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Socio-Economic Challenges in the Indian Export Sector (1962-2015): An Empirical Study

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ABSTRACT

There has been a growing concern regarding the exports and imports of India and the increasing trade deficit. The obvious solution lies in depreciation of rupee to improve trade balance. But, Indian rupee has depreciated (USD) 17% from January 2013 to March 2016, leading to decline of 27% in exports. Thus, mere depreciation is not coming to rescue the Indian economy and other factors are playing a major role in determining the impact of depreciation on India's International Trade. This study attempts to answer that can depreciation be used as a tool toimprove trade balance and if yes then why is it not improving. This is done by empirically estimating the Marshall-Lerner Condition (1962-2015) and J-curve (1979-2014).Export –import model has been used to determine the export and import elasticity and the results show that depreciation should improve the trade balance (under the assumption of perfect elasticity of exports' supply) but J-curve contradicts it. Hence, factors affecting exports supply (inflation, natural disasters and financial crisis) are discussed. The study concludes that increasing trade balance deficit even after depreciation is due to the export supply constraints rather than slowing of demand for exports as demand for exports is highly elastic.

Keywords: Depreciation, Empirical study, Export and Import Elasticity, International Trade, Supply constraints, Trade Balance JEL Code: F14

1. INTRODUCTION

The rationale of this study is to understand the significance of depreciation on Indian economy and its trade balance; also identifying and determining the impact of various factors on exports' supply.

The exchange rate of India has depreciated from 8.125 Rs/ USD (1962) to 61.02 Rs/USD (2014) and trade balance deficit has increased from 2258.34 USD million to 67239.7 USD million as per World Bank Data bank. In the last decade (2004-2014), the Indian currency depreciated from 45.31/USD to 61.02 / USD with an increase in trade balance deficit of noteworthy 349.45%. India's external sector has exhibited remarkable resilience and dynamism in the recent years.Also, the fact that Indian rupee in terms of USD has depreciated 17% from January 2013 to March 2016, even then the total exports have shown a declining trend from $30.5 billion to $22billion (27%) in the same time period. These trends indicate thatalong with depreciation other factors are significantly impacting the Indian Economy and its exports sector' restricting full positive impact of depreciation.

India's trade (% of GDP) has increased from 11.10% (1960) to 42.41% in 2015 and this open economy is more prone to be affected by the international economic affairs.Exports of India in value displayed an upward trend from $18.26 billion (1991-92) to $46 billion (2001-02) majorly due to the shift of reforms and policies to integrate with the world economy. During this decade, there has been a positive trend except 1996-99 and 2001-02. This is due to the Asian Crisis which reduced the export growth from 20.5% (1995-96) to -3.9% (1998-99) to -1.7% (2001-02). However, India recorded a double digit growth rate of 20.4% (2002-03) and was at the peak of 30 % (2004-05). This was attributed to various factors including the depreciation of rupee. Since, India is highly dependent on the imported crude oil consumption (75%) and so any change in the international oil market will definitely have an impact on the Indian economy as occurred in 1970 oil crisis and 2008-09 and annual average growth rate was recorded at an all time low of 13% (2008-09) and turned negative -20.3 (2009-10) Also, the rupee appreciated from Rs. 46.54 /USD (2006) to Rs.39.37/USD (2008). This led to imbalance of demand supply in the foreign exchange market, finally leading to slowdown of exports. In this way, the international subprime crisis of 2007 and oil crisis of 2008 led to a sharp shrinkage in the demand for Indian exports and thereby impacting the Indian economy negatively and increased the trade deficit. Domestic demand also displayed a declining trend in industrial and services sector as seen in the GDP growth. The global crisis 2008 has led to dual unfavorable effect in terms of reducing international financing and trade credit and thus leading to decline in global demand. The growth in merchandise exports was 3.6% in USD terms and 16.9% in INR terms (2008-09) as compared to 28.9% and 14.7% respectively (2007-08). This significant difference in growth in terms of the USD and INR was on account of the depreciation of rupee vis-à-vis US dollar during the year (India Budget, 2009).The year 2015 has witnessed a weak global demand which resulted in the decline of Indian petroleum exports by 18% in volume terms as compared to 2012.

India is surely a beneficiary by adopting outward-looking policies which is accompanied by the unfavorable impact of opening the economy as discussed above, and in order to curb them, various fiscal and monetary expansionary policies have been undertaken, and as by-product the inflation also increases which inturn negatively affects the growth of the country by distorting the prices and creating instability in the international market. Also, a higher inflation leads to pressure on the competitiveness of Indian exports as the cost of production overpowers the benefits of depreciation and it is no longer profitable for the producers whose profit margins has reduced to produce more goods to meet the exports' demand. A producer limits his production by producing sufficient to meet the domestic demand. Containing inflation, thus, is important even for improving the external balance position.However, various studies argue that inflation adversely affects the growth only if it crosses a threshold limit and have favorable impact below this optimum inflation rate (Sarel 1997, Bruno and Easterly 1998). CEPR reports that 17 emerging and developing economies targeted inflation rate of 3% in the last decade[1]. Upto 3% level of annual inflation

(CPI) is considered necessary for the growth of the Indian economy, but if it increases more than that it will hamper the growth[2]. OECD data for India's inflationreveals that only 4 years recorded an optimum inflation which is 1968, 1970, 1978 and 2015. All other years have higher rates of inflation leading to crowding out some positive effects of depreciation and thus reducing the exports.

Additionally, inflation is also the result of decline in production. The GAR 2015[3], by the UN Office for Disaster Risk Reduction (UNISDR) disclosed that average annual economic loss in India due to disasters is estimated to be $9.8 billion of which more than $7 billion attributed to floods. This disturbs the demand-supply stability and leads to increase in price level. A Thomson Reuters Foundation reportsaid about each year disasters hit 4.8 million Indians (2015), but by 2030 that could rise to about 19 million if preventive steps are not taken[4]. As per, World Resources Institute (WRI)[5] "India has more of its annual GDP exposed to river flooding each year, on average, than any other country. Its current $14.3 billion (2015) exposure could increase to about $154 billion by 2030." WTO reports that India was number 2 in terms of natural disasters (358) in the time period 1962-2004. The global economic losses due to natural disasters have increased over time, and are likely to increase in the foreseeable future, especially in the developing countries (Botzen and van den Bergh, 2009; Intergovernmental Panel on Climate Change, hereafter, IPCC, 2012). Adverse climatic conditions have led to 1% loss of GDP for developing nations during 2001-06, whereas it was 0.3% for low income nations and less than 0.1% for high income nations (IPCC, 2012). Around 2,682 extreme events have occurred in Asia during 1970-2012, resulting in 0.92 million deaths and US$ 798.8 billion (adjusted at 2012 prices) of economic damages. Most of these disasters were attributed to incidence of floods and cyclonic storms, *i.e.*, 45% and 35%, respectively (WMO, 2014). The total damage costs due to natural disasters in India were US$ 2.92 billion during the 1970s. The extent of damage costs increased in the subsequent decades from US$ 5.92 billion during the 1980s to US$ 18.41 billion and US$ 23.74 billion during 1990s and 2000s, respectively (EM-DAT). The total economic damages due to extreme events were US$ 48.06 billion during the period 1980-2010 that is an average of $1.55 billion per yearwhich accounts for about 2% of India's GDP (Padmanabhan 2012).This provides grounds that effect of disasters on the Indian economy should be analyzed as it greatly impacts the production and supply of exports.

These have direct impacts on the exchange rate as well as the indirect impacts on the production and supply through various channels including trade policies, negotiations, free trade agreements, etc. India records free trade, preferential access and economic cooperation with 54 individual countries. Also, there are bilateral trade agreements with 18 groups/ countries. However, it is argued widely (G Pramod Kumar 2014[6],Asit Ranjan Mishra 2016[7], Kirtika Suneja 2016[8], Nirmala2016[9])that most of the FTAs exist due to geo-political reasons rather than commercial gains. India's Economic Survey (2010-11) notes[10]: "While there are benefits from these FTAs for Indian exports, in some cases the benefits to the partner countries are much more, with net gains of incremental exports from India being small or negative. FTAs also lead to a new type of inverted duty structure with duties for final products being lower from FTA partners compared to duties for the previous-stage raw materials imported from non-FTA countries. This acts as a disincentive to local manufacturing which is not competitive against FTA imports because of the inverted duty structure… The policy challenge related to FTAs/CECAs should take note of specific concerns of the domestic sector and ensure FTAs do not mushroom. Instead they should lead to higher trade particularly higher net exports from India."Thus, these agreements also play an important role to determine the affect of depreciation on the exports supply as well as demand. They have been discussed in detail in the analysis.

Thus, the exchange rate and currency depreciation is just one among various variables influencing the supply of exports and thus international trade. Other factors also need to be analyzed for the holistic and complete understanding of India's trade pattern.

2. REVIEW OF DEPRECIATION IMPACT ON TRADE BALANCE

Marshall-Lerner condition and J-curve are the two most important theories developed in assessing the impact of depreciation on trade balance. Marshall-Lerner Condition states that assuming perfect elasticity of supply of exports, if the sum of price elasticity of demand (ε_x^d) for export and price elasticity of demand for import (ε_m^d) is greater than 1, only then the Balance of Trade will improve with the depreciation of the currency. It can be represented as $\varepsilon_x^d + \varepsilon_m^d > 1$. The depreciation affects the country in three ways: The imports become costlier and so their volume reduces, the exports are encouraged as they become cheaper for the rest of the world and lesser foreign currency is earned by a given quantity of exports. Any combination of export and import elasticity that satisfies the Marshall-Lerner condition will cause the first two effects described above to outweigh the third, leading to an improved trade balance. Therefore, the liaison of exchange rate and trade balance is an imperative basis for the foreign policy of any country.Marshall-Lerner Condition is the mathematical tool to analyze the efficacy of depreciation, whereas J-curve is the graphical representation of the response of trade balance towards the changes in the exchange rate. It shows the balance of trade pattern of a country with the time period. Studies have shown mixed results in this regard (Awan et.al. 2012, Perera 2009, Bahmani-Oskooee and Cheema 2009, Alawattage 2005, Bahmani-Oskooee 1985). There exists rich heritage of empirical studies to validate this condition as represented in table 1, and for India one major analysis – Trade Elasticities and the Marshall-Lerner Condition for India (1993-2011) was undertaken by Ritesh Pandey, 2013 wherein his results showed that devaluation of exchange rate leads to improvement in the trade balance. Our paper has used and extended the model developed in this study.

Table 22.1
Review of Marshall-Lerner Condition

Title	*Author*	*Result*
ML Condition in Ghana- prior 1983	Judith Olivia Canipe (2012)	Marshall–Lerner Condition not satisfied
Estimate the relationship between the real exchange rate and the balance of trade – South Asian Countries	Adnan Ali Shahzad (2013)	Satisfied for some (India was not included in this study)
Estimation of M-L Condition of Pakistan with 12 major trading partners (2008)	Aftab and Khan (2008)	Marshall – Lerner Condition not satisfied
A study of ML Condition for the selected South Asian countries	Lal and Lowinger (2002)	Supported the ML condition. (India was not included)
Estimate the ML condition in 4 developing countries	Bahmani-Oskooee (1985)	Satisfied the J-curve and ML condition

3. OBJECTIVES OF THE STUDY

Firstly, it deals with empirical estimation of the Marshall-Lerner Condition to verify if depreciation of currency can be utilized as a tool to improve the trade balance of Indian economy. This is done by forming an export-import model (keeping the assumption of perfect elasticity of supply of exports intact). The results showed that import and export demand are highly elastic, thus there are no constraints from the demand side and depreciation should be able to improve the trade balance.

The second objective is to depict the relationship between trade balance of India and the Indian currency by graphically analyzing the affect of depreciation using J-curve. According to J-curve when the real depreciation of the currency takes place, the trade balance will worsen initially but eventually it starts improving and gradually the deficit becomes zero and thereafter trade reaches surplus. However, the analysis results are contradictory to findings of first objective and shows that depreciation is not rescuing Indian economy and its trade balance deficit is increasing except small decreasing trends in between.

Third and major objective is to identify the factors which are creating supply constraints. Since, the demand for exports is perfectly elastic (no demand constraints) as shown from first objective, there arises need to relax the assumption of perfect elasticity of supply of exports and understand the supply side of exports. In order to do so, three dummy variables are incorporated namely Inflation, Natural Disasters and Financial Crisis in the export-import model and discussed among other factors which play a significant role in determining the supply of exports in absolute and in value terms.

4. RESEARCH METHODOLOGY AND EMPIRICAL FINDINGSOF MARSHALL-LERNER CONDITION IN INDIA (1962-2015)

Table 22.2
Identification and Source of Variables

Variable	*Data for the variable*	*Source*
Exports (X)	Exports as percentage of GDP	World Bank Databank of Exports,2015
Imports(Y)	Imports as percentage of GDP	World Bank Databank of Imports,2015
Real Exchange Rate(ER)	Exchange Rate in terms of USD ($)	World Bank Databank of Exchange Rate ,2015
Domestic Income (DI)	Gross National Income (GNI) of the country in USD million	World Bank Databank of GNI,2015
World Income (WI)	Summation of available GNI data of all countries in USD million (except India)	World Bank Databank of GNI ,2015

The source is kept constant to maintain the consistency of the data.

4.1. Model Creation

Inorderto estimatetheMarshall-LernerConditionbyevaluatingtheexportandimportelasticity, an export-import modelhasbeenformedwith2 equations. This model is represented as follows:

$$\log X = \beta_1 + \beta_2 \log WI + \beta_3 \log RER + \mu_1 \quad \text{to calculate Export Elasticity-----(1)}$$

$$\log Y = \alpha_1 + \alpha_2 \log DI + \alpha_3 \log RER + \mu_2 \quad \text{to calculate Import Elasticity----- (2)}$$

Equation(1) represents the Export equation where Export (X) is the dependent variable on the World Income(WI) andthe Real Exchange Rate (RER) which are the independent variables. And equation(2) represents the Import equation where Import (Y) is the dependent variable on the Domestic Income(DI) and the Real Exchange Rate (RER)which are the independent variables. Where, β_1 is the intercept coefficient which represents the change in the Exports (Dependent variable) is not dependent onWorld Income and Real Exchange Rate (Independent variables), β_2 is the slope coefficient representing the responsiveness of Exports (Dependent variable) with thechange inWorldIncome (Independentvariable) and β_3 is the slope coefficient representing the responsiveness of Exports (Dependent variable) with the change in Real Exchange Rate (Independent variable). α_1 is the intercept coefficient which represents the change in the Imports (Dependent variable) is not dependent on Indian Domestic Income (GNI) and Real Exchange Rate (Independent variables), α_2 is the slope coefficient representing the responsiveness of Imports (Dependent variable) with the change in Indian Domestic Income(Independent variable) and $\alpha_3$is the slope coefficient representing the responsiveness of Imports (Dependent variable) with the change in Real Exchange Rate (Independent variable). $\mu_1$and μ_2= the disturbance term in the export and import equation respectively.

4.2. Major Findings

The empirical estimation begins with first testing the time series for the Stationarity using Unit Root test and Cointergration using Augmented-Dickey Fuller Test. The results show that the series are stationary (table 22.3) and no Cointegration is present (table 22.4). Thereafter, all the time series are converted into Log and OLS is used to determine the slope coefficients at 95% confidence level and conclusion are drawn about the export and import demand elasticity and Marshall-Lerner Condition (table 22.4 and table 22.5).

Table 22.3
Stationary testing using SAS

Variable	*Test Statistic*	*5 % CriticalValue*	*Result*
Exports fromIndia	3.40	3.41	Stationary
Imports to India	3.38	3.41	Stationary

Source: Author's own calculation, World Bank database 2016

Table 22.4
CointegrationTesting using SAS

Variables	*Test Statistic*	*5 % CriticalValue*	*Result*
ExportsModel	-3.45	-3.34	No Cointegration
Imports Model	-3.77	-3.34	No Cointegration

Source: Author's own calculation, World Bank database 2016

Table 22.5
Exports equation of India (1962-2015)

Regression Statistics			
Multiple R	0.945738901		
R Square	0.894422068		
Adjusted R Square	0.890281757		
Standard Error	0.092613314		
Observations	54		
	Coefficients	*Standard Error*	*t Stat*
Intercept	-2.02870989	0.790324745	-2.566932017
Real Exchange rate (RER)	0.462750871	0.097629988	4.739843563
World Income (WI)	0.168982549	0.064425442	2.622916399

Source: Author's own calculation, World Bank database 2016 for exports, imports, exchange rate and GNI.

Thus, the export equation becomes

$$X = -2.02 + 0.16WI + 0.46\ RER$$
$$(0.79) \quad (0.06) \quad (0.09)$$

Export Elasticity = $\Delta X/\Delta RER = 1/0.46 = 2.17$ & World Income Elasticity = $\Delta X/\Delta WI = 1/0.16 = 6.25$. There is high level of regression (0.94) between the dependent variable (Exports) and the independent variables (RER and WI) and 89% of the variations in Exports can be explained by them (table 5). RER and WI are positively related with the Exports showing that as the exchange rate appreciates and world income increases by 1 unit each, the exports (% of GDP) also increases by 0.46 units and 0.16 units respectively (table 22.5). Price elasticity of demand for exports is perfectly elastic indicating that there are no demand constraints.

Table 22.6
Import equation of India (1962-2015)

Regression Statistics			
Multiple R	0.943548989		
R Square	0.890284695		
Adjusted R Square	0.885982134		
Standard Error	0.090809815		
Observations	54		
	Coefficients	*Standard Error*	*t Stat*
Intercept	-4.34175463	0.680945437	-6.376068329
Domestic Income (DI)	0.457531745	0.068577311	6.671765593
Real Exchange rate (RER)	0.082448805	0.090306589	1.912987701

Source: Author's own calculation, World Bank database 2016 for exports, imports, exchange rate and GNI.

Thus, the import equation become

$$\hat{Y} = -4.3 + 0.082\ RER + 0.45\ DI$$
$$(0.68) \quad (0.09) \quad (0.06)$$

Import Elasticity = $\Delta M/\Delta RER = 1/0.082 = 12.1$ & Domestic Income Elasticity = $\Delta Y/\Delta DI = 1/0.45 = 2.22$. There is high level of regression (0.94) between the dependent variable (Imports) and the independent variables (RER and DI) and 88% of the variations in Imports can be explained by them (table 6). RER and DI are positively related with the Imports showing that as the exchange rate appreciates and domestic income increases by 1 unit each, the imports (% of GDP) also increases by 0.08 units and 0.45 units respectively (table 22.6). Price elasticity of demand for imports is perfectly elastic.

Summing up, the Marshall-Lerner Condition will become Export Elasticity + Import Elasticity = 2.17 +12.1 = 14.27 (table 22.5 and 22.6). Thus, it is verified that ML is satisfied for India over 54 years (1962-2015) as it is greater than 1 (taking the assumption of perfect elasticity of supply of exports). This indicates that depreciation of the Indian currency should be able to improve the trade balance. To analyze this aspect practically, the Indian trade balance is discussed in the next objective.

5. RESEARCH METHODOLOGY AND EMPIRICAL FINDINGS OFJ-CURVE IN INDIA (1979-2014)

J-curve depicts the graphical representation of the trade balance over the time period. The time period is of 36 years (1979-2014) as the data is unavailable prior to 1979. The net trade of goods and services data in USD million is taken from the World Bank databank and trade balance so obtained is plotted against the time to understand the changes in trade balance with respect to the exchange rate. Three figures are used to cogently explain the trade balance trend.

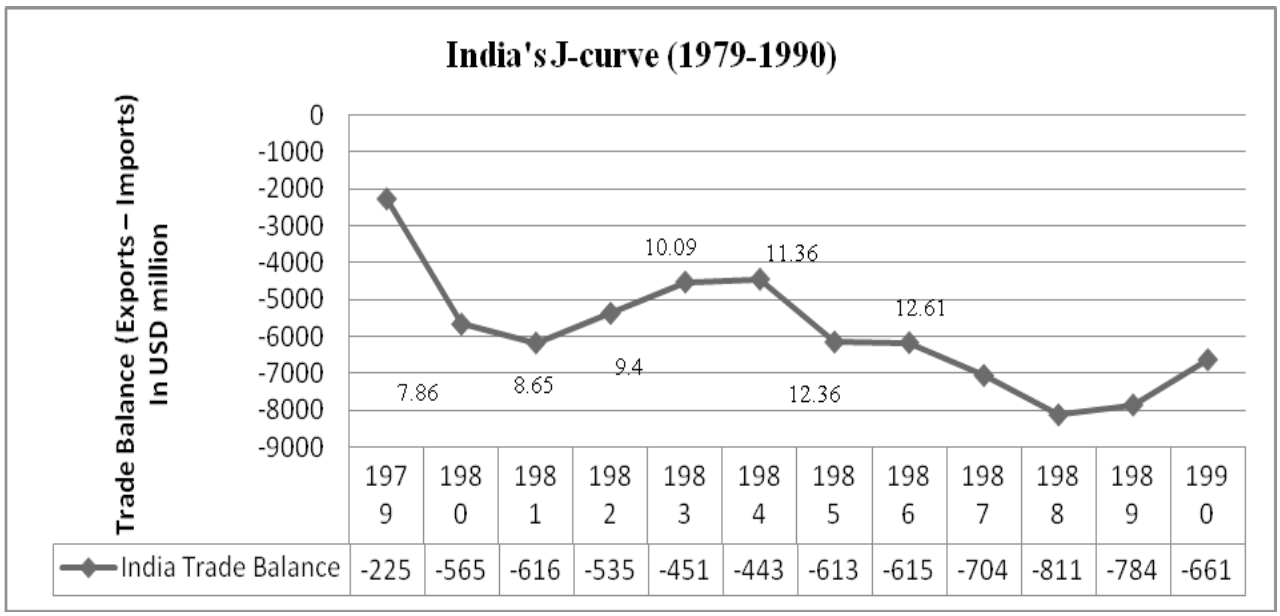

Fig 22.1: India's J-curve (1979-1990)

Source: Author's own calculation, World Bank database 2016 for exchange rate and net trade of goods and services.

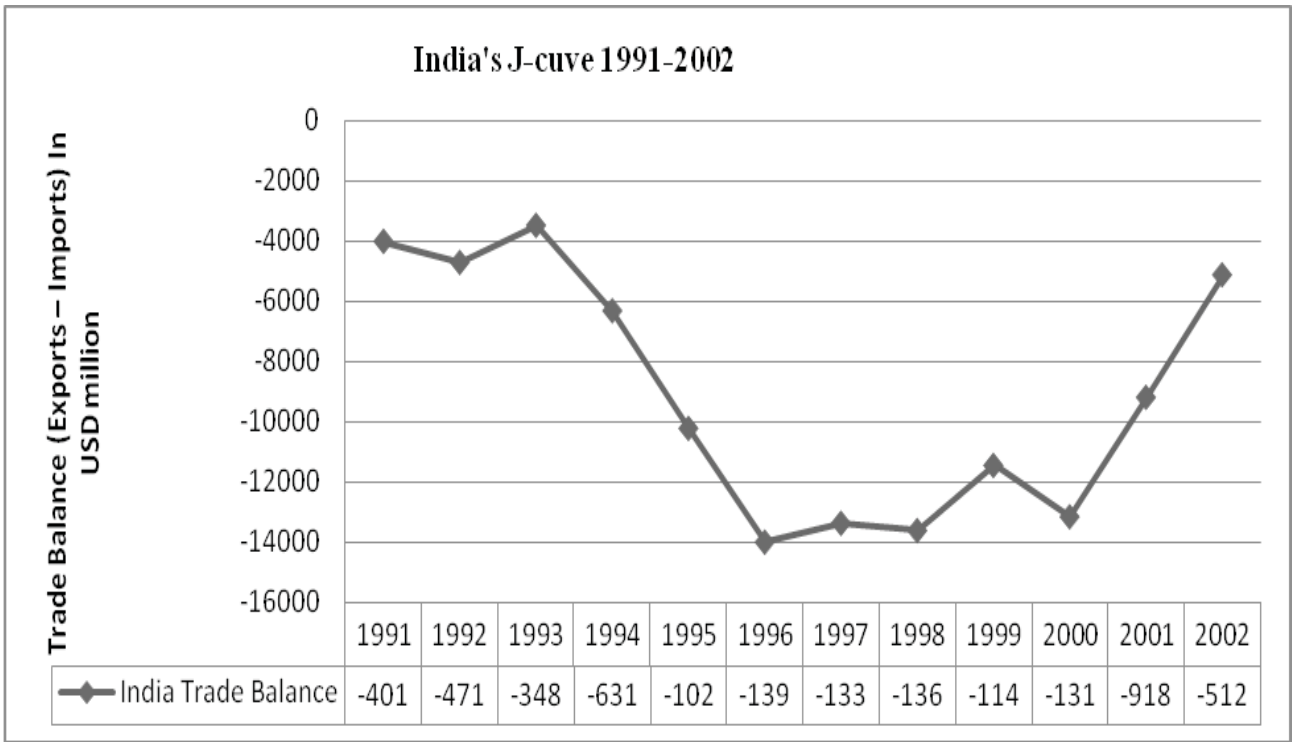

Figure 22.2: India's J-Curve (1991-2002)

Source: Author's own calculation, World Bank database 2016 for exchange rate and net trade of goods and services.

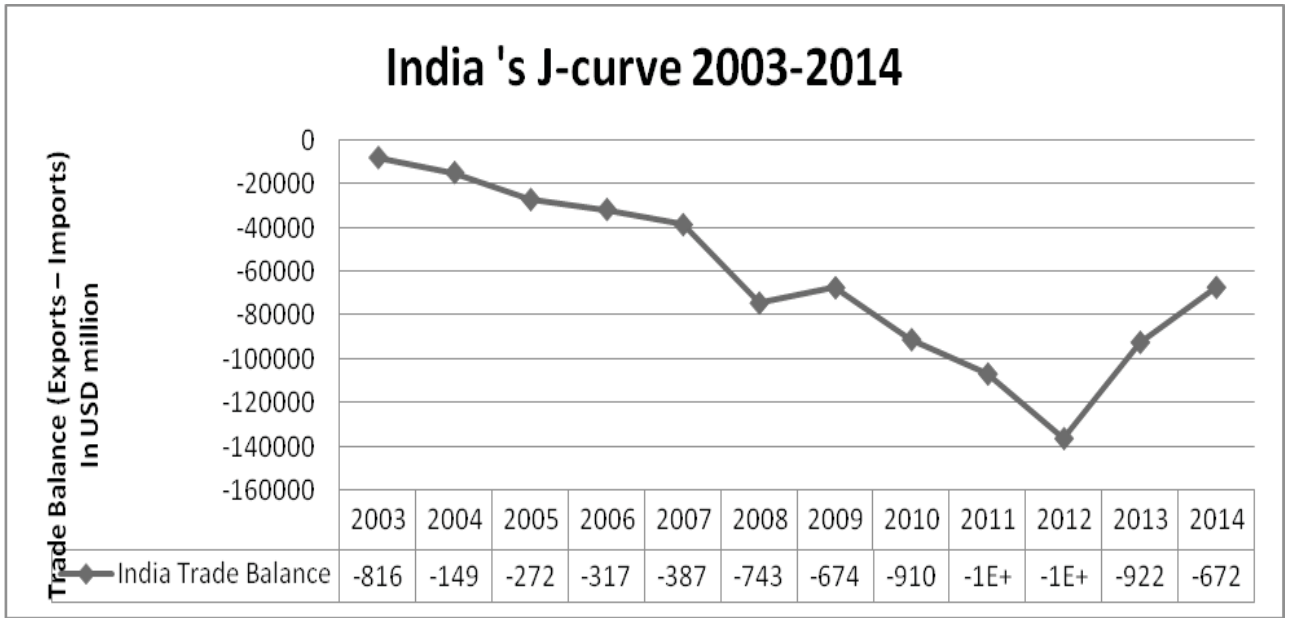

Figure 22.3: India's J-curve (2003-2014)

Source: Author's own calculation, World Bank database 2016 for exchange rate and net trade of goods and services.

When the Indian currency depreciated from 8.12 Rs./$ (1979) to 17.50 Rs./$ (1990), the trade balance deficit increased from 2258.34 USD million to 6615.56 USD million (fig 1).Similar trends are noticed in the time period 1991-2002 and 2003-2014 (fig 2 and fig3). Although there were small phases of reduction in the trade balance deficit but in totality (1979-2014), it has increased by 64981.36 USD million. This analysis shows that practically J-curve is not observed in the long-run and depreciation of the Indian currency is unable to improve the trade balance. This can be attributed to the volatility of the exchange rate market as a result of which the full positive effect of depreciation on trade balance is not released and the next depreciation takes place starting a new declining trend in the trade balance of the country. This cycle continues and before reaching the point of trade surplus, the trade balance again shows downward trend.

Summing up the analysis of objective 1 and objective 2, it is clear that under the assumption of perfect elasticity of supply of exports, the depreciation should be able to improve the trade balance of the country but it is not realistic as J-curve shows that balance of trade is not improving even after multifold depreciation. Therefore, the validity of this assumption is critically analyzed in the next section.

6. RESEARCH METHODOLOGY AND EMPIRICAL FINDINGS OF EXPORTS' SUPPLY CONSTRAINTS IN INDIA (1962- 2015)

This model is an extension of the model adopted in objective 1 where the entire data source remains same. Three dummy variables are added namely Inflation (Di) collected from OECD database, Disasters (Dd) collected from the International Disaster database and Financial and other crisis (Dc) impacting the Indian Economy. Di = 0 for all non-optimum inflation rates and 1 for optimum inflation rate (3% as concluded by CEPR [11] and D H and Pai Panandiker[12]), Dd = 0 for non-disaster years and 1 for disaster years (Natural, Complex and Technical disasters) and Dc =1 for non crisis years and 1 for crisis years.

$$\log X = \beta_1 + \beta_2 \log WI + \beta_3 \log RER + \beta_4 Di + \beta_5 Dd + \beta_6 Dc + \mu_1 \quad \text{to calculate Export Elasticity (3)}$$

$$\log Y = \alpha_1 + \alpha_2 \log DI + \alpha_3 \log RER + \alpha_4 Di + \alpha_5 Di + \alpha_6 Dc + \mu_2 \quad \text{to calculate Import Elasticity (4)}$$

After adopting the same methodology, the export equation becomes (table 22.7):

$$X = -2.45 + 0.20\ WI + 0.44\ RER + 0.011Di - 0.05\ Dd - 0.01\ Dc$$

$$(0.87)\quad (0.07)\quad (0.10)\ (0.05)\quad (0.04)\quad (0.02)$$

Export Elasticity = $\Delta X/\Delta RER = 1/0.44 = 2.27$ &World Income Elasticity = $\Delta X/\Delta WI = 1/0.20 = 5$. There is high level of regression (0.89) between the dependent variable (Exports) and the independent variables (RER and WI) and 89% of the variations in Exports can be explained by them (table 22.7). RER and WI are positively related with the Exports showing that as the exchange rate appreciates and world income increases by 1 unit each, the exports (% of GDP) also increases by 0.44 units and 0.20 units respectively (table 22.7). Price elasticity of demand for exports is perfectly elastic indicating that there are no demand constraints.

Table 22.7
Export Equation of India with dummy variables (1962-2015)

Regression Statistics			
Multiple R	0.947482023		
R Square	0.897722183		
Adjusted R Square	0.887068244		
Standard Error	0.093959791		
Observations	54		
	Coefficients	Standard Error	t Stat
Intercept	-2.45910182	0.877352205	-2.802867318
Exchange rate	0.445298073	0.10018877	4.444590681
World Income	0.2049962	0.071753959	2.856932262
Di	0.01174237	0.050201834	-2.23390323
Dd	-0.05499149	0.044855464	-1.925970868
Dc	-0.0143809	0.026954201	-1.833530778

Source: Author's own calculation, World Bank database 2016 for exports, imports, exchange rate and GNI; Inflation from OECD database, Disasters and Crisis from EM-DAT International Disaster Database.

Table 22.8
Import Equation with dummy variables (1962-2015)

Regression Statistics			
Multiple R	0.94663745		
R Square	0.896122462		
Adjusted R Square	0.885301885		
Standard Error	0.091080305		
Observations	54		
	Coefficients	Standard Error	t Stat
Intercept	-4.3371357	0.711505828	-6.095713527
Domestic Income	0.458989	0.071729183	6.398915767
Real Exchange Rate	0.101947092	0.092239494	1.805243397
Di	-0.05358542	0.048672945	-1.800928206
Dd	0.03217425	0.04114814	-1.781912526
Dc	0.03102558	0.025862405	-1.999640106

Source: Author's own calculation, World Bank database 2016 for exports, imports, exchange rate and GNI; Inflation from OECD database, Disasters and Crisis from EM-DAT International Disaster Database.

After adopting the same methodology, the import equation becomes (table 22.8):

$$\hat{Y} = -4.3 + 0.101\ RER + 0.45\ DI - 0.05\ Di + 0.03\ Dd + 0.03\ Dc$$
$$(0.71) \quad (0.09) \quad (0.07) \quad (0.04) \quad (0.04) \quad (0.02)$$

Import Elasticity = $\Delta M/\Delta RER = 1/0.101 = 9.990$ & Domestic Income Elasticity = $\Delta Y/\Delta DI = 1/0.45 = 2.22$. There is high level of regression (0.88) between the dependent variable (Imports) and the independent variables (RER and DI) and 89% of the variations in Imports can be explained by them (table 8). RER and DI are positively related with the Imports showing that as the exchange rate appreciates and domestic income increases by 1 unit each, the imports (% of GDP) also increases by 0.101 units and 0.45 units respectively (table 22.8). Thus, Price elasticity of demand for imports is perfectly elastic.

Summing up, the Marshall-Lerner Condition is Export Elasticity + Import Elasticity = 2.27 +9.99 = 12.26 (table 22.6 and 22.7). Thus, it is verified that ML is satisfied for India over 54 years (1962-2015) as it is greater than 1. This indicates that depreciation of the Indian currency should be able to improve the trade balance. However, the elastic exports' demand should be met by elastic supply of exports for the trade balance to improve. Theoptimum inflation rate will be favorable and increases of 0.01 % in the exports (% of GDP), the disasters and the financial crisis will decline exports (% of GDP) by 0.05% and 0.01% respectively. Therefore, these factors will influence the value and volume of exports greatly (table 7). Also, the optimum inflation will decline the imports (% of GDP) by 0.05% and the disasters and financial crisis are positively related to imports and increase the imports (% of GDP) by 0.03% and 0.03% respectively (table 8).But, India experiences non-optimum inflation rates, large economic loss by natural, complex and technical disasters and unstable global financial and other markets leading to crisis which are adversely impacting Indian economy and hampering its production and creating constraints on the exports' supply.

7. CONCLUSIONS

The depreciation of the Indian currency can lead to an improvement in the trade balance as the demand for exports and import are perfectly elastic, provided the supply shocks are curbed. India is prone to supply shocks due to high agricultural and imported raw material dependence which reduces growth and increases inflation. India is grappling with high inflation (more than threshold limit of 3%)which reduces exports and increases imports. Also, when rupee falls but supply remains the same, Indian exports may rise temporarily as production is diverted from domestic market to export market (since exporting becomes more profitable relative to domestic sales). But large exports will increase the domestic prices of exports and the initial gain in international price competitiveness will be neutralized by higher inflation. Stringent qualitative and quantitative measures are required to check inflation which has social and economic influence. Inflation is also the result of supply not meeting demand due to economic loss because of the natural disasters. For instance, inflation reached 11 % in 2010 as food grain production reduced by 17 million tone due to deficient monsoon (inflation was 14.7 for primary articles). The annual loss in India due to disasters is $10 billion and there is requirement for adequate investment in the Disaster Risk Reduction (DRR). This will not only reduce inflation but also make significant difference in achieving the national and international targets in terms of improving health, providing education, sustainable growth and output, thereby making exports' supply elastic. Policies also need to be adopted to restrict the negative impact of trade openness when financial crisis occurs as they have negative impact on the exports and imports. Apart from these three factors, there is requirement to review the Free Trade Agreements of India as it is often voiced that

these are more for maintaining geo-political relationships rather than commercial benefits. Also, it was pointed out in The Economist India Summit 2016 by Commerce and Industry Minister Nirmala Sitharaman that exporters are unable to exploit the FTAs to their favor and some of the exports that could have taken place in the absence of FTAs are not actually happening. Infact, some of the trade agreements have led to an increase in trade but only on the import side and not exports as India maintains higher tariff rates as compared to its partners.

To sum up, India needs to unveil the opportunity by adopting measures to curb factors leading to supply constraintwhichaffects exports negatively. This study concludes that demand of exports and imports are perfectly elastic and Marshall-Lerner Condition is satisfied assuming perfect elasticity of supply of exports.Therefore, the constraints are definitely not due to global demand, instead due to insufficient supply of exports which is due to non-optimum inflation rate, high rates of natural disasters, global crisis and unfavorable FTAs. Thus, government needs to adopt stringent policies towards them.

8. NOTE

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5. Same as Note 3
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10. Same as Note 6
11. Same as Note 1
12. Same as Note 2

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