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Indo-Nepal Trade Relation: The Phenomenon of Black Hole Effect

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Abstract

In the field of international trade, an economy is assumed to be reeling under the 'BLACK HOLE EFFECT' of another economy, if all the major variables of international trade, irrespective of in which country they belong to, solely act in the favor of the latter economy. The results based on the models suggest that all the economic variables used in the study, whether Nepalese or Indian, show more favor to Indian economy compared to Nepalese economy confirming that Nepal has been spiraling into the 'BLACK HOLE EFFECT' originated from the Indian economy. Such an effect tends to be an everlasting phenomenon until and unless a substantially enough counterbalancing force is applied to nullify it. The 'BLACK HOLE EFFECT' explains why Nepal has not been able to reap the benefit that would have come from the 'locomotive effect' of the robust growth of the Indian economy.

Keywords: Foreign Trade, Gravity Model, BLACK HOLE EFFECT

JEL Classification: C22, F10, F14

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CONTENTS

I. INTRODUCTION

This article has borrowed the idea of the 'BLACK HOLE'[1] from the Physical Science and has attempted to apply the same in the field of international trade by examining the trade relationship between India and Nepal. In the field of international trade the 'BLACK HOLE EFFECT' is assumed to take place if most of the major determining variables of international trade, irrespective of in which trading partner they belong to, work in the favor of only one trading partner so that there will be virtually an unidirectional movement of goods from one trading partner to another. In this case the former economy acts as the 'BLACK HOLE' economy to the latter economy. As like in the case of Physical Science, once an economy starts reeling under the 'BLACK HOLE EFFECT' of another economy, it will not only be hard but also almost impossible for the economy to get out of such a phenomenon until and unless a substantially enough counterbalancing force is instituted.

The objective of this model is to explore the phenomenon of the 'BLACK HOLE EFFECT' by examining the relative effectiveness of some of the important variables of international trade. This is a two country model. It assumes that there exists a perfect competition and both the economies are fully liberalized. The free movement of goods/services and factors of production are assumed to be fully ensured. Finally, it is assumed that both the economies always try to maximize their exports earnings.

With the increase in relative efficiency/productive capacity, a country may acquire self-sufficiency in many products and ultimately starts acquiring economic prosperity and power. Substantial increase in relative efficiency, self-sufficiency and prosperity in one trading partner tends to put two major effects on its existing trading partners. Firstly, with the increase in its relative productive efficiency, self-sufficiency and prosperity, the tastes and preferences of its residents change. While the need for importing from the existing trading partner declines due to increased self-sufficiency, the preferences of importing shifts towards the high quality good producing trading partners due to relative increase in prosperity and purchasing power. Secondly, its exports to existing partner starts to increase at the same time due to both the 'pull and push effects' coming out from the increase in its relative efficiency and quality. These effects ultimately tend to cause a virtually unilateral movement of goods from the relatively more efficient trading partner to the existing relatively less efficient trading partner making the former trading partner a 'BLACK HOLE' economy to the latter. This phenomenon tends to affect the external sector of the less efficient existing trading partner very badly.

Like most of the traditional trade models, the 'BLACK HOLE APPROACH' also uses gross domestic products, indices of consumer prices, the sizes of the population of the trading partners, the exchange rate (EX) between the trading partners, as exogenous variables. However, unlike the conventional approaches, this approach uses comparative analytical method to analyze the relative effectiveness of a particular exogenous variable(s) on both the endogenous variables- exports and imports- in isolation. This has been done in order to facilitate the comparison of the relative effectiveness of each of the independent variable on the dependent variable in an individual basis.

As this is a very new approach, the literatures on the same topic are almost unavailable. However, different works can be found out in the case of the above mentioned variables. The gravity model approach is one of the popular approaches which take account of the variables like GDPs, size of populations, real exchange rate, percapita incomes of and distances, among others, between the trading partners. The basic gravity model to trade assumes that the bilateral trade flows basically depends, directly to the economic sizes of the partner countries and inversely to the distance between them (Head, 2003). However, the standard gravity model is

[1] Sometimes the term 'black hole' is informally used as a synonym to crisis. However, it is used here in a formal sense and stands as a synonym to the 'economic power'. In order to distinguish it from its informal uses the term is written here in the BLOCK LETTERS.

augmented by incorporating a number of variables like infrastructure endowments, squared differences in per capita incomes, real exchange rates (Martinez and Felicitas 2003) and geographic, political, and institutional factors that either augment or diminish the gravitational forces giving rise to commerce between countries (DeRosa). While Christie (2002) has slightly augmented the basic gravity model by incorporating some dummy variables in it, Harris and Matyas (1998) did so by incorporating some financial variables, where the real exchange rate acts as a proxy for prices. Sometimes, the word black hole has also been used as a synonym to crisis. For example, Stephen et.al., (1989) argue, "… Pursuit of private individual gain by lobbies can cause to minimize society's income because of the negative externality of redistributive activity. This is called an economic black hole because lobbying can drive economic income virtually to zero."

Though the 'BLACK HOLE EFFECT' approach uses the similar variables as that of the gravity model approach, the former is entirely different from the latter in the sense that while the 'BLACK HOLE EFFECT' approach uses comparative analytical approach to evaluate the relative effectiveness of the exogenous variables in isolation, the gravity model approach simply analyses the volume of trade flows among the nations ignoring the relative effectiveness of the variables used in the analysis. In this sense, the 'BLACK HOLE EFFECT' approach is much superior and helpful than the gravity model approach in formulating the external sector related policies. Not only this, the 'BLACK HOLE EFFECT' approach can also be used in various econometric models for exploring the relative effectiveness of the exogenous variables used in the model.

This paper has been divided into five sections. Section II deals with the Indo-Nepal trade relationships. Section III deals with the methodology parts. Section IV is devoted to the analysis of the empirical results and finally the last section, Section V, summarizes the findings of the study.

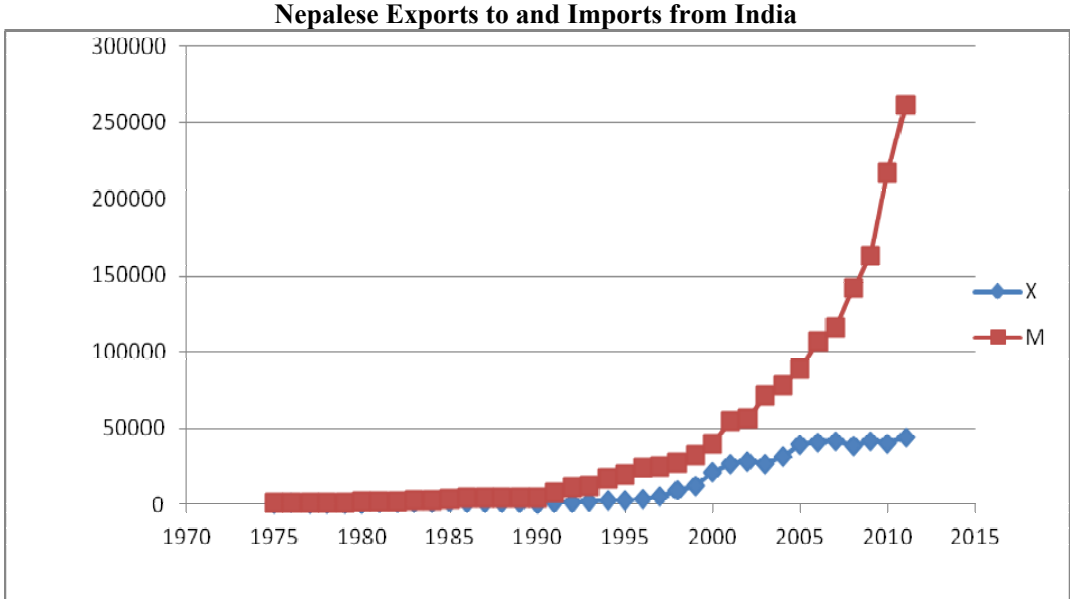
II. INDO-NEPAL TRADE RELATIONSHIP

The trade relationship between India and Nepal has a very long history. It has been continuing since time immemorial. In the recent time too, Nepalese trade has been heavily concentrated to India making the latter as the single largest trading partner of Nepal. However, despite a long history of involvement in trade activities, the nature and composition of Nepalese exports could not have got significant shift from agro-forestry based low value added primary commodities to capital based modern manufacturing products. Even if there are a few manufactured exportable, they are incapable of providing the benefits that could have come from both the backward as well as forward linkages to the Nepalese economy.

If we scrutinize minutely, Nepalese trade with India has been characterized by a persistent and widening deficit. Each year the volume of trade deficit with India[2] is in increasing trend as depicted by the chart given below (Chart-1).

[2] Same situation exists with countries other than India.

Chart-1
Nepalese Exports to and Imports from India



Data source: Nepal Rastra Bank

Not only the transit trade but also the border trade is equally flourished across the Indo-Nepal open border. The craze of Nepalese people dwelling near the bordering areas to go for marketing in the bordering Indian market due to price differentials shows that Nepalese people living near the border areas have been heavily dependent on the bordering Indian market for fulfilling their daily needs of goods. All these phenomena give the evidence of that border trade between India and Nepal is completely like a one-way trafficking in which the movement of goods is virtually unidirectional- from India to Nepal.

The Table-1 depicts different ratios of Nepalese transit trade with India. If the recent trend of Nepalese trade with India is analyzed, it can be observed that more than 65 percent of Nepalese trade is still concentrated with India alone. The ratio of Nepalese exports to India and Nepalese imports from India has been declining continually over the period (Table-1). For example, the ratio of export to import which was 72.8 percent in 1975/76, slid down to 15.1 percent in 1995/96. After it reached to 47.6 percent in 2000/01, again started declining and reached to 16.6 percent in 2011/12 and 13.8 percent in 2012/13. The other important ratios of Indo-Nepal trade has been reproduced in the same table. All these facts indicate that in the case of transit trade too, the movement of goods is virtually unidirectional- from India to Nepal.

Table 1
The Summaries of Different Ratios of Nepalese Trade With India (In Percent)

Ratios	1975/76	1985/86	1995/96	2,000/01	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Export-Import Ratio	72.8	31.3	15.1	47.6	38.0	36.0	27.1	25.2	18.4	16.6	16.6	13.7
Share in Total Exports	75.4	40.3	18.5	46.8	67.6	70.3	65.1	60.6	65.8	67.4	66.8	66.3
Share in Total Imports	61.9	42.5	32.8	47.3	61.7	59.5	64.2	57.1	58.0	66.1	64.8	65.9
Share in Trade Deficit	41.9	43.6	38.0	47.8	58.5	54.8	63.8	56.0	56.5	65.9	64.5	65.9
Share in Total Trade	67.0	42.0	29.8	47.1	63.2	62.0	64.3	57.8	59.1	66.3	65.1	66.0
Export-GDP Ratio	5.1	2.2	1.5	5.9	6.2	5.7	4.7	4.1	3.4	3.2	3.2	3.0
Import-GDP Ratio	7.1	7.1	9.8	12.4	16.4	15.9	17.5	16.4	18.2	19.1	19.2	21.6
Trade Deficit-GDP Ratio	1.9	4.9	8.3	6.5	10.2	10.2	12.7	12.3	14.8	16.0	16.0	18.6
Import Coverage Capacity of Total Exports	8.7	3.8	1.8	5.7	4.6	4.3	3.2	3.0	2.2	2.0	2.0	1.7

Source: Nepal Rastra Bank.

As a result of huge and persistent deficit in trade with India and the lack of other means of the earnings of the Indian currency (IC) in the country at the same time, Nepal has been suffering from a huge and persistent balance of payments (BOP) deficit with India forcing the former to purchase the inconvertible IC at the cost of severely needed US Dollar, in a tremendous amount, each year.

III. METHODOLOGICAL FRAMEWORK

The Model

There are a number of determining variables of international trade. Most widely used variables are the gross domestic products (GDPs), real exchange rate (RER), GDP per capitas (GDPPCs) etc., of the trading partners. Keeping in mind that regressing nominal values vis-à-vis real value may produce misleading results, therefore, this study takes account of only the nominal values of all the variables chosen in the model. This is done because the values of exports and imports are available only in the nominal forms.

This study uses Nepalese nominal GDP (NGDPN), Indian nominal GDP (NGDPI), Nepalese consumer price index (CPIN), Indian consumer price index (CPII), the nominal exchange rate of Nepalese currency vis-à-vis Indian currency (Ex), size of the Nepalese population (POPN) and size of the Indian population (POPI) as the exogenous variables. Nepalese exports to India (X) and Nepalese imports from India (M) have been taken as the endogenous variables and the Ordinary Least Square (OLS) method is employed to test the relative effect of the aforementioned exogenous variable(s) on both the endogenous variable(s) X and M one by one.

This has been done because relative effectiveness of each exogenous variable on the endogenous variable(s) can only be seen in the true sense, if separate bivariate regression equations are constructed for each endogenous and exogenous variable. Therefore, for facilitating the comparison and thereby investigating the relative effectiveness of each exogenous variable at the individual level on 'X' and 'M', 14 simple **bivariate** regression equations of estimates have been constructed in this article. The additional benefit of constructing such types of bivariate models is that it helps to nullify the possibility of 'synergy effect' that would have come due to the presence of the multiple independent variables. Based on this argument, the basic equations of estimate for Nepalese exports to and imports from India, therefore, take of the following forms-

$X_t = f(NGDPN_t)$……..……..…1

$M_t = f(NGDPN_t)$……..……..….2

$X_t = f(NGDPI_t)$……..……3

$M_t = f(NGDPI_t)$..……..…....4

$X_t = f(EX_t)$.....5

$M_t = f(EX_t)$.....6

$X_t = f(CPIN_t)$.....7

$M_t = f(CPIN_t)$.....8

$X_t = f(CPII_t)$.....9

$M_t = f(CPII_t)$.....10

$X_t = f(POPN_t)$.....11

$M_t = f(POPN_t)$.....12

$X_t = f(POPI_t)$.....13

$M_t = f(POPI_t)$.....14

Where, all the subscripts t's represent the current time period.

The Data

The data of Nepalese export to India, Nepalese import from India and the exchange rate of Nepalese currency (NC) vis-à-vis Indian currency (IC) have been derived from the Nepal Rastra Bank (NRB) sources. The consumer price index of Nepal (CPIN), Nepalese nominal GDP (NGDPN), Indian nominal GDP (NGDPI), Indian consumer price index (CPII), size of the Nepalese population (POPN) and size of the Indian population (POPI) have been derived from the CD ROM (2013) of the International Financial Statistics (IFS) issued by the International Monetary Fund (IMF). This article has analyzed the time series data for the period of 1975 to 2011. For the purpose of analysis, as all the series fulfilled non-stationarity property, the series are made stationary by taking their first differences before running the models.

IV. ANALYSIS OF THE RESULTS[3]

Although Equation '1' shows that Nepalese exports to India increases with the increase in NGDPN. This is theoretically consistent and the increase in exports may be due to the increase in production of Nepalese exportable. Similarly, equation '2' shows that Nepalese imports from India also increases with the increase in NGDPN. This is also theoretically consistent and the increase in imports may be due to the increase in demand for consumption and investment from both the private and public sectors. However, if scrutinized minutely, the estimated coefficient of NGDPN in equation '2' is higher than in equation '1'. This indicates that increase in NGDPN contribute more for increase in Nepalese imports from India compared to increase in Nepalese exports to India. Therefore, Nepalese GDP works more favorably for India than for Nepal.

In the case of Indian nominal GDP (NGDPI), equations '3' and '4' show that as like the NGDPN, increase in NGDPI also cause to increase both the Nepalese exports to India as well as the Nepalese imports from India. Increase in Nepalese exports to India with the increase in NGDPI is theoretically consistent and do not require any explanation. However, increase in Nepalese

[3] To see the result of the estimated equations please refer to the annex.

imports from India with the increase in NGDPI may be due to the increase in economies of scale of production in the Indian economy and its consequent 'pushing effect'. If compared minutely, as like in the case of NGDPN, increase in NGDPI also contributes more for increase in Nepalese imports from India compared to increase in Nepalese exports to India. This shows that both the NGDPN and NGDPI work more favorably for India than for Nepal.

The equations '5' and '6' test the effects of change in the nominal exchange rate of NC vis-à-vis IC on 'X' and 'M'. In order to test such an effect, it has been kept in mind that the nominal exchange rate of Nepalese currency vis-à-vis the Indian currency is fixed in nature. Carrying out regression analysis using the whole series of the exchange rate may provide some misleading result. Therefore, in order to minimize the errors, only the particular year in which the exchange rate was revised and the consecutive three years are taken to construct the data series in this case. The result of the equation '5' suggests that when the nominal exchange rate of NC vis-à-vis IC increases, i.e. Nepalese currency depreciates, Nepalese exports to India increases. In the similar fashion, equation '6' also shows that whenever NC depreciates vis-à-vis IC, instead of declining, Nepalese imports from India also increases. While compared the values of the coefficients and the probability values, equation '6' is relatively better fit than equation '5'. This shows that the nominal depreciation NC vis-à-vis IC works more favorably for India than for Nepal. This is not implausible in the case where Nepalese imports from India constitute wide varieties of goods ranging from daily consumer goods to construction goods, petroleum products, vehicles & spare parts and other heavy machineries & equipments and the quantity of exports and imports are measured in monetary terms instead in terms of physical units at the same time. The increase in Nepalese imports from India as a result of depreciation of NC vis-à-vis IC may explain the popular 'J-curve' phenomenon. This result rather suggests that revaluation of Nepalese currency vis-à-vis Indian currency benefits Nepal in Indo-Nepal bilateral trade due the operation of the "J-curve" phenomenon.

In the case of CPIN, equation '7' shows that the increase in CPIN causes to increase in Nepalese exports to India. Though this relation seems to be theoretically inconsistent, it may hold true if either the majority of goods exported are price inelastic in nature or majority of the commodities included in the CPI basket of Nepal do not find their way to India. If scrutinized the composition of Nepalese exports to India, the lion's share of exports constitute agro-forestry-based primary commodities for which the price is highly inelastic. Furthermore, most of the goods included in the CPI basket of Nepal are either not exported to India or even if exported, their shares are too thin. For example, commodities included in the 'food and beverage' sub-basket of Nepalese CPI are rather mostly imported from India than exported to it. Similarly, only a very few Nepalese manufactures under the sub-basket 'non-food and services' find their way to Indian market. At the same time when the volume of trade is measured in monetary units instead of in physical units and most of the Nepalese exportable to India constitute the goods lying outside of the CPI basket, the positive relationship between changes in Nepalese CPI and changes in Nepalese exports to India does not seem to be much implausible. In the same manner, equation '8' also shows a positive relationship between CPIN and Nepalese imports from India. This implies that when CPIN increases, Nepalese imports from India increases. This is also acceptable. However, if viewed comparatively, equation '8' is better fit than equation '7'. Therefore, even if increase in CPIN causes to increase both the 'X' and 'M', it causes to increase 'M' relatively more than it causes to increase 'X'. This shows that the net effect of increase in CPIN is to increase Nepalese imports from India. Therefore, the variable CPIN also works more favorably for India than for Nepal.

The equations '9' and '10' test the effect of CPII on both the Nepalese exports to and imports from India. Equation '9' shows that when CPII increases, 'X' increases, which is theoretically correct and hence acceptable. In the case of CPII and Nepalese imports from India, equation '10' shows that when CPII increases, Nepalese imports from India also increases. Compared to the value of the coefficient of CPII in equation '9', the value of the coefficient of CPII in equation '10' is higher. This shows that increase in CPII causes more to increase Nepalese imports from India compared to increase in Nepalese exports to India. Though, it seems to be theoretically

inconsistent, it is not implausible because the data are measured in terms of monetary value and Nepal has to import wide ranges of goods from India for which cost barely matters. This shows that both the CPIN and CPII work more favorably for India than for Nepal.

The effect of change in Nepalese population (POPN) both the Nepalese exports to India (X) and Nepalese imports from India (M) are positive. The result as depicted by equation '11' shows that when POPN increases, Nepalese exports to India increases. This is theoretically correct and hence acceptable. Similarly, while analyzed the effect of change in POPN on Nepalese imports from India, the equation '12' shows that when POPN increases, imports from India also increases. This is also theoretically correct and acceptable. The result further shows the equation '12' is better fit than equation '11'. Therefore, as like other variables, POPN also works more favorably for India than for Nepal.

Equations '13' and '14' depict that there is a positive relationship between Indian POPI and Nepalese exports to India (X) and Nepalese imports from India (M). The result as depicted by equation '13' shows that when POPI increases, Nepalese exports to India increases. This is theoretically correct and hence acceptable. Similarly, while analyzed the effect of increase in POPI on Nepalese imports from India, the equation '14' shows that when POPI increases, imports from India also increases. This is also theoretically correct and acceptable, as with the increase in size of the economically active population, the productivity of that country increases. However, the result further shows that the equation '14' is better fit than equation '13'. Therefore, as like other variables, POPI also works more favorably for India than for Nepal.

After analyzing the whole results, it can be observed that all the independent variables used in the analysis work as a two-way key in the sense that while they cause to increase Nepalese exports to India at a given time, they also cause to increase Nepalese imports from India at the same time. However, if scrutinized minutely, the results show that each and every exogenous variable used in the models work in the favor of India irrespective of whether they are Nepalese or Indian variables. This confirms that Nepal has been facing the 'BLACK HOLE EFFECT' coming out from the relatively efficient Indian economy.

V. CONCLUSION

The analysis employs both the Nepalese and Indian economic variables to test their relative effectiveness on Nepalese exports to India and Nepalese imports from India. The results derived from the above models clearly show that irrespective of whether they are Nepalese or Indian economic variables all of them work in the favor of Indian economy instead of working in the favor of Nepalese economy leaving Nepal in 'no option situation'. One of the issues to be raised here is that unlike suggested by the academia and the business houses, this study rules out the adoption of the policy of devaluation of NC vis-à-vis IC to improve Nepalese trade situation with India. If Nepal devalues NC vis-à-vis IC, Nepal will have to face loses in trade with India. All these facts provide the evidence that in the case of Indo-Nepal trade relation, Nepal has been suffering from the 'BLACK HOLE EFFECT' originating from the robustness of the Indian economy. This effect has made all the economic variables used in the model to work more favorably to Indian economy. That is why despite a robust growth of the Indian economy, Nepal has not been able to reap the benefits that would have come through the 'locomotive effect' of the growth of Indian economy. If this situation continues unabated, Indo-Nepal trade may head towards a 'zero sum game'.

Until and unless an effective measure is taken promptly, this situation always forces Nepal to lose in trade with India in terms of financial gain. In order to make gain in true sense, it is imperative to pull the Nepalese economy out from the Indian economy's 'BLACK HOLE EFFECT'. This can only be done by assigning a counterbalancing force, at least, equal to the pulling force exerted by the Indian economy to the Nepalese economy. This may demand a non-economic solution for the time being. Nepal has to adopt the import substitution strategy

followed by various administrative reforms within the country as a short term policy. However, in the long term a 'big push' is required for carrying out massive structural reforms in order to remove the various trade related bottlenecks. Therefore, the concerned Nepalese authorities need to take an integrated approach for improving the conditions of the trade related infrastructures followed by effective import substitution strategy to gain in trade with India.

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ANNEXES

Table-2
Effects of RGDPN and RGDPI on Nepalese Exports to and Imports from India

Equation	Variables	dlog(NGDPN)	dlog(NGDPI)	Residual Test		
				BGSC	BPG	JB
1	X SE t p	0.84 0.39 2.18 0.0358	- - - -	0.14 (93.2%)	1.63 (44.3%)	0.47 (79.08%)
2	M SE t p	1.16 0.14 8.05 0.0000	-	0.42 (81.2%)	2.20 (33.3%)	0.26 (87.7%)
3	X SE t p		0.78 0.38 2.08 0.0446	012 (93.9%)	0.43 (80.6%)	0.55 (76.12%)
4	M SE t p		1.06 0.16 7.0 0.0000	2.29 (31.9%)	1.70 (42.8%)	1.19 (55.3%)

Note: BGSC = Brusch-Godfray Serial Correlation (LM) test
BPG = Brusch Pegan Godfray Heteroschadasticity test
JB= Jarqua Berra test for Normality.

Table 3
Effects of Ex, CPIN and CPII on Nepalese Exports to and Imports from India

Equation	Variables	dlog(Ex)	dlog(CPIN)	dlog(CPII)	Residual Test		
					BGSC	BPG	JB
5	X SE t p	2.82 2.01 1.40 0.2041			0.00 (100%)	3.71 (15.6%)	2.93 (23.1%)
6	M SE t p	5.18 2.14 2.42 0.0460			0.41 (81.5%)	1.74 (41.8%)	0.41 (81.4%)
7	X SE t p		0.86 0.58 1.49 0.1457		0.00 (100%)	2.50 (28.6%)	0.01 (99.4%)
8	M SE t p		1.60 0.23 7.09 0.0000		0.74 (69.1%)	8.9 (1.2%)	0.31 (85.5%)
9	X SE t p			1.40 0.61 2.31 0.0271	0.31 (85.8%)	3.5 (17.2%)	0.001 (99.9%)
10	M SE t p			1.86 0.22 8.34 0.0000	1.83 (40.0%)	0.37 (82.9)	1.82 (40.1%)

Table 4
Effects of RERN, POPN and POPI on Nepalese Exports to and Imports from India

Equation	Variables	dlog(POPN)	dlog(POPI)	Residual Test		
				BGSC	BPG	JB
11	X SE t p	5.14 2.23 2.30 0.0273		0.52 (77.2%)	3.61 (16.4%)	0.63 (72.9%)
12	M SE t p	6.37 0.92 6.94 0.0000		1.07 (58.7%)	1.34 (51.3%)	0.72 (69.8%)
13	X SE t p		5.39 2.58 2.09 0.0437	0.22 (89.5%)	4.31 (11.6%)	0.49 (78.4%)
14	M SE t p		6.96 1.11 6.29 0.0000	1.78 (41.1%)	1.21 (54.5%)	0.53 (76.6%)