Does a J-Curve Effect Exist in Nepal-India Trade?

Deergha Raj Adhikari
University of Louisiana at Lafayette

Nepal is facing a persistent negative trade balance with India. One of the ways a nation can improve its trade balance is by imposing or raising tariffs on its import. An import tariff raises the price of imports, lowers its domestic demand, and ultimately lowers its import, which leads to an improvement in the country's trade balance in the long run. However, consumers take time to change their habit or find a substitute in response to a price rise, a tariff led price increase of imports only increases the import bills, thereby, worsens the nation's trade balance in the short run. Thus, the short-run deterioration and the long-run improvement of trade balance following the imposition of an import tariff produce a J-curve phenomenon. This study tests the presence of a J-curve effect, if any, on Nepal-India trade.

Our study defines BOT as a dependent variable and measures it as Nepal's export to India minus Nepal's import from India. Our independent variables include RRGDP (ratio of real GDP) measured as Nepal's real GDP divided by India's real GDP, and RP (relative price) measured as the ratio of Nepal's consumer price index to India's consumer price index. We estimate an unrestricted vector autoregressive model (VAR). The coefficient of the variables RP_{t-1} is found to be negative but insignificant at 5% significance level. Our findings thus imply that a fall in the relative price, RP, resulting from an imposition of a new tariff or a hike of existing tariff on import from India will have no effect on Nepal's trade balance with India. In other words, an import tariff on Nepal's import from India will not produce a J-curve effect on Nepal's trade balance with India.

Keywords: J-curve effect, export-to-import ratio, exchange rate, unit root, cointegration

INTRODUCTION

Nations burdened with a higher percentage of import-to-GDP often seek to improve their balance of trade by imposing tariffs on imports from the countries they have trade deficit with. Institution of import tariffs of 25 and 10 percent on steel and aluminum respectively in 2018 and across the board tariffs on most of the imports from China in 20019 is one of the attempts the United States made to curb its trade deficits. Nepal is facing a similar situation. The diagram below clearly indicates that its trade with India has been on the deficit ever since 2001, which shows a clear trend of rising over the last many years. This trend is attributed to rising demand for consumption and investment goods with no matching increase in their supply in Nepal. In addition, Nepal has a fixed exchange rate system with India at IR1= NR1.6, which has been such for the last several years. Since the exchange rate is fixed any rise in consumption and investment demand in Nepal with a lackluster rise in investment has only added to the country's negative trade balance with India over time.

FIGURE 1
NEPAL-INDIA TRADE
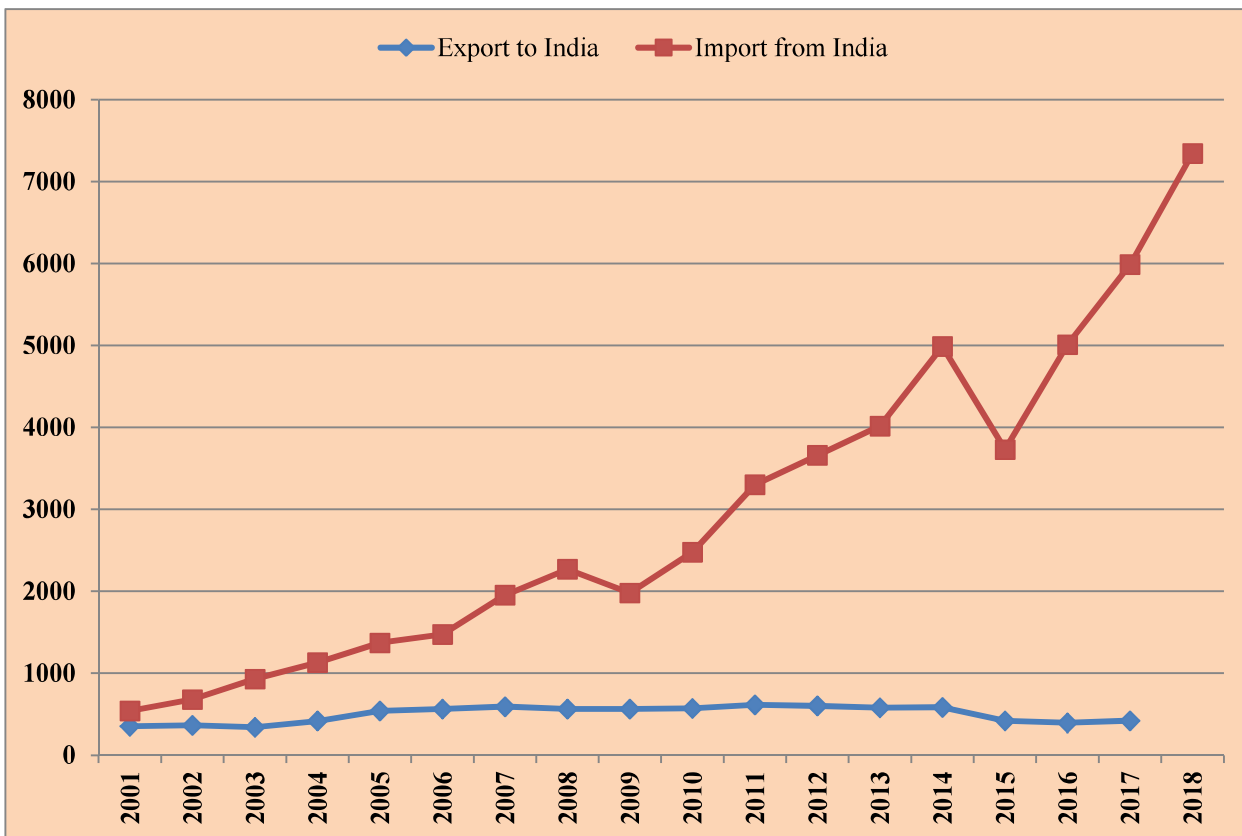
Measures taken by countries with a persistent negative trade balance usually include (a) imposing tariffs on imports, (b) devaluing its currency or letting its currency depreciate against the currency of the nation it has trade deficit with, (c) providing export subsidies to domestic producers of the importable products, etc. For a country such as Nepal, whose one of the sources of revenue is tariff on import and export, providing a substantial amount of money on export subsidies to domestic producers of importable products is not an option. Also, Nepal seems to be reluctant to change its currency's exchange rate with Indian currency due to political reasons. So, the only option that is left for Nepal is to raise tariffs on its imports from India.

An import tariff raises the price of imports, lowers their domestic demand, and ultimately lowers import's which leads to an improvement in the importing country's trade balance in the long run. However, since it takes time for consumers to change their habit of find a substitute in response to a price rise, a tariff led price increase of importable only increases the import bills, thereby, worsening the nation's trade balance in the short run. Thus, the short-run deterioration and the long-run improvement of trade balance following the imposition of an import tariff produce a J-curve effect. If such effect exists, then a policy prescription for Nepal in curbing its trade deficit with India would be to impose or increase import tariffs on its import from India. Therefore, the goal of this study is to examine the presence of such effect.

There is a long list of studies conducted on testing the J-curve effect on bilateral trade. Examples include that by Gupta, et al (1999) on Japan, Wilson (2001) on Singapore, Narayan (2004) on New Zealand, Bahmani-Oskooee and Kutan (2009) on Bulgaria, Croatia, and Russia, Bahmani-Oskooee and

Harvey (2009) on Malaysia, Shahbaz, et al (2012) on Pakistan, Dollery (2013) Malaysia, and Wijeweer Kyophilavong, et al (2013) on Laos, Adhikari (2018(1)) on Brazil, and Adhikari (2018(2)) on China.

Studies so far on a J-curve effect are mainly focused on testing for such an effect of depreciation or devaluation on the sovereign currency's value (exchange rate). Our study, on the other hand, tests the presence of a J-curve effect of an import tariff, which, to our knowledge, has never been done before. We investigate, if any J-curve effect exist on Nepal-India trade, We present our model in Section 2, outline data sources in section 3, lay out the methodology and empirical findings in section 4, summarize and conclude the study in section 5, and finally lay out policy implications and limitations of the study in section 6.

THE MODEL

We outline our model as following:

$$BOT_t = \beta_0 + \beta_1 RRGDP_t + \beta_2 RP_t + u_t \tag{1}$$

where, BOT stands for Nepal's balance of trade with India and is measured as Nepal's export to India over Nepal's import from India, RRGDP for ratio of Nepal's real GDP to India's real GDP, and RP for Nepal's relative price measured as Nepal's consumer price index over India's consumer price index.

The coefficient β_1 is expected to be negative, because any increase in RRGDP means a relative rise in Nepal's real GDP or a relative fall in India's real GDP. Since, any increase in Nepal's real GDP will increase Nepal's total imports including those from India it lowers the value of BOT. Similarly, any decrease in India's real GDP will lower India's imports including those from Nepal lowering the BOT. As for β_2, it is also expected to be negative, because any increase RP means a relative rise in Nepal's consumer price index or a relative fall in India's consumer price index. Since any increase in Nepal's consumer price index (CPI) will make Indian products cheaper to Nepalese it raises Nepal's import from India causing the BOT to fall. Similarly, any fall in India's CPI will make Indian's products relatively cheaper to Nepalese thereby causing Nepal's import from Indian to rise and in turn causing BOT to fall. Since any tariff imposed by Nepal on imports from India is equivalent to a rise in India's CPI for Nepalese consumers of Indian products, it will have the same effect as a fall in the variable RP raising the value of the variable BOT (i.e. an improvement in Nepal's balance of trade with India).

DATA

We obtained data on Nepal's export to and import from India from International Monetary Fund website (http://data.imf.org/regular.aspx?key=61726508) and that on Nepal's and India's real GDPs and Nepal's and India's consumer price index from World Development Indicators, 2019. Our data covers the year 1988-2018.

METHODOLOGY AND EMPIRICAL FINDINGS

We first seek to find if any long-run relationship exists among our model variables. To determine if any such relation exists, we first attempt to make sure no spurious correlation exists among our model variables, which is very common among time series. We, therefore, first apply the augmented Dickey-Fuller test on all model variables, which yields the following results.

Variable	t-statistic	Critical Value at 5%	Stationary?
BOT	-1.548920	-2.963972	No
ΔBOT	-4.769498	-2.967767	Yes
RRGDP	1.448945	-2.963972	No
ΔRRGDP	-4.436507	-2.967767	Yes
RP	-1.873319	-2.963972	No
ΔRP	-4.918969	-2.967767	Yes

The Dickey-Fuller test suggests that our model variables are nonstationary at their levels but stationary in their first differenced values. This finding satisfies the condition for the application of Johansen (1990) cointegration test, which is simple to use and is widely used. However, the Johansen test is sensitive to lag length. Therefore, we applied various lag selection criteria to find the appropriate lag length for the Johansen cointegration test. The results below show that the appropriate lag length is one as selected by five of six criteria. So, we conducted the Johansen cointegration test at the lag length of one.

TABLE 1
LAG SELECTION

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-75.65177	NA	0.068053	5.826057	5.970039	5.868871
1	4.272878	136.1679*	0.000358*	0.572379*	1.148307*	0.743633*

Both the trace test and maximum eigenvalue test indicate that no cointegration vector exists among our model variables.

TABLE 2
UNRESTRICTED COINTEGRATION RANK TEST (TRACE)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.*
None	0.330022	17.62658	29.79707	0.5937
Trace test indicates no cointegration at the 0.05 level				

TABLE 3
UNRESTRICTED COINTEGRATION RANK TEST (MAXIMUM EIGENVALUE)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.*
None	0.330022	11.61482	21.13162	0.5860
Max-eigenvalue test indicates no cointegration at the 0.05 level				

Since no cointegration found among our model variables, it implies no long-run relationship exists among the variables included in our model. Therefore, we estimated an unrestricted vector autoregressive (VAR) model. The result from the estimate is as following:

$$BOT_t = 0.596884 - 0.806806BOT_{t-1} + 0.002667RGDP_{t-1} - 0.883433RP_{t-1} \qquad (2)$$
t-value = (0.25141) (-6.29310) (0.76809) (-0.41430)

The figures in parentheses are corresponding t-values and are being compared with their critical t-value at 5% significance level. The estimation results as shown in equation (2) suggest that none of the independent variables except the one-period lagged value of the dependent variable is significant at 5% significance level including the variable of our interest, RP. A negative but insignificant coefficient associated with this variable indicates that any fall (rise) in the relative price including the one caused by a rise in tariff on import from India will have no effect on Nepal's trade balance with India. In other words, although the negative sign associated with the variable, RP_{t-1} implies that, a fall in Nepal's relative price, RP, caused by an imposition of a new import tariff or a hike of existing tariff on imports from India will improve Nepal's balance of trade with India, but the effect is statistically insignificant. This in turn implies an import tariff on Nepal's import from India will have no short-term or long-term effect on its balance of trade with India. Thus, the findings indicate the absence of the J-curve effect of the import tariff.

SUMMARY AND CONCLUSTIONS

Data on Nepal-India trade clearly indicates that Nepal's trade with India has been on the deficit every year since 2001, which shows a clear trend of rising over the last few years. This trend is attributed to rising demand for consumption and investment goods with no matching increase in their supply in Nepal. In addition, Nepal has a fixed exchange rate system with India at IR1= NR1.6, which has been such for the last several years and is attributed to be an additional factor contributing to the nation's trade deficit. Since the exchange rate is fixed any rise in consumption and investment demand in Nepal with a lackluster rise in investment, it has only added to the country's negative trade balance with India over time.

Nations suffering from a persistent trade deficit usually take the following measures: (a) imposing a tariff on imports, (b) devaluing its currency or letting its currency depreciate against the currency of the nation it has trade deficit with, (c) providing export subsidies to domestic producers of importable products, etc. However, a significant amount of Nepal's revenue is derived from tariffs on import and export. Therefore, Nepal cannot afford to provide export subsidies in effective amounts to its domestic producers of importable products. Also, Nepal seems to be reluctant to change its exchange rate with Indian currency due to various reasons. So, the only viable option for Nepal is to take resort to raising tariffs on its imports from India.

An import tariff raises the price of imports, lowers its domestic demand, and ultimately lowers its import, which leads to an improvement in the country's trade balance in the long run. However, consumers take time to change their habit or find a substitute in response to a price rise, a tariff led price increase of imports only increases the nation's import bills, thereby, worsens the nation's trade balance in the short run. Thus, the short-run deterioration and the long-run improvement in trade balance following the imposition of an import tariff produce a J-curve effect. This study tests the presence of the J-curve effect, if any, on Nepal-India trade, which, to our knowledge, has not been done before.

Our study defines BOT as a dependent variable and measures it as Nepal's export to India minus Nepal's import from India. Our independent variables include RRGDP (ratio of Nepal's real GDP to India's real GDP) and RP (ratio of Nepal's consumer price index to India's consumer price index).

Since we didn't find a long-run relationship among our model variables using the Johansen cointegration test, we estimated a non-restricted vector autoregressive (VAR) model. The coefficient of the variables RP_{t-1} is found to be negative but insignificant at 5% significance level, implying that any

appreciation in the relative price will have no effect on Nepal's trade balance in the short run. This finding indicates the absence of the J-curve effect in Nepal-India trade of a relative price change, which in turn implies that any tariff on imports from India will have no effect on Nepal's balance of trade with India (BOT) including the J-curve effect.

POLICY IMPLICATIONS AND LIMITATIONS OF THE STUDY

Findings of this study imply that imposing a new tariff or raising an existing tariff on imports from India will have no effect on Nepal's trade balance with India. Therefore, Nepal needs to consider some other policies to improve its trade balance with India.

There are several factors that can improve Nepal's trade balance with India, such as, a devaluation of Nepalese currency against Indian currency, relaxing tariff on exports to India, physically restraining imports from India, requesting a voluntary restraint from India on its export to Nepal, providing export subsidies to domestic producers, etc.. However, we only investigated the effect of import tariff on Nepal's trade balance with India, which severely limits the scope of this study. So, future study needs to focus on other measures Nepal can take to improve its trade balance with India.

REFERENCES

Adhikari, D. R. (2018a, June). Testing the Marshal-Lerner Condition on Trade between the U.S. and Brazil. *European Journal of Business Research*, 18(1).

Adhikari, D. R. (2018b). Testing the Marshal-Lerner Condition and the J-curve Effect on U.S.-China Trade. *Journal of Applied Business and Economics*, 20(8).

Aghevil, B.B., Khan, M.S., & Montiel P.J. (1991). Exchange Rate Policy in Developing Countries: Some Analytical Issues. *Occasional Paper No. 78*, IMF, Washington, D.C.

Bahmani-Oskooee, M., & Harvey, M. (2009). The J-curve: Malaysia vs. Her Major Trading Partners. *Applied Economics*, 42, 1067-1076.

Bahmani-Oskooee, M., & Kutan, A.M. (2009). The J-curve in the Emerging Economies of Eastern Europe. *Applied Economics*, 41, 2523-2532.

Bahmani-Oskooee, M., & Wang, Y. (2006). The J-curve: China versus Her Trading Partners. *Bull. Econ. Res.*, 58, 323-343.

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money. *Oxford Bull. Econ. Stat.*, 5(2), 169-210.

Narayan, P.K. (2004). New Zealand's Trade Balance: Evidence from the J-curve and Granger Causality. *Applied Economics Letters*, 11, 351-354.

Shahbaz, M., Islam, F., & Aamir, N. (2012). Is Devaluation Contractionary? Empirical Evidence for Pakistan. *Econ. Change Restruct.*, 45, 299-316.

Wijeweera, A., & Dollery, B. (2013). J-curve Disparity between the Goods Sector and the Services Sector: Evidence from Australia. *Applied Economics Letters*, 20, 452-456.

Wislon, P. (2001). Exchange Rate and the Trade Balance for Dynamic Asian Economies: Does the J-curve Exist for Singapore, Malaysia and Korea? *Open Econ. Review*, 12, 389-413.