in road construction, medicaments and food products experience modest increase.

Additionally, trade with New Zealand also appears to be improving significantly as a result of devaluation. The results suggest that *ceteris paribus*, 1% devaluation in Fiji significantly improves Fiji's trade position with New Zealand by approximately 0.7% in the long-run (Table 3). Additionally, Fiji experiences increases in exports and imports from New Zealand in the long-run as a result of devaluation (Appendix 7). However, the magnitude of the impact on the exports outweighs its influence on imports. This results in the overall favourable impact on the bilateral trade balance in the long-run. Major commodity exports to New Zealand such as sugar, garments, fish and other food products experiences favourable increase after devaluation in Fiji.

On the other hand, Fiji's trade with Australia experiences deterioration in the bilateral trade balance at least at the 10% level of significance. The results suggest that, *ceteris paribus*, 1% devaluation in Fiji reduces Fiji's trade balance position with Australia by 2.2% in the long-run (Table 3). The results from the export model suggest that exports from Fiji to Australia, which include gold, garments and food products, increases significantly while imports from Australia to Fiji are not affected as a result of devaluation (Appendix 7). This implies that changes in the real bilateral exchange rate do not significantly alter import volumes from Australia to Fiji. Hence, due to the inelastic nature of Fiji's import demand from Australia, the continued demand for imports such as food products, manufactured goods, chemicals, oil and fats among others, results in an adverse impact on the bilateral trade balance with Australia. The finding that devaluation worsens Fiji's trade performance with Australia is also consistent with the earlier findings of Kaufman (2008). Kaufman (2008) estimates that the M-L condition does not hold true for Fiji's trade performance with Australia. This consequently implies that devaluation worsens the bilateral trade balance between the two countries.

Table 3 Estimates of long-run coefficients of trade balance models with Bilateral trade partners

| <i>Major Trade Partners</i> | E^r | Y | Y^f | Constant |
|--------------------------------------|-----------------------|-----------------------|---------------------|----------|
| <i>AUSTRALIA</i> | -2.225 (1.260)* | -11.163 (2.147)*** | 1.919 (5.524) | -0.223 |
| <i>NEW ZEALAND</i> | 0.710 (0.190)*** | -4.308 (1.088)*** | 1.823 (0.845)** | 25.360 |
| <i>JAPAN</i> | -1.230 (0.779) | 0.488 (1.780) | 4.809 (1.589)*** | -108.513 |
| <i>UNITED STATES</i> | 5.873 (0.902)*** | -0.273 (2.504) | -0.007 (-1.771) | -22.334 |
| <i>UNITED KINGDOM</i> | -11.967 (2.615)*** | 5.497 (3.460) | 4.810 (3.699) | -127.031 |
| <i>Emerging Asian Trade Partners</i> | | | | |
| <i>SINGAPORE</i> | -4.075 (1.937)** | 6.877 (4.254) | -2.062 (1.428) | -48.538 |
| <i>CHINA</i> | -13.971 (5.320)** | 2.370 (11.344) | 1.383 (2.811) | -2.963 |
| <i>MALAYSIA</i> | -11.378 (3.473)*** | -24.106 (9.179)** | 6.704 (3.197)** | 282.403 |
| <i>INDIA</i> | -11.718 (2.637)*** | -9.377 (5.236)* | 9.740 (2.156)*** | -8.635 |
| <i>HONG KONG</i> | -7.984 (2.096)*** | -8.284 (5.621) | -0.062 (2.558) | 0.287 |

Notes:

1. Standard errors are given in parentheses.

2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.

Similarly, it is found that devaluation significantly worsens Fiji's bilateral trade balance with the UK in the long-run. Fiji's major export to the UK has been sugar, for which Fiji for a long period of time has enjoyed preferential access⁸ to the EU markets and the UK. Hence, it is argued that due to the agreed export prices of sugar to the UK, changes in the exchange rate have not been beneficial. In fact, currency devaluation has not resulted in a significant increase in sugar exports to the UK. However, this result also lends support to the findings of Kaufman (2008). Study by Kaufman (2008) also finds insignificant impact of exchange rate on the Fiji-UK export relationship. Nonetheless, imports such as chemicals and food products from the UK, experience significant increases. This causes an ultimate adverse impact on the bilateral trade position. To the contrary, bilateral trade performance with Japan is found to be unaffected by currency devaluation in Fiji (Table 3). This is attributable to the insignificant increase in bilateral exports accompanied

⁸ The preferential access of Fiji's sugar to EU market will end in 2017.

by a 10% significant increase in imports in the long-run (Appendix 7). It is ascertained that since Fiji relies on imports of manufactured goods, machinery and transport equipment from Japan, importation of these products continue at a similar pace as before devaluation. This is because of its substantial use in the domestic production processes and its lack of domestic substitutability.

Moreover, the empirical result for Fiji's trade with emerging Asian economies such as with Singapore, China, Malaysia, India and Hong Kong has been gaining increased attention over the last decade or so. Given the interest of this study, the empirical results for this set of countries reveal that currency devaluation in all the cases has unfavourable impact on Fiji's bilateral trade balance with these countries (Table 3). The results imply that Fiji's exports to these Asian countries which largely involve export of fish and other food products do not respond favourably to devaluation. However, imports from these countries which are largely dominated by mineral fuel, food products, manufactured goods, machinery and transport equipment, shows strong positive association to devaluation (Appendix 7). This is largely because these importable commodities are important components in local domestic production and consumption processes. However, domestic substitution for these commodities is weak. Hence, this results in continued import of these commodities despite devaluation in Fiji. The results also reinforce that currency devaluation does not have a uniform effect across all trading partners and that dominant currency is playing a role in the ultimate effect on trade pattern.

Henceforth, next discussed is the impact of domestic and foreign income on Fiji's bilateral trade performance. The impact of Fiji's domestic income by and large has been found to be negative and on most instances to be significantly influencing the bilateral trade flows. This conventional argument is valid for almost half of the countries in the study. This includes trade with Australia, New Zealand, Malaysia and India. The results suggests that for a 1% increase in Fiji's real GDP, *ceteris paribus*, Fiji's bilateral trade balance significantly decreases with Australia by 11%, New Zealand by 4%, Malaysia by 24% and India by around 9% in the long-run (Table 3). The results for these four trade partners suggest that a rise in Fiji's GDP causes an increase in demand for imports from these countries. Hence, this causes an adverse impact on its bilateral trade balance. These results are also supported from each country's bilateral import demand models of Fiji

(Appendix 7 and 8). For other trade partners, Fiji's GDP does not have a significant impact on its bilateral trade performance.

Furthermore, the long-run estimates of the trading partner income suggest that four of the ten trading partner countries experience significant favourable relationship of the bilateral trade performance with Fiji. These trading partners include New Zealand, Japan, Malaysia and India (Table 3). The results suggest that increase in income in these countries translate into increase in Fiji's exports to these countries. However, the income of other trade partners does not significantly affect Fiji's trade performance in the long-run. This could be particularly true when Fiji's exports are not among the most preferred consumed goods in these countries and there are substitutes to Fiji's exportable products. The result is also robust as these results are also supported by each country's bilateral export demand models (Appendix 7 and 8). What comes out clearly is that there is unfavourable impact of devaluation on bilateral trade balances with trading partners that supply significant amounts of imports to Fiji.

Moreover, the short-run impact of Fiji's currency devaluation suggests that devaluation in Fiji improves the bilateral trade position with Australia, Japan, the UK, Singapore, Malaysia and Hong Kong at all lag lengths (Table 4 and Table 5). Trade with New Zealand and the USA, on the other hand, experiences short-run deterioration while trade with India and China experience mixed responses. A closer look at the short-run elasticities for the trade partners reveal that currency devaluation has insignificant relation at all the lags with New Zealand, the USA, Singapore, Malaysia and China. Trade balance with Australia, on the other hand, is estimated to improve significantly as a result of the decline in imports from Australia atleast in the short-run. Nevertheless, as the long-run results suggest, this does not last for a long period of time. The inelastic nature of imports from Australia tends to dominate in the long-run. India, Japan, Hong Kong and the UK also show similar favourable impact of devaluation on its trade balance in the short-run.

Table 4 **Short-run coefficient estimates of real exchange rates in the major trade partners' trade balance models**

| <i>Short-run results</i> | Australia | New Zealand | Japan | USA | UK |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| $\Delta \ln E_{t-1}^r$ | 2.115 (0.775)** | -0.569 (0.369) | 0.745 (0.595) | -1.527 (0.943) | 6.252 (2.306)** |
| $\Delta \ln E_{t-2}^r$ | 1.131 (0.784) | -0.248 (0.414) | 1.932 (0.592)*** | | 5.854 (2.351)** |
| $\Delta \ln E_{t-3}^r$ | 0.648 (0.568) | -0.135 (0.301) | 2.091 (0.701)** | | 3.789 (2.730) |
| $\Delta \ln E_{t-4}^r$ | | | | | 9.161 (3.402)** |
| $\Delta \ln E_{t-5}^r$ | | | | | 8.778 (3.575)** |
| <i>COUP</i> | -0.251 (0.112) | -0.009 (0.082) | -0.236 (0.188) | -0.415 (0.167)** | 0.073 (0.277) |
| Diagnostics | | | | | |
| ECT_{t-1} | -0.937 (0.295)*** | -0.968 (0.228)*** | -0.899 (0.211)*** | -0.458 (0.152)*** | -0.604 (0.183)*** |
| R^2 | 0.800 | 0.726 | 0.737 | 0.466 | 0.790 |
| <i>Adjusted R²</i> | 0.646 | 0.524 | 0.544 | 0.356 | 0.278 |
| σ | 0.213 | 0.184 | 0.380 | 0.435 | 0.398 |
| X^2N | 0.214 [0.899] | 0.876 [0.645] | 0.036 [0.982] | 2.131 [0.345] | 3.441 [0.179] |
| X^2Het | 28.183 [0.455] | 32.380 [0.218] | 30.667 [0.285] | 11.395 [0.411] | 25.524 [0.545] |
| <i>LM Test(SC)</i> | 19.924 [0.224] | 21.120 [0.174] | 31.224 [0.500] | 10.850 [0.819] | 12.149 [0.734] |
| <i>AR roots graph</i> | stable | stable | stable | stable | stable |

Notes:

1. Standard errors are given in parentheses while p values are in brackets.
2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.
3. Optimal lag lengths are chosen by the SIC method.
4. Variables in the first column with numbers in subscripts ($t-1$) shows the number of lag lengths taken in the respective model as suggested by the optimal lag selection method.
5. ECT_{t-1} represents the error correction terms; Δ is the respective variable taken in its first difference, σ is the standard error of equation; Adjusted R^2 shows the adjusted R-squared statistics to determine how well model fits the data by taking into account the number of explanatory variables in the model.
6. Diagnostics are Jarque-Bera statistics for normality (X^2N) and chi-squared for heteroskedasticity tests (X^2Het), and LM Test statistics for serial correlation ($LM\ test(SC)$) while AR roots graph tests for model stability. The p-values for the diagnostic tests are in brackets [...] and a value greater than 5% indicates, the model passing the particular diagnostic test.

Table 5 Short-run coefficient estimates of real exchange rates in emerging Asian trade partners' trade balance models

| <i>Short-run results</i> | Singapore | China | Malaysia | India | Hong Kong |
|-------------------------------|--------------------|---------------------|--------------------|----------------------|----------------------|
| $\Delta \ln E_{t-1}^r$ | 2.897 (4.475) | 4.245 (8.110) | 0.312 (3.394) | 11.532 (3.644)*** | 7.414 (2.059)*** |
| $\Delta \ln E_{t-2}^r$ | 5.990 (4.471) | -2.830 (8.571) | 1.494 (3.059) | 11.366 (4.606)** | 4.172 (2.345)* |
| $\Delta \ln E_{t-3}^r$ | | -5.660 (8.850) | | 3.282 (3.799) | 2.410 (1.984) |
| $\Delta \ln E_{t-4}^r$ | | | | -0.077 (3.420) | 3.135 (1.758)* |
| $\Delta \ln E_{t-5}^r$ | | | | 4.808 (2.838)* | |
| <i>coup</i> | -1.007 (0.720) | -1.142 (1.412) | -0.474 (0.538) | 0.288 (0.603) | -0.087 (0.323) |
| Diagnostics | | | | | |
| ECT_{t-1} | -0.617 (0.326)* | -0.534 (0.228)** | -0.271 (0.139)* | -1.131 (0.223)*** | -0.773 (0.279)*** |
| R^2 | 0.332 | 0.703 | 0.397 | 0.884 | 0.881 |
| <i>Adjusted R²</i> | 0.053 | 0.484 | 0.145 | 0.601 | 0.717 |
| σ | 1.248 | 1.959 | 0.789 | 3.875 | 0.375 |
| X^2N | 1.217 [0.544] | 1.908 [0.385] | 0.367 [0.833] | 0.009 [0.995] | 0.317 [0.853] |
| X^2Het | 17.149 [0.580] | 29.079 [0.357] | 22.417 [0.264] | 27.203 [0.453] | 13.690 [0.251] |
| <i>LM Test(SC)</i> | 20.046 [0.218] | 9.951 [0.869] | 10.939 [0.813] | 17.850 [0.333] | 14.387 [0.570] |
| <i>AR roots graph</i> | stable | stable | stable | stable | stable |

Notes:

1. Standard errors are given in parentheses while p values are in brackets.
2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.
3. Optimal lag lengths are chosen by the SIC method.
4. Variables in the first column with numbers in subscripts ($t - 1$) shows the number of lag lengths taken in the respective model as suggested by the optimal lag selection method.
5. ECT_{t-1} represents the error correction terms; Δ is the respective variable taken in its first difference, σ is the standard error of equation; Adjusted R^2 shows the adjusted R-squared statistics to determine how well model fits the data by taking into account the number of explanatory variables in the model.
6. Diagnostics are Jarque-Bera statistics for normality (X^2N) and chi-squared for heteroskedasticity tests (X^2Het), and LM Test statistics for serial correlation ($LM\ test(SC)$) while AR roots graph tests for model stability. The p-values for the diagnostic tests are in brackets [...] and a value greater than 5% indicates, the model passing the particular diagnostic test.

Additionally, in consistent with earlier studies such as Gounder (2001), Prasad (2012) and Prakash and Maiti (2016), bilateral trade balance tends to deteriorate as a result of political instability in the country. However, it is estimated to be significant only in the case of bilateral trade balance with the USA. The diagnostic tests shows that all the models pass tests of autocorrelation, normality and heteroskedasticity along with the tests for model stability. The R-squared and the adjusted R-squared is also relatively strong for all the bilateral trade balance models. All the models are also statistically well behaved as the error-correction term has negative sign, is statistically significant and ranges between 0 and -1 in all the cases. This ensures that the series are non-explosive and that long-run equilibrium is attainable.

4.2.2 Testing the Bilateral J-curve phenomenon

The bilateral level J-curve phenomenon is analysed for Fiji's with its ten trading partner countries in the study. Based on the three methods of assessing the J-curve phenomenon, the results are summarised and presented in Table 6. The analysis reveals very weak evidence of the J-curve phenomenon at the bilateral level of trade.

Table 6 **Results on the bilateral level J-curve phenomenon**

| Trading Partner Countries | The J-curve phenomenon using: | | |
|--------------------------------------|-------------------------------|-------------------|---------------------------------------|
| | Traditional definition | New definition | Impulse Response Function Analysis |
| <i>Major Trade Partners</i> | | | |
| Australia | No | No | No |
| New Zealand | No | Yes | No |
| Japan | No | No | Yes |
| United Kingdom | No | No | Yes |
| Unites States of America | No | Yes | Yes |
| <i>Emerging Asian Trade Partners</i> | | | |
| Singapore | No | No | No |
| Malaysia | No | No | No |
| India | No | No | No |
| Hong Kong | No | No | No |
| China | No | No | No |

In particular, the analysis shows no evidence of the J-curve phenomenon using the traditional definition, in two cases using the new definition and in three cases using the IRF analysis. The

analysis using the traditional definition indicates that in no cases there is a trade balance that experiences initial decline followed by improvement in response to changes in the exchange rate in the short-run. However, trade with New Zealand and the USA finds applicability of the J-curve phenomenon using the new definition. Additionally, using the IRF analysis⁹, the J-curve phenomenon is valid in the case of Fiji's trade with Japan, the UK and the USA.

Moreover, trade with Australia does not show presence of the J-curve phenomenon using any of the methods. The results using traditional and new definition suggest short-run improvement followed by long-run deterioration of the bilateral trade balance. The IRF analysis also does not show the J-curve phenomenon (Figure 2.1). In fact, the graphical representation of the shock in the real exchange rate to trade balance exhibits a V-shaped relationship up until six periods after which it tends to decline. The response pattern of trade balance between Fiji and Australia is largely consistent with our earlier discussion and arguments. Fiji's bilateral trade with New Zealand also shows no evidence of the J-curve phenomenon using the traditional definition and the IRF analysis but confirms its validity using the new definition. It is noted that the short-run effects of devaluation on the trade balance between Fiji and New Zealand is unfavourable. However, using the IRF analysis, the results reveal an inverted U-shaped relationship (Figure 2.2). In particular, it reveals a decline in the bilateral trade balance four periods after the devaluation year, after which it improves modestly.

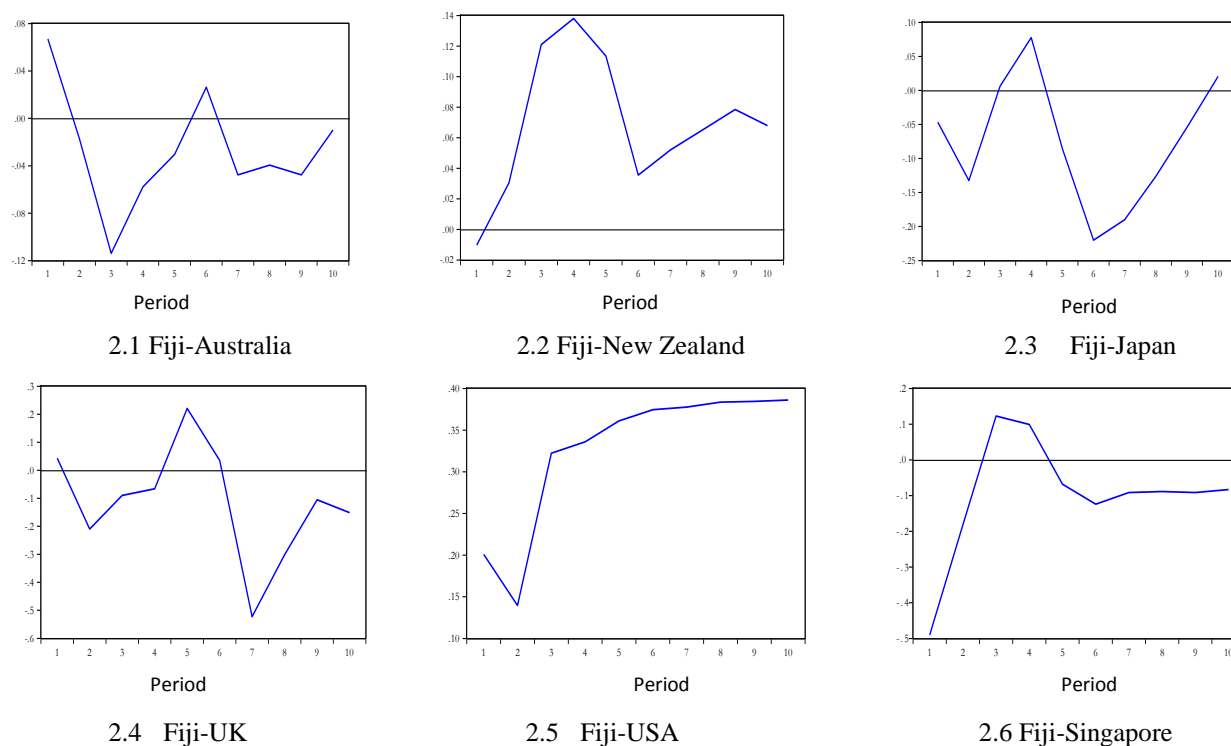
Japan and the UK, on the other hand, yield evidence of the J-curve phenomenon using the IRF analysis only (Figure 2.3 and 2.4, respectively). Trade with Japan for instance, shows that the bilateral trade balance immediately falls for at least two periods accompanied by improvements between periods two and four. Bilateral trade with the UK experiences decline in the later periods which provides evidence that the J-curve phenomenon with the UK is not strictly followed for a long period of time. With regard to Fiji's trade with the USA, it gains support for the J-curve phenomenon using the new definition and the IRF analysis (Figure 2.5). The results from the new definition show short-run negative coefficients of the real bilateral exchange rate followed by significant positive impact in the long-run. Additionally, the IRF analysis shows that the trade

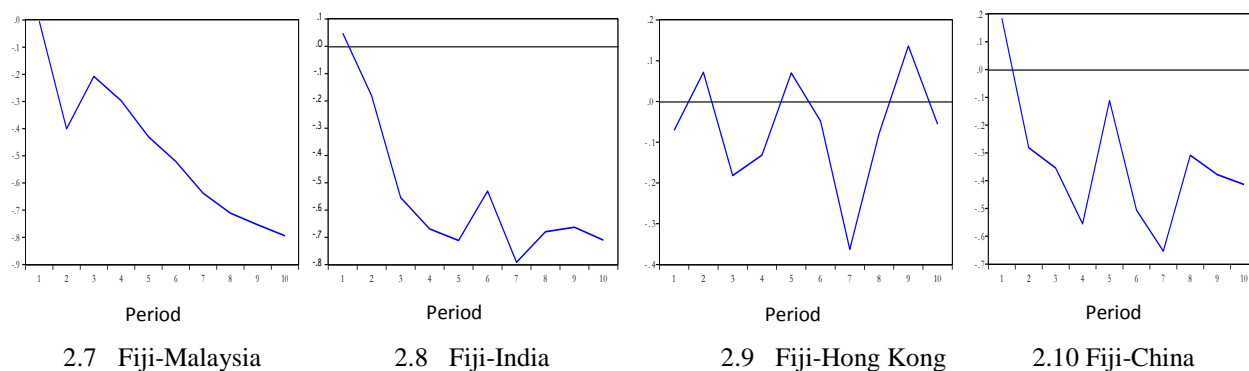
⁹ All the results obtained with IRF analysis are presented in Figure 2 for the ten trading partner countries.

balance with the USA falls for the first two periods followed by modest improvements in later periods.

Furthermore, tests on the presence of the bilateral J-curve phenomenon with Fiji's 'Emerging Asian Trade Partners' suggests that the phenomenon is not valid for any of the countries in this category. More specifically, using the traditional definition there is evidence of an immediate favourable impact in the short-run in all the cases, followed by instances of negative real exchange rate coefficients at longer periods in some cases. These coefficients results do not provide any evidence of the J-curve phenomenon using the traditional definition. Moreover, using the new definition, the short-run favourable impact of the real exchange rate on the trade balances is followed by long-run significant and negative impact on the same in all the cases. This again results in no evidence of the J-curve phenomenon using the new definition.

Figure 2 Response of the trade balance between Fiji and its respective trading partner countries to generalised one standard deviation innovation in the real bilateral exchange rate





Additionally, the IRF analysis also does not reveal the J-curve phenomenon in any of the cases. In particular, the response of the bilateral trade balance with Singapore (Figure 2.6) exhibits an inverted U-shaped relationship while trade with Malaysia does not depict any specific pattern (Figure 2.7). However, the response of the bilateral trade balance with India (Figure 2.8), Hong Kong (Figure 2.9) and China (Figure 2.10) depicts a W-shaped relationship. More specifically, the results show periods of immediate decline followed by improvements combined with another round of decline and improvements. Nevertheless, in the later periods, it follows a path of continuous decline. It is argued that the non-presence of the J-curve phenomenon for this set of countries is largely because of Fiji being a net importer and heavily dependent on importable commodities from these countries. Hence, despite the currency devaluation, the bilateral trade balance situation continues to deteriorate in the long-run with these countries.

Based on the three methods to validate the J-curve phenomenon, the study finds evidence of the phenomenon in four out of the ten trading partners considered in the study. These include countries classified as part of the ‘Major Trade Partners’ only. The countries with evidence of the J-curve phenomenon using any of the methods of assessment include New Zealand, Japan, the UK and the USA. In particular, the study finds that the J-curve phenomenon is more pronounced using either the new definition or the IRF analysis. However, none of the trading partners classified as part of the ‘Emerging Asian Trade Partners’ reveal evidence of the J-curve phenomenon. This result reinforces the argument that not all trade partners are affected in the same manner as a result of devaluation.

5. Conclusion and policy implications

This study has attempted to fill the gap in the literature on the nexus of exchange rate with bilateral level trade performance. This analysis to some extent has ensured that the analysis of devaluation on bilateral trade performance is as comprehensive as possible in the context of a Pacific island developing economy, Fiji. As a result, this analysis has allowed us to identify how currency devaluation in Fiji has impacted bilateral trade performance in response to devaluation in the country.

The empirical results show a favourable impact of devaluation on the bilateral goods trade performance with countries classified in the ‘Major Trade Partners’ only. Trade with New Zealand and the USA experiences significant improvement in the trade balance in response to currency devaluation in Fiji. However, all the countries classified as part of ‘Emerging Asian Trade Partners’ along with Australia and the UK experience significant deterioration in bilateral trade performance in response to devaluation in the country. The empirical results suggest that Fiji’s exports to these destinations are relatively insensitive to changes in exchange rate while imports from these countries continue to increase despite the devaluation. Hence, heavy dependence on major importable commodities from these countries results in overall trade deficits. In the short-run, the impact of devaluation is generally found to be favourable in most of the cases. Additionally, in almost all the models, an increase in domestic income is noted to result in increase in imports while a rise in trading partner income has a positive impact on the trade balance.

Moreover, using either of the methods, the study finds evidence of the J-curve phenomenon in only four out of the ten trading partner countries analysed in this study. These countries include New Zealand, Japan, the UK and the USA. However, none of the Asian trade partners’ show evidence of the J-curve phenomenon. This result reinforces that by removing the aggregation biasness, evidence shows that currency devaluation does not have a uniform effect across all trading partner countries.

From a policy perspective, we can conclude that increasing export relationship with the Asian emerging markets appears to bring about increasing trade opportunities as links through air and sea transport are well established. Additionally, increased trade with New Zealand, Japan, the UK and

the USA are expected to bring benefit in the midst of devaluation in Fiji. However, caution needs to be in place for increasing Fiji's trade with Australia because of unfavourable impacts observed on the bilateral trade balance. When Fiji, being a country with a fixed exchange regime, heavily depends on the devaluation as a shock absorber during the crisis period, it is noteworthy to mention that this cannot provide a permanent solution for the long-run. Thus, we recommend carefully designed trade strategies to be an integral part to minimise trade deficit problems in the economy.

We also mention that one of the major limitations in carrying out this study to make it a comprehensive one is the unavailability of adequate time-series data with Pacific island developing economies which makes it very difficult to estimate Fiji's trade relationship with other PICs in the region. Though the trade share has historically been low, in the current times trade among the countries in the region has gained momentum. Hence, evaluating the impact of devaluation on the trade relationship with the neighbouring island countries would be an interesting and useful exercise.

References

- Arora, S., Bahmani-Oskooee, M., & Goswami, G. G. (2003). Bilateral J-curve between India and her trading partners. *Applied Economics*, 35(9), 1037-1041.
- Bahmani-Oskooee, M., & Brooks, T. (1999). Cointegration approach to estimating bilateral trade elasticities between U.S. and her trading partners. *International Economic Journal*, 13(4), 119-128.
- Bahmani-Oskooee, M., Goswami, G., & Talukdar, B. (2005). The bilateral J-curve: Australia versus her 23 trading partners. *Australian Economic Papers*, 44(2), 110-120.
- Bahmani-Oskooee, M., & Harvey, H. (2012). J-curve: Singapore versus her major trading partners. *Economic Papers*, 31(4), 515-522.
- Bahmani-Oskooee, M., & Ratha, A. (2004). The J-curve: A literature review. *Applied Economics*, 36, 1377-1398.
- Bahmani-Oskooee, M., & Wang, Y. (2006). The J-curve: China versus her trading partners. *Bulletin of Economic Research*, 58(4), 323-343.
- Bahmani-Oskooee, M., & Xu, J. (2013). The J-curve and Japan-China commodity trade. *Journal of Chinese Economic and Business Studies*, 11(1), 13-28.
- Casas, C., Diez, F., Gopinath, G., & Gourinchas, P. (2016). Dominant Currency paradigm. *NBER Working Paper No. 22943*, National Bureau of Economic Research, Inc. Available at www.nber.org/papers/w22943

- Celik, S., & Kaya, H. (2010). Real exchange rates and bilateral trade dynamics of Turkey: Panel cointegration approach. *Applied Economics Letters*, 17(8), 791–795.
- Dash, A. (2013). Bilateral J-curve between India and her trading partners: A quantitative perspective. *Economic Analysis & Policy*, 43(3), 315-338.
- FBOS. (various years(a)). *Overseas Merchandise Trade Statistics*. Suva: Fiji Bureau of Statistics.
- FBOS. (various years(b)). *Key Statistics*. Suva: Fiji Bureau of Statistics.
- Gounder, R. (2001). Aid-growth nexus: Empirical evidence from Fiji. *Applied Economics*, 33(8), 1009-1019.
- IMF. (2015). International Financial Statistics (online database). Washington DC, USA. Retrieved June 20, 2015, from International Monetary Fund: <https://elibrary-data.imf.org/>
- Kaufmann, U. (2008). Gains from trade versus adjustment costs: The Economic Partnership Agreement and the Pacific Agreement on Closer Economic Relations. *Unpublished Master of Commerce dissertation*, The University of the South Pacific, Suva.
- Lal, A., & Lowinger, T. (2002). The J-curve: Evidence from East Asia. *Journal of Economic Integration*, 17, 397-415.
- Narayan, P. (2006). Examining the relationship between trade balance and exchange rate: the case of China's trade with the USA. *Applied Economics Letters*, 13(8), 507-510.
- Narayan, P., & Narayan, S. (2004). The J-curve; evidence from Fiji. *International Review of Applied Economics*, 18(3), 369-380.
- Narayan, P., & Narayan, S. (2007). Is devaluation expansionary or contractionary? Empirical evidence from Fiji. *Applied Economics*, 39, 2589–2598.
- Prakash, K., & Maiti, D. (2016). Does devaluation improve trade balance in small island economies? The case of Fiji. *Economic Modelling*, 55, 382-393.
- Prasad, B. (2012). Fiji economy: Muddling through. *The Round Table: The Commonwealth Journal of International Affairs*, 101(6), 557-573.
- Reddy, M. (1997). Devaluation and economic simulation: The Fiji economy post-coup. *Pacific Economic Bulletin*, 12(2), 85-94.
- Rose, A., & Yellen, J. (1989). Is there a J-curve? *Journal of Monetary Economics*, 24(1), 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.
- The World Bank. (2015). World Development Indicators (online database). Washington DC, USA. Retrieved May 1, 2015, from The World Bank: <http://data.worldbank.org/data-catalog/world-development-indicators>
- Wang, C.-H., Lin, C.-H. A., & Yang, C.-H. (2012). Short-run and long-run effects of exchange rate change on trade balance: Evidence from China and its trading partners. *Japan and the World Economy*, 24(4), 266-273.

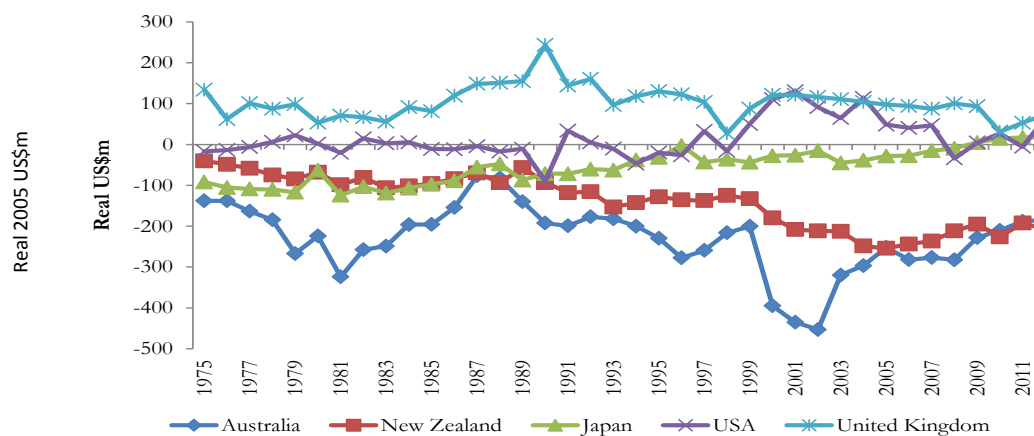
Appendices

1. Fiji's trading partners' composition in 2015

| Domestic Exports | | Imports | |
|------------------|-----------|------------------|-----------|
| Top 10 Countries | Share (%) | Top 10 Countries | Share (%) |
| USA | 24.4 | Singapore | 19.0 |
| Australia | 22.0 | Australia | 15.4 |
| UK | 7.2 | China | 14.6 |
| New Zealand | 5.2 | New Zealand | 14.3 |
| Vanuatu | 4.4 | Korea | 6.4 |
| China | 4.2 | Japan | 4.7 |
| Japan | 3.6 | USA | 2.9 |
| Samoa | 2.3 | Thailand | 2.7 |
| Kiribati | 2.3 | Hong Kong | 2.4 |
| Tonga | 2.3 | Malaysia | 2.1 |

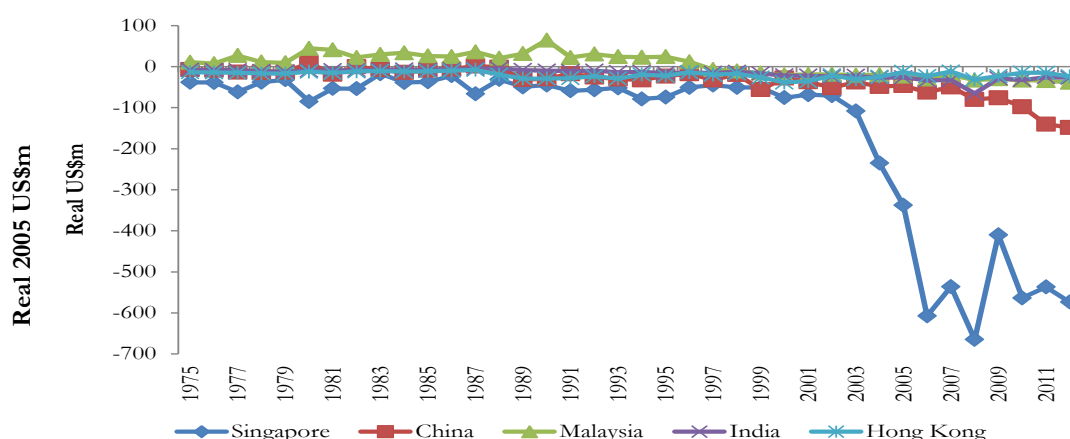
Source: Fiji Bureau of Statistics, Key Statistics (March, 2016)

2. Fiji's trend of trade balance with her major trade partner countries, 1975–2012



Source: Fiji Bureau of Statistics, Overseas Merchandise Trade Statistics (various years)

3. Fiji's trend of trade balance with her emerging Asian trade partner countries, 1975–2012



Source: Fiji Bureau of Statistics, Overseas Merchandise Trade Statistics (various years)

4. Variable definitions

| | |
|--------------|---|
| TBG_{AUS} | measures Fiji's goods trade balance with Australia defined as Fiji's export of goods to Australia divided by import of goods from Australia in constant US dollars at 2005 prices |
| TBG_{NZ} | measures Fiji's goods trade balance with New Zealand defined as Fiji's export of goods to New Zealand divided by import of goods from New Zealand in constant US dollars at 2005 prices |
| TBG_{JPN} | measures Fiji's goods trade balance with Japan defined as Fiji's export of goods to Japan divided by import of goods from Japan in constant US dollars at 2005 prices |
| TBG_{USA} | measures Fiji's goods trade balance with USA defined as Fiji's export of goods to USA divided by import of goods from USA in constant US dollars at 2005 prices |
| TBG_{UK} | measures Fiji's goods trade balance with UK defined as Fiji's export of goods to UK divided by import of goods from UK in constant US dollars at 2005 prices |
| TBG_{SING} | measures Fiji's goods trade balance with Singapore defined as Fiji's export of goods to Singapore divided by import of goods from Singapore in constant US dollars at 2005 prices |
| TBG_{CHN} | measures Fiji's goods trade balance with China defined as Fiji's export of goods to China divided by import of goods from China in constant US dollars at 2005 prices |
| TBG_{MALA} | measures Fiji's goods trade balance with Malaysia defined as Fiji's export of goods to Malaysia divided by import of goods from Malaysia in constant US dollars at 2005 prices |
| TBG_{IND} | measures Fiji's goods trade balance with India defined as Fiji's export of goods to India divided by import of goods from India in constant US dollars at 2005 prices |

| | |
|--------------|---|
| TBG_{HK} | measures Fiji's goods trade balance with Hong Kong defined as Fiji's export of goods to Hong Kong divided by import of goods from Hong Kong in constant US dollars at 2005 prices |
| E^r | measures trade-weighted real effective exchange rate defined to show an increase as an devaluation of the Fijian currency expressed as an index of 2005=100 |
| E^r_{AUS} | measures real exchange rate between Fiji and Australia defined to show an increase as an devaluation of the Fijian currency expressed as an index of 2005=100 |
| E^r_{NZ} | measures real exchange rate between Fiji and New Zealand defined to show an increase as an devaluation of the Fijian currency expressed as an index of 2005=100 |
| E^r_{JPN} | measures real exchange rate between Fiji and Japan defined to show an increase as an devaluation of the Fijian currency expressed as an index of 2005=100 |
| E^r_{USA} | measures real exchange rate between Fiji and USA defined to show an increase as an devaluation of the Fijian currency expressed as an index of 2005=100 |
| Y | measures Fiji's real GDP expressed in constant US dollars at 2005 prices |
| Y^f | measures trade-weighted real GDP for Fiji's trading partner countries expressed in constant US dollars at 2005 prices |
| Y^f_{AUS} | measures real GDP for Australia expressed in constant US dollars at 2005 prices |
| Y^f_{NZ} | measures real GDP for New Zealand expressed in constant US dollars at 2005 prices |
| Y^f_{JPN} | measures real GDP for Japan expressed in constant US dollars at 2005 prices |
| Y^f_{USA} | measures real GDP for USA expressed in constant US dollars at 2005 prices |
| Y^f_{UK} | measures real GDP for UK expressed in constant US dollars at 2005 prices |
| Y^f_{SING} | measures real GDP for Singapore expressed in constant US dollars at 2005 prices |
| Y^f_{CHN} | measures real GDP for China expressed in constant US dollars at 2005 prices |
| Y^f_{MALA} | measures real GDP for Malaysia expressed in constant US dollars at 2005 prices |
| Y^f_{IND} | measures real GDP for India expressed in constant US dollars at 2005 prices |
| Y^f_{HK} | measures real GDP for Hong Kong expressed in constant US dollars at 2005 prices |
| $COUP$ | 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 coups with the rest of the years taking a value of 0 |

5. Results of the unit root test for variables employed

| Variables | ADF statistic | | p-values | |
|--------------|---------------|------------------|----------|-------|
| | Level (LL) | First Difference | Level | First |
| TBG_{AUS} | -1.520 (0) | -5.753 (0) | 0.513 | 0.000 |
| TBG_{NZ} | -2.253 (1) | -5.552 (0) | 0.192 | 0.000 |
| TBG_{JPN} | -2.326 (0) | -6.461 (0) | 0.169 | 0.000 |
| TBG_{USA} | -2.671 (1) | -9.513 (0) | 0.089 | 0.000 |
| TBG_{UK} | -2.371 (0) | -10.013 (0) | 0.157 | 0.000 |
| TBG_{SING} | -0.823 (0) | -7.185 (0) | 0.353 | 0.000 |
| TBG_{CHN} | -1.842 (1) | -6.718 (1) | 0.063 | 0.000 |
| TBG_{MALA} | -0.789 (0) | -6.412 (0) | 0.811 | 0.000 |
| TBG_{IND} | -1.071 (1) | -9.609 (0) | 0.717 | 0.000 |
| TBG_{HK} | -6.651 (2) | -2.235 (0) | 0.198 | 0.000 |
| E^r | -1.505 (1) | -4.095 (0) | 0.520 | 0.003 |
| E^r_{AUS} | -1.381 (0) | -6.136 (0) | 0.581 | 0.000 |
| E^r_{NZ} | -1.774 (0) | -6.448 (0) | 0.387 | 0.000 |
| E^r_{JPN} | -2.189 (1) | -4.797 (0) | 0.214 | 0.000 |
| E^r_{USA} | -2.110 (0) | -5.703 (0) | 0.242 | 0.000 |
| Y | -1.312 (1) | -8.626 (0) | 0.613 | 0.000 |
| Y^f | -1.386 (1) | -9.307 (0) | 0.578 | 0.000 |
| Y^f_{AUS} | 0.203 (0) | -5.467 (0) | 0.969 | 0.000 |
| Y^f_{NZ} | 1.020 (0) | -5.807 (0) | 0.996 | 0.000 |
| Y^f_{JPN} | -0.843 (0) | -5.269 (0) | 0.952 | 0.001 |
| Y^f_{USA} | -1.297 (1) | -4.141 (0) | 0.621 | 0.003 |
| Y^f_{UK} | -0.793 (1) | -3.202 (0) | 0.809 | 0.028 |
| Y^f_{SING} | -1.826 (0) | -5.051 (0) | 0.363 | 0.000 |
| Y^f_{CHN} | 0.239 (6) | -3.619 (3) | 0.971 | 0.011 |
| Y^f_{MALA} | -1.801 (0) | -4.933 (0) | 0.374 | 0.000 |
| Y^f_{IND} | 2.343 (0) | -5.755 (0) | 0.998 | 0.000 |
| Y^f_{HK} | -2.997 (0) | -5.262 (0) | 0.147 | 0.001 |

Notes:

- All variables are taken in its log-linear form.
- Appropriate attention is being made to the correct specification for the ADF tests in terms of including in the test equation intercept, trend and intercept or none.

- iii. Schwarz Info Criterion (SIC) is being used for optimal lag selection. LL represents optimal lag lengths for each variable included in the test are given in parenthesis.
- iv. The critical values for 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).
- v. Variables are taken in its change form for unit root test at first difference.
- vi. *In summary, the major finding from the ADF test is that we are not able to reject the unit root hypothesis at the conventional levels of significance; that is at 5%. However, when the variables are taken in its first difference form, we are able to reject the unit root null hypothesis at the 5% significance level. These results suggest that all the variables employed in this study are integrated of order one, that is they are I(1) in nature.*

6. Results of cointegration test for various equations

| Null hypothesis | $r = 0$ (p-value) | $r \leq 1$ (p-value) | $r \leq 2$ (p-value) | Conclusion on cointegration rank |
|--|----------------------|-------------------------|-------------------------|-------------------------------------|
| Fiji's goods trade balance model with Australia | 40.094 (0.001) | 20.016 (0.071) | 6.727 (0.522) | 1 |
| Fiji's goods trade balance model with New Zealand | 29.115 (0.032) | 20.207 (0.067) | 9.818 (0.224) | 1 |
| Fiji's goods trade balance model with Japan | 32.312 (0.011) | 18.986 (0.097) | 11.815 (0.118) | 1 |
| Fiji's goods trade balance model with USA | 27.852 (0.046) | 16.377 (0.204) | 6.031 (0.609) | 1 |
| Fiji's goods trade balance model with UK | 42.095 (0.000) | 17.686 (0.142) | 11.091 (0.150) | 1 |
| Fiji's goods trade balance model with Singapore | 39.759 (0.001) | 20.643 (0.058) | 9.522 (0.245) | 1 |
| Fiji's goods trade balance model with China | 35.673 (0.004) | 16.084 (0.220) | 9.949 (0.215) | 1 |
| Fiji's goods trade balance model with Malaysia | 34.741 (0.005) | 20.301 (0.065) | 15.502 (0.032) | 1 |
| Fiji's goods trade balance model with India | 34.629 (0.005) | 19.826 (0.075) | 15.541 (0.031) | 1 |
| Fiji's goods trade balance model with Hong Kong | 30.718 (0.019) | 18.082 (0.127) | 9.763 (0.228) | 1 |

Notes:

- i. The unrestricted cointegration rank test are done for linear deterministic trend for intercept (no trend) using the Maximum-Eigenvalue method.
- ii. For every respective trade balance models with four variables, the 5% critical Max-Eigen Statistics at $r = 0$ is 27.584; $r = 1$ is 21.132; $r=2$ is 14.265; $r=3$ is 3.841.
- iii. The values reported in the table are the observed Max-Eigen Statistics which are compared with the 5% critical Max-Eigen Statistics to determine the number of cointegration in each model.
- iv. P-values for the tests are obtained from MacKinnon-Haug-Michelis (1999) as reported in the EViews 8 software. The observed P-value for each model is given in parenthesis.
- v. *In summary, the major 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 our models*

7. Estimates of long-run coefficients of export and import models with major bilateral trade partners

| Trading Partners | E^r | Y | Y^f | Constant |
|--------------------------|---------------------|----------------------|---------------------|----------|
| <i>Bilateral Exports</i> | | | | |
| <i>AUSTRALIA</i> | 3.397 (1.494)** | | 0.116 (0.727) | -5.968 |
| <i>NEW ZEALAND</i> | 0.811 (0.280)*** | | -0.468 (0.289) | 15.570 |
| <i>JAPAN</i> | 0.331 (0.373) | | 1.782 (0.552)*** | -30.601 |
| <i>UNITED STATES</i> | 5.215 (1.113)*** | | 0.364 (0.460) | -20.868 |
| <i>UNITED KINGDOM</i> | -0.878 (0.765) | | -0.486 (0.516) | 26.001 |
| <i>Bilateral Imports</i> | | | | |
| <i>AUSTRALIA</i> | -0.100 (0.424) | 1.162 (0.283)*** | | -3.822 |
| <i>NEW ZEALAND</i> | 0.689 (0.149)*** | 0.757 (0.180)*** | | -2.027 |
| <i>JAPAN</i> | 0.372 (0.196)* | -2.325 (0.313)*** | | 43.656 |
| <i>USA</i> | 1.858 (1.153) | 0.613 (0.647) | | -6.440 |
| <i>UNITED KINGDOM</i> | 1.893 (0.642)*** | -4.491 (0.552)*** | | 67.225 |

Notes:

1. Standard errors are given in parentheses.

2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.

8. Estimates of long-run coefficients of export and import models with emerging Asian trade partners

| Asian Trade Partners | E^r | Y | Y^f | Constant |
|--------------------------|-----------------------|---------------------|---------------------|----------|
| <i>Bilateral Exports</i> | | | | |
| <i>SINGAPORE</i> | -4.432 (3.612) | | 1.657 (0.910)* | -1.303 |
| <i>CHINA</i> | 1.067 (4.134) | | 0.870 (0.613) | -14.946 |
| <i>MALAYSIA</i> | -17.240 (5.284)*** | | 2.811 (1.529)* | 35.083 |
| <i>INDIA</i> | -11.122 (1.812)*** | | 6.078 (0.711)*** | -66.056 |
| <i>HONG KONG</i> | 2.557 (0.669)*** | | -1.619 (0.901)* | 0.144 |
| <i>Bilateral Imports</i> | | | | |
| <i>SINGAPORE</i> | 16.304 (8.701)* | -5.018 (7.607) | | 11.178 |
| <i>CHINA</i> | 4.787 (0.884)*** | -1.122 (0.759) | | 5.238 |
| <i>MALAYSIA</i> | 8.152 (0.985)*** | -1.221 (0.812) | | -9.828 |
| <i>INDIA</i> | -1.679 (0.493)*** | 4.013 (0.376)*** | | -41.717 |
| <i>HONG KONG</i> | 4.403 (0.581)*** | 2.508 (1.373)* | | -0.076 |

Notes:

1. Standard errors are given in parentheses.

2. (*), (**) and (***) denotes significance at the 10%, 5% and 1% level, respectively.