Determinants of Trade, Trade Advantage & Trade Competitiveness in Indian Pharmaceuticals

N.M.Varshini & M.Manonmani

This paper analyzes the determinants of trade, trade advantage and trade competitiveness in pharmaceutical industry in India during 2000-2014. Tools such as bivariate correlation coefficient, step-wise regression and multiple regression models were used. The variables such as GDP, Foreign Direct Investment (FDI), Money Supply (M2), Indirect Taxes (IT), Exchange Rate (ER), Population Growth (PG), Real GDP, Per capita GDP and Inflation were used. It was found that the relationship between export, import and total trade with related variables were significant. GDP was the major factor determining the export performance of pharmaceutical industry in India. There was direct relationship between trade openness and money supply and Government Expenditure (GE) was the major factor responsible for the growth of trade balance

N.M.Varshini is Ph D Research Scholar **&** ***M. Manonmani*** **(E- Mail: manonmyil@yahoo.com)** is Professor & Head, Department of Economics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore 641043

Introduction

Drugs and pharmaceutical industry plays a vital role in the economic development of a nation. It is one of the largest and most advanced sectors in the world, acting as a source for various drugs, medicines and their intermediates as well as other pharmaceutical formulations. Being an intensely knowledge-driven industry, it offers innumerable business opportunities for the investors and corporate the world over. The existence of well-defined and strong pharmaceutical industry is important for promoting and sustaining research and developmental (R&D) efforts and initiatives in an economy as well as making available quality medicines to all at affordable prices. That is, it is essential to improve the health status of the individuals as well as the society as a whole, so that positive contributions could be made to the economic growth and regional development of a country.

Pharmaceutical industry contributes to the welfare of humanity and provides significant socio economic benefits to the society through creation

of jobs, supply chains and community development. Indian Pharmaceutical industry is one of the largest and most developed industries in the world. The country accounts for an estimated 10 percent of global production and 2 percent of world markets in pharmaceuticals. It has over the years made significant progress in infrastructure development, technical capability and hence produced a wide range of pharmaceutical products. The industry now produces bulk drugs under all major therapeutic groups.

It has been theoretically argued that both export and import may play a crucial role in the economic development. The theoretical and empirical studies mainly concentrate on either the relationship between export and growth or between import and growth or the association between export, import and economic growth. The Export-led Growth hypothesis (ELGH) assumes that export advancement is one of the key indicators of growth. The overall progress of countries can be achieved not only by mounting the quantity of manpower and investment within the economy, but also by increasing exports.

This study analyzes the determinants of balance of trade in real terms since it plays a vital role in national income accounts of a country and it appears in the GDP equation as net export. Trade balance is the difference between the monetary value of exports and imports in an economy over a certain period of time or simply the difference between what goods a country produces and how many goods it buys from abroad. The sum can take the form of a deficit if imports overweigh exports or a surplus if exports are more than imports or equivalent when the values of exports and imports are equal. This concept is known since the sixteenth century, but for these many centuries, economists have debated its significance without agreement. As a result they are divided between those who are for and against trade surplus and trade deficits. Those who believe that trade deficits are harmful, have often interpreted it as a sign of a country's economic weakness, and a source of increased and excessive foreign dependence, which is at the expense of domestic production and jobs. It also represents a sacrifice of future growth because the country purchases more than it produces, and investment in future growth is being traded for consumption in the present. Large trade deficits also create an environment conducive to financial crises that could damage the economy.

On the contrary, when a country's total annual exports exceed its total annual imports, it is said to have a trade surplus. This means that the country gets more resources than it spends; a situation that attracts foreign currency, and generates jobs in the exporting country. Thus, whether a country runs trade deficit or surplus is not by itself indicative of the strength of that economy or of its prosperity. Deficits are only good for transitional economies, and they are a sign of strength if they are accompanied by rising domestic investment and/or rising government expenditures on infrastructure. Trade deficits are linked to economic development due to imports of

capital goods, raw materials, intermediate products among others. However when trade deficits arise on the current account, there is an equal and opposite trade surplus on the financial account of the balance of payments, which indicate that foreigners are purchasing domestic assets. Therefore trade deficits cannot be condemned wholly and even the economic theory dictates that a trade deficit is not purely bad as it will correct itself over time.

Trade deficits cannot be condemned wholly and even the economic theory dictates that a trade deficit is not purely bad as it will correct itself over time.

Analysis of determinants of trade openness is regarded significant since it also leads to better allocation of resources. When an economy opens up, components of comparative advantage force the economy to specialize in the sector for which it has better factor endowments. As a result, productivity of that sector goes up. The exports from that sector also increase which consequently boost growth. Lastly, trade openness also encourages technology transfer from developed to developing economies which leads to an increase in factor productivity and finally enhances growth. The investigators had considered this aspect also from the economics point of view.

Export diversification (or concentration) index is held to be important for developing countries because many developing countries are often highly dependent on relatively few primary commodities for their export earnings. Unstable prices for these commodities may subject a developing country's exports to serious terms of trade shocks. Since covariation in individual commodity prices is less than perfect, diversification into new primary export products is generally viewed as a positive development. The strongest positive effects are normally associated with diversification into manufactured goods, and its benefits include higher and more stable export earnings, job creation and learning effects, and the development of new skills and infrastructure that would facilitate the development of even newer export products. Hence an effort was made in this study to analyze the export diversification (or concentration) index. In view of the above points the investigators had undertaken this study.

Methodology

This study was based on secondary data for the period spanning between 2000 and 2014. Data relating to export, import and total trade for pharmaceutical industry at world and at all India level were drawn from WTO statistical data base. Data on GDP and FDI were taken from Economic Survey and Hand Book of Statistics on Indian Economy published by Reserve Bank of India. Money Supply (M2), Exchange Rate and Government Expenditure were taken from World Bank Database. The variables namely exports and imports were converted in to real terms by dividing them by GDP. Base shifting in GDP was done

to bring about uniformity in values to a single base. The reference period of the study was based on the availability of data for all the variables.

1. Bi-variate Correlation Coefficient

The Pearson correlation coefficient, often referred to as the Pearson R test, is a statistical formula that measures the strength between variables and relationships. To determine how strong the relationship is between two variables, we need to find the coefficient value, which can range between -1.00 and 1.00. The formula is as follows:

$$r = \frac{N\sum dxdy - \sum dx \sum dy}{\sqrt{N\sum dx^2 - (\sum dx)^2}\sqrt{N\sum dy^2 - (\sum dy)^2}}$$

2. Step-wise Regression Model

Step-wise regression model was applied to find out the determinants of export, import and total trade. The model is explained as follows:

Model-I

$$Ln\ (Y) = a_0 + a_1\ (LnINF) + u$$

Model-II

$$Ln\ (Y) = b_0 + b_1\ (LnGDP) + b_2\ (LnFDI) + u$$

Model-III

$$Ln\ (Y) = c_0 + c_1\ (LnGDP) + c_2\ (LnFDI) + c_3\ (LnINF) + u$$

Model-IV

$$Ln\ (Y) = d_0 + d_1\ (LnGDP) + d_2\ (LnFDI) + d_3\ (LnINF) + d_4\ (LnIT) + u$$

Where,

Ln (Y) = Dependent Variable (Export, Import, Total Trade)

LnGDP, LnFDI, LnINF, LnIT = Independent Variables, where

GDP= Gross Domestic Product, FDI= Foreign Direct Investment, INF= Inflation,

IT= Indirect Tax

3. Multiple Regression Model

The following multiple regression models were used to examine the determinants of trade openness, trade balance, export diversification and revealed comparative and competitive advantages.

a. Trade Openness Model

$$Ln\ (Y) = \alpha_0 + \alpha_1\ (LnFDI) + \alpha_2\ (LnM2) + u$$

Ln (Y) = Dependent Variable (Trade Openness)

LnFDI, LnM2 = Independent Variables

b. Trade Balance Model

$$Ln\ (Y) = x_0 + x_1\ (LnFDI) + x_2\ (LnER) + x_3\ (LnGE) + u$$ where

Ln (Y) = Dependent Variable (Trade balance)

LnFDI, LnER, LnGE = Independent Variables

c. Export Diversification Model

Ln (Y) = ε_0 + ε_1 (LnPG) + ε_2 (LnER) + ε_3 (LnGDP) +u where

Ln (Y) = Dependent Variable (Export Diversification)

LnPG, LnER, LnGDP = Independent Variables

d. Revealed Comparative and competitive Advantages Model

Ln (Y) = β_0 + β_1 (LnED) + β_2 (LnReal GDP) + β_3 (LnFDI) + β_4 (LnPer Capita GDP) +u where

Ln (Y) = Dependent Variable (Balassa Revealed Comparative Advantage (BRCA) and White's Revealed Competitive Advantage (WRCA)

LnED, LnReal GDP, LnFDI, LnPer Capita GDP = Independent Variables,

Where, α_0, x_0, ε_0 and β_0, α_1, α_2, x_1, x_2, x_3, ε_1, ε_2, ε_3, β_1, β_2, β_3, β_4 are constant coefficients

FDI (Foreign Direct Investment), M2 (Money Supply), ER (Exchange Rate), GE(Government Expenditure), PG (Population Growth), GDP(Gross Domestic Product), ED (Export Diversification) are parameters and 'u' is a random term in all the models.

Determinants of Export, Import & Total Trade

Before an effort was undertaken to examine the determinants of export, import and total trade in the pharmaceutical trade in India nature of relationship (closeness) based on Karl Pearson two-tailed correlation matrix was formed. The dependent variables were export, import and total trade and independent variables were GDP, FDI, Inflation and Indirect Tax. Table 1 presents export correlation matrix

Table 1 Correlation Matrix Showing Related Variables of Export

		Export	GDP	FDI	IT	INF
Export	Pearson Correlation	1	0.996**	0.908**	0.986**	0.684**
	Sig. (2-tailed)		0.000	0.000	0.000	0.005
	N	15	15	15	15	15
GDP	Pearson Correlation	0.996**	1	0.902**	0.985**	0.662**
	Sig. (2-tailed)	0.000		0.000	0.000	0.007
	N	15	15	15	15	15
FDI	Pearson Correlation	0.908**	0.902**	1	0.879**	0.680**
	Sig. (2-tailed)	0.000	0.000		0.000	0.005
	N	15	15	15	15	15
IT	Pearson Correlation	0.986*	0.985**	0.879**	1	0.616*
	Sig. (2-tailed)	0.000	0.000	0.000		0.014
	N	15	15	15	15	15
INF	Pearson Correlation	0.684**	0.662**	0.680**	0.616*	1
	Sig. (2-tailed)	0.005	0.007	0.005	0.014	
	N	15	15	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

The relationship between export and related variables were significant either at one percent or five percent significant level. It ranged between 0.616 and 0.996. After knowing that all the variables were related significantly to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The results are shown in Table 2

Table 2 Determinants of Export

Model	b_0 (constant)	Independent Variables				R^2	F-statistic
		a_1 (GDP)	a_2 (FDI)	a_3(INF)	a_4(IT)		
I	-2.540	-	-	3.015**	-	0.667	11.409**
	(-1.392)			(3.378)			
II	-2.708*	1.316*	0.046	-	-	0.993	769.600*
	(-12.863)	(16.171)	(0.869)				
III	-2.977 *	1.302*	0.031	0.169	-	0.992	522.730*
	(-10.164)	(15.947)	(0.567)	(1.103)			
IV	-2.755*	0.962*	0.036	0.373	0.231	0.995	454.887*
	(-9.602)	(4.403)	(0.714)	(1.656)	(1.570)		

Source: Calculations were based on WTO statistical data base and Statistical Handbook of India
Note:*Significant at 1 percent level
**Significant at 5 percent level

Model-I taking into account export as dependent variable showed that one unit change in inflation would bring about more than three units change in export of pharmaceutical product. In model- II export was regressed on GDP and FDI. It was observed that the elasticity coefficient of GDP was 1.316 which was statistically significant at one percent level. Model-III explained the fact that when GDP, FDI and Inflation were combined, GDP was elastic at 1.302 units and the other two variables were positively related with export. Again in the model-IV all the variables (GDP, FDI, Inflation (INF) and Indirect Tax (IT) had positive relationship with pharmaceutical export from India. The fit was good based on F statistic for all the models. The R^2 value showed more than 90 percent change in three out of four models. It is concluded that GDP is the major factor determining the export performance of pharmaceutical industry in India during the reference period under study. Table 3 presents facts on import correlation matrix.

It is concluded that GDP is the major factor determining the export performance of pharmaceutical industry in India

The relationship between import and related variables in the pharmaceutical industry of India were significant either at one percent or at five percent significant level. It ranged between 0.616 and 0.985. After knowing that all the variables were related to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The results are shown in Table 4.

Table- 3 Correlation Matrix Showing Related Variables of Import

		Import	GDP	FDI	IT	INF
Import	Pearson Correlation	1	0.982**	0.909**	0.972**	0.740**
	Sig. (2-tailed)		0.000	0.000	0.000	0.002
	N	15	15	15	15	15
GDP	Pearson Correlation	0.982**	1	0.902**	0.985**	0.662**
	Sig. (2-tailed)	0.000		0.000	0.000	0.007
	N	15	15	15	15	15
FDI	Pearson Correlation	0.909**	0.902**	1	0.879**	0.680**
	Sig. (2-tailed)	0.000	0.000		0.000	0.005
	N	15	15	15	15	15
IT	Pearson Correlation	0.972*	0.985**	0.879**	1	0.616*
	Sig. (2-tailed)	0.000	0.000	0.000		0.014
	N	15	15	15	15	15
INF	Pearson Correlation	0.740**	0.662**	0.680**	0.616*	1
	Sig. (2-tailed)	0.002	0.007	0.005	0.014	
	N	15	15	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

Table 4 Determinants of Import

Model	b_0(constant)	Independent Variables				R^2	F-statistic
		b_1 (GDP)	b_2 (FDI)	b_3(INF)	b_4 (IT)		
I	-3.114	-	-	3.048*	-	0.548	15.768*
	(-1.985)			(3.971)			
II	-2.554*	1.123*	0.106	-	-	0.967	174.698*
	(-6.273)	(7.138)	(1.030)				
III	-3.367*	1.071*	0.049	0.627**	-	0.979	170.787*
	(-7.211)	(8.094)	(0.555)	(2.525)			
IV	-3.094*	0.531	0.058	0.726**	0.594	0.983	147.527*
	(-6.615)	(1.492)	(0.695)	(3.027)	(1.616)		

Source: Calculations were based on WTO statistical data base and Statistical Handbook of India
Note:*Significant at 1 percent level
**Significant at 5 percent level

In four models import was regressed on GDP, FDI, Inflation and Indirect Tax. Highly elastic co-efficient was observed when import was regressed on inflation alone and it was more than three units. More than one unit change was observed in import due to GDP growth in model-II and III. And inflation was showing positive moderate relationship with import elasticity co-efficient to the extent of 0.726 which was statistically significant at five percent level. Based on the F-Statistic the fit was good for all the models. Table 5 presents facts on total trade correlation matrix of India's pharmaceutical industry.

Table 5 Correlation Matrix Showing Related Variables of Total Trade

		Total Trade	GDP	FDI	IT	INF
Total Trade	Pearson Correlation	1	0.982**	0.909**	0.972**	0.740**
	Sig. (2-tailed)		0.000	0.000	0.000	0.002
	N	15	15	15	15	15
GDP	Pearson Correlation	0.982**	1	0.902**	0.985**	0.662**
	Sig. (2-tailed)	0.000		0.000	0.000	0.007
	N	15	15	15	15	15
FDI	Pearson Correlation	0.909**	0.902**	1	0.879**	0.680**
	Sig. (2-tailed)	0.000	0.000		0.000	0.005
	N	15	15	15	15	15
IT	Pearson Correlation	0.972*	0.985**	0.879**	1	0.616*
	Sig. (2-tailed)	0.000	0.000	0.000		0.014
	N	15	15	15	15	15
INF	Pearson Correlation	0.740**	0.662**	0.680**	0.616*	1
	Sig. (2-tailed)	0.002	0.007	0.005	0.014	
	N	15	15	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

The relationship between total trade and related variables were significant either at one percent or five percent significant level. It ranged between 0.616 and 0.994. After knowing that all the variables were related to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The results are shown in Table 6.

Table 6 Determinants of Total Trade

Model	c_0(constant)	Independent Variables				R^2	F- Statistic
		c_1 (GDP)	c_2 (FDI)	c_3 (INF)	c_4 (IT)		
I	-2.440	-	-	3.024*	-	0.686	12.277*
	(-1.383)			(3.504)			
II	-2.441*	1.272*	0.060	-	-	0.989	564.822*
	(-10.112)	(13.631)	(0.988)				
III	-2.795*	1.249*	0.036	0.273	-	0.992	431.146*
	(-8.967)	(14.138)	(0.601)	(1.647)			
IV	-2.598*	0.861*	0.042	0.344	0.427	0.994	387.849*
	(-8.504)	(3.699)	(0.769)	(2.195)	(1.780)		

Source: Calculations were based on WTO statistical data base and statistical handbook of India
Note:*Significant at 1 percent level
**Significant at 5 percent level

When total trade was taken into account with all the independent variables, the only one determining total trade was GDP. Another important point to be noted is that all the independent variables were showing positive relationship with the

When total trade was taken into account with all the independent variables, the only one determining total trade was GDP.

dependent variable. When inflation was regressed alone with total trade, it was showing significant relationship with highly elastic co-efficient as 3.024.

Determinants of Trade Openness, Trade Balance

Table 7 presents facts on trade openness correlation matrix of India's pharmaceutical industry.

Table 7 Correlation Matrix Showing Related Variables of Trade Openness

		Trade Openness	FDI	M2
Trade Openness	Pearson Correlation	1	.878**	.855**
	Sig. (2-tailed)		.000	.000
	N	15	15	15
FDI	Pearson Correlation	.878**	1	.899**
	Sig. (2-tailed)	.000		.000
	N	15	15	15
M2	Pearson Correlation	.855**	.899**	1
	Sig. (2-tailed)	.000	.000	
	N	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

The relationship between trade openness and related variables were significant either at one percent or five percent significant level. It ranged between 0.855 and 0.899. After knowing that all the variables were related significantly to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The results are shown in Table 8 on determinants of trade openness between important variables based on multiple regression model for Indian pharmaceutical industry. The dependent variable was trade openness and independent variables include Foreign Direct Investment (FDI) and money supply (M2).

Table 8 Determinants of Trade Openness

Variables	Regression co-efficient
d_0 (Constant)	-0.271(-1.624)
d_1 (FDI)	0.042(0.731)
d_2 (M2)	0.257**(3.426)
R^2	0.885
F-statistic	46.387

Source: Calculations were based on WTO statistical data base and Statistical Handbook of India
Note: *Significant at 1 percent level
**Significant at 5 percent level
Figures in brackets are 't' Values

The results of determinants of trade openness showed that the fit was good. Based on the R^2 value it was concluded that 88.5 percent change in trade openness was due to the combined effect of

independent variables, FDI and M2. But the co-efficient of money supply (M2) showed that there was direct relationship between trade openness and money supply with statistical significance. Table 9 presents facts on trade balance correlation matrix of India's pharmaceutical industry.

The co-efficient of money supply (M2) showed that there was direct relationship between trade openness and money supply with statistical significance.

Table 9 Correlation Matrix Showing Related Variables of Trade Balance

		Trade Balance	FDI	ER	GE
Trade Balance	Pearson Correlation	1	.907**	.701**	.942**
	Sig. (2-tailed)		.000	.004	.000
	N	15	15	15	15
FDI	Pearson Correlation	.907**	1	.579*	.896**
	Sig. (2-tailed)	.000		.024	.000
	N	15	15	15	15
ER	Pearson Correlation	.701**	.579*	1	.723**
	Sig. (2-tailed)	.004	.024		.002
	N	15	15	15	15
GE	Pearson Correlation	.942**	.896**	.723**	1
	Sig. (2-tailed)	.000	.000	.002	
	N	15	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

The relationship between trade balance and related variables were significant either at one percent or five percent significant level. It ranged between 0.579 and 0.942. After knowing that all the variables were related significantly to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The results are shown in Table 10

Table 10 provides details on the determinants of trade balance based on regression model taking in to account trade balance as dependent variable and Foreign Direct Investment (FDI), Exchange Rate (ER), Government Expenditure (GE) as independent variables for the pharmaceutical industry of India for the reference period under study.

Government expenditure (GE) was the major factor responsible for the growth of trade balance.

It was observed from the above results that positive relationship existed between trade balance, FDI and government expenditure (GE). But the statistical significance at five percent level was noted in the case of trade balance and government expenditure (GE). Hence gov-

Table 10 Determinants of Trade Balance

Variables	Regression co-efficient
e_0 (Constant)	122.282**(3.154)
e_1 (FDI)	0.042(1.491)
e_2 (ER)	-0.326(-0.764)
e_3 (GE)	0.224**(3.327)
R^2	0.923
F- statistic	44.087*

Source: Calculations were based on WTO statistical data base and Statistical Handbook of India

Note:*Significant at 1 percent level
**Significant at 5 percent level
Figures in brackets are 't' Values

ernment expenditure (GE) was the major factor responsible for the growth of trade balance.

Determinants of Export Diversification

Table 11 presents facts on export diversification correlation matrix of India's pharmaceutical industry.

The relationship between export diversification and related variables were

Table 11 Correlation Matrix Showing Related Variables of Export Diversification

		ED	PG	ER	GDP
ED	Pearson Correlation	1	.577*	.858*	.827*
	Sig. (2-tailed)		.000	.000	.000
	N	15	15	15	15
PG	Pearson Correlation	.577*	1	.611**	.908**
	Sig. (2-tailed)	.000		.000	.000
	N	15	15	15	15
ER	Pearson Correlation	.858*	.611**	1	.842*
	Sig. (2-tailed)	.000	.000		.000
	N	15	15	15	15
GDP	Pearson Correlation	.827*	.908*	.842**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	15	15	15	15

Note:*Significant at 1 percent level
**Significant at 5 percent level

significant either at one percent or five percent significant level. It ranged between 0.577 and 0.908. After knowing that all the variables were related significantly to each other, the next step was undertaken to test the magnitude or extent of relationship between the variables based on step-wise regression model. The determinants of export diversification was analyzed by applying multiple regression model taking into account export diversification as endogenous variable and

Table 12 Determinants of Export Diversification

Variables	Regression co-efficient
$á_o$ (Constant)	-77.828(-1.577)
$á_1$ (PG)	9.431(1.637)
$á_2$ (ER)	-1.191**(-2.991)
$á_3$ (GDP)	-0.071(-0.110)
R^2	0.958
F-statistic	83.018*

Source: Calculations were based on WTO statistical data base and statistical handbook of India

Note:*Significant at 1 percent level
**Significant at 5 percent level
Figures in brackets are 't' Values

Population Growth, Exchange Rate and GDP as exogenous variables for the pharmaceutical industry of India. The results are shown in Table 12

The results on determinants of export diversification showed that the fit was good based on F-Statistic which was significant at one percent level. The coefficient of determination R^2 explained that 95.8 percent of the changes in the dependent variable (export diversification) was due to the combined effect of independent variables namely population growth, exchange rate and GDP. Based on the regression coefficients, it was concluded that when there is a unit decline in exchange rate, the diversification in export will also decline more than one unit (1.191).

95.8 percent of the changes in the dependent variable (export diversification) was due to the combined effect of independent variables namely population growth, exchange rate and GDP.

Determinants of Revealed Comparative/Competitive Advantage

We examined the major determinants of comparative and competitive advantage taking into account the Balassa Revealed Comparative (BRCA) and White's Revealed Competitive Advantage (WRCA) as endogenous variables and Export Diversification (ED), Real GDP, FDI and Per capita GDP as exogenous variables for the whole reference period under consideration.

Table 13 Determinants of Revealed Comparative/Competitive Advantage

Variables	Endogenous Variables (Dependent Variables)	
	BRCA	WRCA
$\hat{a}_0$ (Constant)	114.891*(6.588)	0.737*(4.537)
$\hat{a}_1$ (ED)	-0.194**(-3.091)	-0.004*(-6.672)
$\hat{a}_2$ (Real GDP)	-0.146(-0.700)	0.004**(2.227)
$\hat{a}_3$ (FDI)	0.027(2.079)	0.001**(2.263)
$\hat{a}_4$ (Per capita GDP)	0.095**(2.560)	0.003*(8.004)
R^2	0.911	0.954
F-statistic	25.580*	25.106*

Source: Calculations were based on WTO statistical data base and Statistical Handbook of India
Note:*Significant at 1 percent level
**Significant at 5 percent level
Figures in brackets are 't' Values

Based on the above coefficients it was observed that 91.1 percent change in BRCA indices were due to the combined effect of export diversification, real GDP, FDI and per capita GDP. The remaining nine percent changes may be incidental. The fit was good since F-Sta-

The major determinant of BRCA was found to be per capita GDP.

tistic was statistically significant. FDI and per capita GDP were showing positive relationship while other the variables namely export diversification and real GDP were showing negative relationship. The major determinant of BRCA was found to be per capita GDP. Whereas the regression model relating to determinants of competitive advantage (WRCA) showed that out of four independent variables three were showing positive and statistically significant relationship. The high R^2 value explained that changes in competitive advantage were due to the combined effect of independent variables namely Real GDP, FDI and per capita GDP, but they were less elastic.

Conclusion

The results underpin the importance of improving infrastructural facility of the economy and to form strategies to encourage FDI inflows in more diversified areas. It has been suggested that India has to make effective policy to promote export. In order to achieve sustained growth in trade, Indian policy makers should consider role of trade openness in their policy actions. Exports of pharmaceutical products should be viewed as a principle and considered in all future development plans as the essence so that the country can take advantage of the new opportunities in the international trade market by relying on its comparative advantages.

References

Gulshan Akhtar (2013), "Indian Pharmaceutical Industry: An Overview", *IOSR Journal of Humanities and Social Science (IOSR-JHSS)* 13(3): 51-66.

https://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade_indicators.htm

NIIR Board, Drugs & Pharmaceutical Technology Handbook, Format: Paperback, ISBN: 8178330547 Code: NI130, Pages: 636, Publisher: Asia Pacific Business Press Inc.