Bilateral trade: a study on SAARC countries

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A Study on SAARC Countries

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ABSTRACT

This research paper offers a selective survey of gravity equation in the International Trade. Gravity equation was first introduced in the Sixties as a purely empirical proposition to explain bilateral trade flow. The data was taken from the SAARC countries to evaluate the factors affecting the bilateral trade volume. The variables that impact on trade volume are studied in this thesis, as in : Transport Cost, Inflation, Exchange Rate, GDP, population, Tariff and distance by using multiple linear regressions. The results of transport cost, inflation, exchange rate, GDP and distance has the significant impact on the bilateral trade, whereas tariff and population have insignificant values.

Introduction

Gravity equation (GE) first introduced in 1960's as an experimental study to explain bilateral trade flows. GE was introduced through a series of theoretical work which showed that the basic gravity equation form was consistent with different models of trade flow. Practical applications of gravity equation prolonged to cover a range of issues, such as the impact of regional trade agreements, currency unions, national borders on trade, and use of the gravity equation to sort out the relative merit of different trade theories (Fratianni, 2007).

Sanso, Cuairan, and Sanz (1993) the gravity equation has been successfully and frequently used for years to further understand the determinants of bilateral trade flow across countries, and subsequently to analyze commercial policy measures. Its basic formulation was a log linear function upon a well defined set of variables. The explanatory variables are the incomes and populations of both countries and the distance between the borders.

Gravity model of trade in international economics predicts the bilateral trade flows based on some variables. The gravity model has been used extensively in empirical studies of international economics since the 1960s. According to the model, bilateral trade is determined by the wealth and size of countries, the distance between the countries, and other factors that distort trade. The theoretical foundations of the gravity model are based on the theory of trade under imperfect competition and has recently been integrated with the factor proportions and demand based theories of International Trade (Tamirisa, 1999).

The gravity equation has been long recognized for its consistent empirical success in explaining many different type of flows, such as Migration, Commuting, Tourism, and

Commodity Shipping. Typically, the log linear equation specifies that a flow from origin I to destination J can be explained by the economic forces at the trade flow origin, economic forces at the flow's destination, and the economic forces either aiding or resisting the flow's movement from origin to the destination (Bergstrand, 1985).

SAARC countries are low and middle income developing countries whose economies share many similarities related to their geography as well as the common aspects of their Culture, History and Economic and Social development. Given their high population level by comparison with not only the major industrial countries but also most countries in Africa, Latin America and West Asia, the SAARC countries have a comparative advantage in the production and international trade of many labor-intensive manufacturers. Yet, trade relations of the SAARC countries are also shaped by political factors; in many instances using quantitative restrictions and barriers to imports, these countries hinder trade to protect favored domestic industries.

The objective was to explain trade flows in terms of the gravity equation, the reason for focusing on gravity was the GE, unlike other frameworks, has had great empirical success in explaining bilateral trade flows and very useful in international trade. In its simplest form, the gravity equation explains flows of a of good bond between pairs of Countries. In this study, GDP, Transport cost, population, tariff, exchange rate, inflation and distance between the countries are used as the independent variables and trade volume i.e. imports and exports volume as dependent variables, by using multiple regression technique.

Literature Review

Exchange Rate

Guedae, Sheldon, and McCorriston (2002) analyzed that there is a negative effect of exchange rate uncertainty on the agricultural trade, further more the negative effect of exchange rate volatility has been more significant compared to other sectors and the most common assertion has been that the risk associated with this exchange rate volatility has reduced the level of exports. Rose (2000) used bilateral trade for a panel of 186 countries, over the period 1970-90, finding a small, but statistically significant, negative effect of exchange rate volatility on trade and suggested that the agricultural trade is especially affected by medium- to long-run exchange rate uncertainty. The evidence reported here, suggests that agricultural trade was more susceptible to exchange rate uncertainty than the aggregate trade data would suggest and that the negative effects on the growth of trade have a stronger effect on trade in agricultural goods compared with other sectors.

Higher exchange rate unpredictability leads to high costs for risk aver sing traders and to less foreign trade, if variations in exchange rate becomes unpredictable, which also creates uncertainty about the earnings to be made and hence reduces the benefits of international trade. Results concerning the impact of exchange rate uncertainty on export flows suggest that there is a negative and statistically significant long-run relationship between export flows and exchange rate variability. In most of the countries, exchange rate volatility has a short run effect on exports flow and has a substantive causal relationship in which changes in exchange rate volatility causes changes in real exports.

Stockman (1985) examined how steady state inflation affects the direction and size of international trade. The effects of inflation work through changes in supplies of labor and capital. For certain rates of inflation, the minor changes can have remarkable effects on the direction of trade; for other rates of inflation, the volume of trade is affected. When money is held for transactions purposes and factor supplies are endogenous, changes in inflation can cause changes in the pattern of trade. Depending upon the income of elasticity of demand for the two traded goods, and upon the initial pattern of trade the volume of trade may rise or fall and the pattern of trade may be reversed by a change in the rate of inflation.

Research Methods

Method of Data Collection

Secondary data is comprised on 21 observations for year 2006-2008, collected from the different sources i.e. official website of world trade organization (WTO), International monetary fund (IMF), CIA factbook files and official websites of the SAARC countries. The data is comprised on independent variables:

Gross Domestic Product (GDP), Tariff, Distance, Population, Transport cost, Exchange rate and Inflation. The dependent variables are the import volume and export volume.

Hypothesis Development

H1: There is a positive relationship between Transportation cost and export volume.

H2: There is a negative relationship between Exchange rate and Export volume.

H3: There is a negative relationship between Distance and Export volume.

H4: There is a positive relationship between GDP and import volume.

H5: There is a positive relationship between Inflation and import volume.

Research Model Developed

Following model was determined the impact of different variables on the trade volume and to test the hypothesis that the variables that impact on trade volume were studied in this research paper, like: transport cost, inflation, exchange rate, GDP, population, Tariff and distance by using multiple linear regression.

Import Volume and Export Volume = $\alpha + \beta$ (Gdp) + β (Tariff) + β (Distance) + β (Population) + (Transport Cost) + (Exchange Rate) + (Inflation) + $\bar{u}$

Where Secondary data was taken comprised on 21 observations for year 2006-2008, collected from the different sources i.e. official website of world trade organization (WTO), International monetary fund (IMF), CIA Factbook files and official websites of the SAARC countries. The data is comprised on independent variables:

Gross Domestic Product (GDP) and the coefficients α and β are regression parameters for the independent variable and $\bar{u}$ denotes the error term. Same model was used by Guedae, Sheldon, and McCorriston (2002); Broll and Eckwert (1999); Feenstra, Markusen, and Rose, 2001) for examining the impact of different variable on International trade.

Statistical Technique

After collecting the data from the selected population, it was analyzed by using SPSS software to measure the impact of change in independent variables on the dependent variables.

Statistical technique “Multiple Linear Regression” was used to identify the variables that impact on bilateral trade volume i.e. Import and export volume.

Results

Findings and Interpretation of the Result

Applying the multiple regression analysis through SPPS software by using the stepwise method, which is highly recommended for this type of analysis. Following results appeared:

Table 1: Model Summary for Export

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.812(a)	.659	.637	1.98734
2	.903(b)	.816	.791	1.50908
3	.971(c)	.943	.931	.86844

Dependent Variable: Exports

Above table shows, percentage change in the dependent variable due to change in independent variables. It shows that 65.9 % change in dependent variable (Export volume) is due to independent variables which are Transportation cost, Exchange rate and Distance. Transportation cost has negative impact on export volume because the significant value was less than .05, it means the Hypothesis is rejected and result is significant.

Second percentage changes in dependent variable due to taken independent variables shows that 81.6%. Exchange rate has negative impact on exports because the significant value was less than .05, it means the Hypothesis is rejected and result is significant.

Third percentage change in dependent variable due to taken independent variables it shows that 94.3%. Distance has negative impact on exports because the significant value is less than .05, its means the Hypothesis is rejected and the result is significant.

Table 2: Model Summary for Import

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.902(a)	.814	.803	1.61008
2	.929(b)	.863	.845	1.42633

Dependent Variable: Imports

Above table shows percentage change in the dependent variable due to change in independent variables. It shows that 81 % change in dependent variable (Import volume) is due to independent variables which are GDP and Inflation.

GDP has positive impact on import volume because significant value is less than .05, it means the Hypothesis is rejected and the result is significant.

Second percentage changes in dependent variable due to taken independent variables shows that 86.3%. Inflation has negative impact on imports because the significant value is less than .05, it means the Hypothesis is rejected and the result is significant.

Table 3: ANOVA for Export

Model		Sum of Squares	D.F	Mean Square	F	Sig.
1.	**Regression**	121.970	1	121.970	30.882	.000[a]
	Residua	63.192	16	3.950		
	Total	185.162	17			

2. Regression	151.002	2	75.501	33.154	0.00[b]
Residua	34.160	15	2.277		
Total	185.162	17			
3. Regression	174.603	3	58.201	77.17C	0.00[c]
Residua	10.559	14	0.754		
Total	185.162	17			

Dependent variable: Exports

The table shows that there is no relationship among the Export volume, Inflation, Tariff, population and GDP because its significant value is less than .05.

Table 4: ANOVA for Import

Model	Sum of Squares	D.F	Mean Square	F	Sig.
1. Regression	181.762	1	181.762	70.114	.000[a]
Residua	41.478	16	2.592		
Total	223.239	17			
2. Regression	192.723	2	96.362	47.366	0.00[b]
Residua	30.516	15	2.034		
Total	223.239	17			

a Predictors: (Constant), GDP
b Predictors: (Constant), GDP, Inflation
c Dependent Variable: Imports

The table shows that there is no relationship among the Import volume, exchange rate, tariff, distance and population because its significant value is less than .05

Table 5: Coefficient for Export

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	Beta	Std. Error	Beta		
1. (Constant), TansExp	-2.293	2.295	.812	-.999	.333
	.924	.166		5.577	.000
2. (Constant), TransExp, ExRate	3.255	2.335	.966	1.394	.184
	1.100	.136	-.425	8.115	.000
	-2.044	.572		-3.571	.003
3. (Constant), TransExp, ExRate, DISTANCE	-29.457	6.000		-4.909	.000
	1.384	.093		14.871	.000
	-2.316	.333		-6.956	.000
	4.211	.753		5.594	.000

a. Dependent variable: Exports

Equation 1

Exports = -29.457 + 1.384*Transport cost – 2.316*Exchange rate+ 4.211*Distance + εit

Where Exports is the dependant variable, β is the constant term and the independent variables include Transport cost, exchange rate and Distance, εit is the error term. If exports

change by 1 unit then transport cost also increase by 1.834, exchange rate decreases by 2.316 and distance increases by 4.211.

Table 6: Coefficient for Import

Model	Unstandardized Coefficients	Standardized Coefficients		T	Sig.
	B	Std. Error	Beta		
1.Constant	4.195	0.590	0.902	5.010	0.000
GDP	1.225	0.146		8.373	0.000
2.(Constant)	0.227	1.980	0.873	-0.115	0.910
GDP	1.185	0.131	0.22.	9.071	0.000
Inflation	2.295	0.989		2.321	0.035

a. Dependent Variable: Import

Equation 2

Imports = - .227 + 1.185*GDP + 2.295*Inflation + εit

Where Imports is the dependant variable, β is the constant term and the independent variables include GDP and Inflation, εit is the error term. If Imports change by 1 unit then GDP increase by 1.185 and inflation increases by 2.295.

Discussion, Implication, Future Research and Conclusions

This research paper shows how the bilateral trade volume in the SAARC countries varies due to different variables, the main objective of this research was to identify the barriers to bilateral trade in SAARC countries, the data consists of three years that is from 2006-2008. Gross Domestic Product (GDP), Tariff, Distance, Population, Transport cost, Exchange rate and Inflation is tested to predict their affect on dependent variable. With the help of gravity model regression is applied. The tool used for the analysis and interpretation of data is SPSS.

SAARC countries are low and middle income developing countries whose economies share many similarities related to their geography as well as the common aspects of their culture, history and economic and social development. This research may help to improve trade facilities and trade relations and enhance trade volumes.

Though, all variables were considered to be in line with the literature, however, based on regression coefficients shown by many variables along with dependency problem, the final model comprised of independent variables that is Transportation cost, GDP, Inflation, exchange rate and distance having significant value less than 0.05 which suggests that these variables have significant impact on the bilateral trade in SAARC countries. On the other hand, results reveal that Tariff and Population have significant value greater than 0.05 therefore it may not necessarily lead to an impact on bilateral trade in SAARC nations.

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