

Exploring the Existence of J-Curve in South Asian Countries: An Empirical Analysis

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ABSTRACT

The core purpose of the present study is to investigate the impact of exchange rate devaluation on the trade balance of South Asian countries. For capturing the performance of Maldives, Bhutan, Pakistan, Nepal, Bangladesh, Sri Lanka, and India's economy, the study involves some leading economic measures like Trade Balance, Foreign Direct Investment, Exchange rate, Gross Domestic Product, and Inflation. The study made use of Panel data from the period 1980 to 2020. The study involved the Fix effect Model framework for the investigation of the J-Curve phenomenon. On behalf of the research, the study recommended some valuable suggestions for the betterment of the above-mentioned economies. Governments must implement regulations that encourage investors to utilize investment effectively and efficiently, upgrade technology, or switch to innovative or demand-friendly exports.

1. Introduction

Countries have always put stress on export promotion and reduction in imports since the late '70s. The jurisdiction of export development shows poor import replacement policies. These policies worsen the BOP situation in many countries including south Asian Countries. This situation made many countries think about an ongoing looking approach. Typically countries look for the best financial policies to gauge their deficit gap. World Bank and International Monetary Fund considered it best to formulate these economic policies. One of the best and main factors is Interest Rate to make these policies more effective. Exchange Rate fluctuations have been used to target many other objectives like raising revenues, strengthening Industrial Sector, etc. However, these objectives are considered secondary. The primary purpose of the Exchange Rate remains constant as it stabilizes the BOP. That is the only reason developing countries use this phenomenon, and devaluation becomes an arguable economic policy for all. The respective policy allows the government to attract foreigners to their domestic goods and, at the same time, makes foreign goods less captivating in household consumption. Change in attraction pattern occurs for the following reasons;

Increased Export level.

Decreased Import level.

Reduction in domestic unemployment.

Improvement in a BOP.

Kalyoncu, Artan, Seyfertin and, Ozturk (2008) stated that r/p between output level and ER is crucial for economic growth. One of the significant factors behind economic development is considered currency-devaluation. According to Dwivedi (2001), the total monetary value of all a country's

economic activities is its national income. Devolution, according to Zaiby (2008), occurs when the value of a country's domestic currency falls in relation to the value of gold or other currencies. Exchange rate depreciation, according to Kalyoncu et al. (2008), raises the cost of imported inputs, which reduces aggregate supply.

To overcome this deficit, South Asian Countries have devaluated their official currency many times till now. It was considered among economists that the demand for exports is price-elastic in foreign countries. Devaluation may increase the exported goods, but that will may not work for inelastic-price interests. Nusrate (2008) presented that ER is a significant variable for finding the trade flows, capital flows, Inflation, International reserves, FDI, and renitence of an economy.

In addition, imports exceed exports in South Asian Countries every year, which widens the BOP gap. In Pakistan, years 2012-2013 deficit was about USD 16522 Million. It was about -182150 PKR Million in January 2016. The average for BOP is recorded 25954.20 PKR million from 1975 through 2016. The deficit was about USD 2 billion in the early six months of 2020.

The present study concludes that an Increase in Exchange Rate, Foreign Direct Investment, GDP improve the Trade Balance of selected SOUTH ASIAN countries. On the other hand, Inflation worsens the Trade Balance in this region.

Statement of Problem

South Asian Countries have been persistently trying to attain balanced trade for many years. South Asian Countries are suffering from the problem of Trade Balance. Usually, developing countries endure a deficit in trade balance due to the inquisitive formation of exports and imports. Present study addresses above mention issue of TB (Trade Balance) in selected South Asian Countries. The study is willing to investigate the impact of Exchange Rate devaluation on TB. After ER depreciation, the present research aspires to examine the existence of the J-Curve in South Asian Countries.

Research Objectives

The primary purpose reflects the critical driver of the analysis, while the general goals recognize the specific problem ER2 we intend to observe. One of the general objectives is to analyze the short-run and long-run impact of Currency devaluation on TB in selected South Asian Countries and to determine the existence of long-run r/p between TB and ER for South Asian Countries. The specific objectives of the study are to examine the validity of the debate that the devaluation of the Exchange Rate improves the Trade Balance in South Asian Countries. Moreover, to explore the existence of The J-Curve in selected South Asian Countries.

Significance of the Study

The study has taken the latest annual data from 1980 to 2020 in a separate study. This study will highlight the importance of Trade Balance (TB) to raise economic performance in South Asian Countries. The study is confident that results will provide the mechanism of worthy impact of currency-devaluation on TB and the importance of various economic indicators which has improved the quality and effectiveness of Trade Balance for South Asian Countries. Moreover, the Present study has provided further guidelines to policymakers.

Scope and Limitations of the study

The scope area for the study is to find the J-Curve in selected South Asian economies. The Present research is highly encouraged to find j-curve and recommend remarkable policies for contributing to the betterment of concerned economies.

2. Review of Literature

In the example of Turkey, Ramzan (2021) empirically examined the impact of the real exchange rate on the overall and disaggregated level of the trade balance. ARDL and Nonlinear ARDL models were

utilized, with data spanning from 1989 to 2017. Using linear ARDL, the J-curve phenomena cannot be found at the aggregate level, but the dis-aggregate level shows that it does indeed exist. In the long run, depreciation of the Lira benefits most industries, according to the research.

In their study, Belhadj et al. (2020) examine the non-linear relationship between changes in the country's exchange rate and trade balance. The study examined panel data from 1984 to 2016 on TB, RER, Tunisia's GDP, and the GDP of 17 main Tunisian trading partners. According to this research, there are threshold levels of appreciation (or depreciation) or appreciation (or depreciation) in the currency rate. The study's findings confirm a non-linear relationship between changes in the country's exchange rate and the country's trade balance.

According to Ibrahim and Bashir (2020), real exchange rates have a significant impact on the trade balance of Sudan, a country in North Africa. The study used Sudan and its trading partners' panel data from 1978 to 2017. On the data of multiple variables such as TB, GDP, GDP of trading partners Sudan, imports, exports, and the real exchange rate was also applied the Autoregressive Distributed Lag (ARDL) approach. According to the study's findings, a decline in the exchange rate has no impact on the trade balance. As a result of these findings, the J-curve phenomenon has not been discovered.

Wu (2020) experimentally investigates the impact of the J-Curve on the US-China trade balance. The research was based on quarterly survey data collected between 2001 and 2007. Furthermore, ARDL and ECM were used to examine several aspects of the US and Chinese economic performance such as REER, trade balance, and GDP. In the short term, the modeling results do not support the J-curve effect, but they do demonstrate a favorable impact on China's trade balance with the US of the devaluation of the Chinese yuan over time.

There is evidence of the J-curve in the trade of 41 commodities between Pakistan and the US, according to Sana Ullah et al. (2020). Between 1978 and 2017, researchers used annual census data to conduct their research. Only 10 industries have a confirmed J-curve, according to the Linear ARDL results. As a result, the asymmetric J-curve is confirmed in 19 industries using Non-Linear ARDL. In eight industries, rupee devaluation has a favorable effect, whereas, in 11 industries, it has a negative effect.

To find out how the currency rate affects Pakistani imports and exports, Hina (2020) will do research. The research team analyzed annual data starting in 1982 and continuing through 2019. The econometric technique known as Johansen Co-integration is used to analyze the data of many variables, including Imports, Exports, and REER. To summarize, depreciating a currency has a negative impact on export demand but a net positive impact on import demand, leading to a negative trade balance. In Pakistan, J-Curve is likewise rejected, according to the findings of the research.

Asghar et al (2020) investigate the impact of exchange rate fluctuations on Pakistan's trade balance. The study examined annual data from 1983 to 2014 to arrive at this conclusion. Selected variables such as tuberculosis (TB) and endometriosis (ER) were also examined using a simple regression model. The findings reveal a link between the exchange rate and the trade balance that is negative. Pakistan has a trade deficit due to a weak correlation. High-interest rates and low investment levels are to blame for the unfavorable association.

Cheng led one of the investigations into the problem (2020). Convergence standard flexibilities were analyzed for all Administration exchanges in the US, as well as the nine major administration classes, focusing on the US economy and using quarterly information for the 1999-2015 timeframe. These investigations added to previous ones and revealed that while devaluation would generally help to improve the Administration's exchange balance over time, this consistency did not hold for all administrations (no critical short-or since a long time ago run impacts of swapping scale changes were noticed for protection administrations or charges for the utilization of licensed innovation).

Using both linear and nonlinear ARDL techniques, Cevik et al. (2019) find additional evidence of a J-Curve in bilateral trade between Turkey and the US. From 1990 to 2017, researchers analyzed data from 18 European Union countries. Real depreciation has a considerable negative impact on short-term bilateral trade balances in seven countries, including Sweden, the Netherlands, Romania, and Portugal. There is no evidence of the J-Curve phenomena in these countries. The results of the ARDL's linear method show this. ARDL's Wald Test results, on the other hand, show that depreciation and appreciation have an imbalanced impact on bilateral trade between Turkey and a small group of nations. According to the research, devaluation worsens short-term trade balances while improving long-term trade balances for Turkey. A J-Curve has also been found in countries like Hungary, the United Kingdom, and the Netherlands, along with the Netherlands and Greece.

From 1971 to 2016, Jadoon and Guang (2019) study the impact of exchange rate fluctuations on Pakistan's trade balance. The Study indicates the long- and short-term favorable impact of ER on tuberculosis after applying the Autoregressive distributed-lag technique to various factors. A weaker PKR against the US dollar will boost exports, improving the country's trade balance in the process. According to the study's findings, an increase in money supply and inflation would lead to a trade imbalance.

Bahmani-Oskooee and Fariditavana (2019) found that the topsy-turvy ARDL model had limited help for the J-bend speculation in a Canada-U.S. bilateral exchange, with 72 products having a direct J-bend influence and 85 products having a non-straight (topsy-turvy) J-bend impact.

Zhang et al. (2018) investigate the non-linearity in the relationship between the Chinese yuan's exchange rate and the country's trade balance. It is a Non-Linear Autoregressive Distributed Lag that's being used in this research (ARDL). These statistics cover the years 2001 through 2015. According to the findings of the study, the exchange rate has an asymmetric short-term influence on 18 trading partners, an adjustment asymmetric impact on 11 trading partners, a cumulative asymmetric impact on 7 trading partners, and an asymmetric long-term impact on the five trading partners. Study also supports J-Curve in the situation of 5 partners because of admiration and the drop in Chinese currency.

J-curve effects on Nigeria's trade balance are experimentally examined by Ajibola et al (2018) using annual data from 1981 to 2016. The data analysis in the study made use of the Johansen Co-integration method. Various variables such as the trade balance, REER, and GDP statistics were also incorporated into the analysis. According to the evidence, the trade balance gained in the near term from the devaluation of the Naira. The findings also revealed that DV and IV had no long-term correlation. The inverted J-curve was the focus in Nigerian economics.

According to Purwono et al. (2018) study titled "The Dynamics of Indonesia's Current Account Deficit: Analysis of the Impact of Exchange Rate Volatility," the current deficit is worsening at a faster rate than previous records have shown. The decrease in the manufactured goods' commodity price, especially for gas and non-oil, is greater than the increase in imports. Because of the import exchanges for oil and gas, a country's currency devaluation against the US dollar increases the weight of larger oil and gas imports.

Khalil and Hassan (2017) put light on the interpretation of elements upsetting export growth in Pakistan. Between 1972 and 2012, researchers used annual census data to conduct their research. Johansen Juselius technique is used to test the different macroeconomic variables. Findings showed the positive of all variables on the export.

Lyke and YoHo (2017) investigate the impact of actual exchange rate changes on Ghana's trade balance in West Africa. Quarterly data was used for the analysis, spanning the first quarter of 1986 through the third quarter of 2016. The study used data from TB, GDP, trading partners' GDP, and REER to apply the linear ARDL technique. These findings show there's no conclusive proof that fluctuations in the trade balance are caused by exchange rate movements in the short or long term.

The J curve has been shown wrong in this instance. According to the findings, depreciations improve the trade balance in the long run, while adoration for the exchange rate has no effect.

To find out whether the rate of exchange affects the trade balance, Lgwe et al (2017) looked at the trade balances of eight countries: Pakistan, Korea (including China), Malaysia, the Philippines, Russia, Singapore, and Israel. Throughout the 1980s, 1990s, and 2013, researchers compiled quarterly data for their findings. The nonlinear autoregressive distributed lag model examines data from various variables, including Real GDP, Trade Balance, and REER (NARDL). In an asymmetric model, depreciation has large influence on the trade balance, but NARDL's findings suggest that when it is isolated from appreciation, it does.

3. Theoretical Framework

The whole mechanism will reverse when there is currency appreciation and it will show the inverted J-Curve. So many methods can investigate the existence of the J-curve; one of effective is:

Marshal-Lerner Condition

The fluctuations in Real-ER influence the Country's Trade Balance. This definition is given by the condition of Marshal Learner, named after being discovered by two great Economists Alfred Marshal and Abba Learner. Marshal Learner thus considered a stable Foreign Exchange market where the addition of price elasticity of the import demand and demand for exports is in ABS.

This theory suggests that the more fluid the Demand Curves of both exports and imports shown larger the TB. Hence aggregate of elasticity of export (demanded) and elasticity of import (demanded) is greater than 1. So, devaluation increases the Trade Balance. It is possible to compose it as:

$$Ed \text{ for exports} + Ed \text{ for imports} > 1$$

The Marshal Learner condition is valid when the elasticity of imports and exports has been about the Effective ER instead of Nominal ER

In a country, the balance of trade is influenced by alterations in the real rate of Exchange. This idea is called Marshall. Lerner. Condition (MLRC). This theory was presented by economists named Alfred, Marshall, and Abba Lerner. Thus, (MLRC) discover a steady international exchange market; in absolute terms, if the price elasticity of the demand for exports (D_x) and the price elasticity of demand for imports (D_M), are greater than one (1). The international exchange market is unbalanced; if the price elasticity of D_x and D_M is smaller than one (1), and if the international market for exchange will depart the balance of payment unaffected, the sum of these two elasticities shows equal to one (1). Thus, the MLRC notifies, how changes in the Real Rate of Exchange influence the balance of trade of an economy.

Suppose that, the output level does not affect prices in the short time period of analysis. The price affixed by producers is unaffected, and then at that price, they meet the demand. When the supply curve is horizontal is a condition where the output does not influence prices. The firm set an unchanged price level. A price \bar{P} is set by firms domestically in the local currency that is to be exported and \bar{P}^* is set as a price by international firms in their overseas currency. It shows that the real rate of exchange, $E \bar{P}^* / \bar{P}$ might differ when the nominal rate of exchange changes E . A domiciliary inhabitant of a nation, who is buying a product from an overseas market will be perturbed by the price of that product at conditions of local currency; yet though the price \bar{P}^* set by overseas producers. The price is $E \bar{P}^*$ in this local economy experiences when the good is imported. At $E \bar{P}^*$, the supply is infinitely elastic. This is shown in Figure 3.1

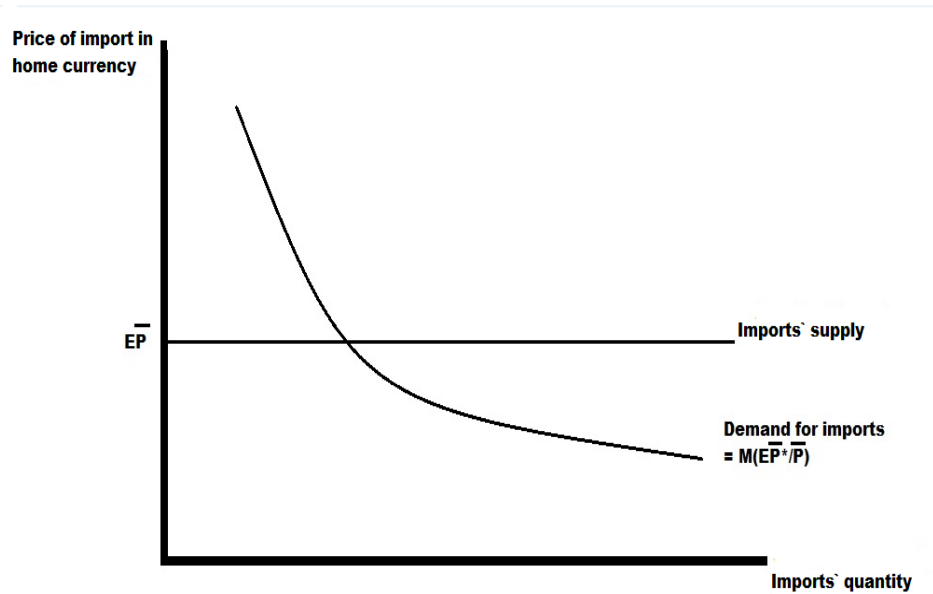


Figure 1

The Market of Imports

At EP^* the supplier is agree to supply every amount of imports with the price of fixed supply, in the import market. The demand of imports (D_M) is declining in the price of imported goods in assessment to local products, $E P^* / \bar{P}$.

In similar case, supply of exports is settle by local producers at \bar{P} , and is boundless Elastic Supply Curve. The price of export-able product for an abroad individual is in international currency, P . By transferring the price into currency units of an abroad individual provide the prices of export-able products \bar{P} / E . It is demonstrated in Figure 3.2

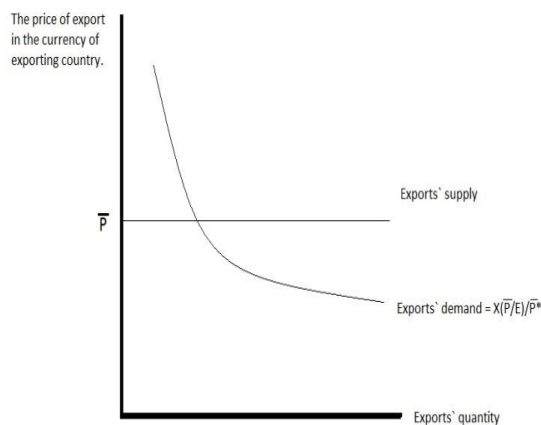


Figure 2

Market of Export

In case of exports market, because of menu costs, supply prices are fixed. Producers are impatient to supply every quantity of exports at price \bar{P} . In this situation, foreign purchaser will contrast the price of Average Foreign exported product with the price of the average local product. Inside this situation, demands depend on Real Rate of Exchange; the real rate of exchange for these abroad is the price of foreign goods in provisos of local goods. A function of declining and negatively connected to relative

price of abroad good $(\bar{P} / E) / \bar{P}^*$ is to be said Demand for Good. So; (D_x) Demand for Export can be written as:

$$X = X(\bar{P} / E) \bar{P}^*$$

If price of exported good of local state is $P=100$, and exchange rate is $E = 40$ per\$, then the cost of exported good in international currency is $\$ P / E = 100 / 40 = \$ 2.5$. At that time; what will occur, when there is a reduction in of exchange? In demand curve of exports, assume the export price is $P = 100$. Rate of exchange is devalued to $E^1 = 50$ /\\$alternatively $E = 40 / \$$. So, export is in International currency is $P / E^1=100 / 50 = 2$ USD. The price of international export has diminished from 2.5 to 2. In this situation, export-able goods become inexpensive, and demand of exports will enhance and exports demand curve will be rightward shift at each level of price. In imports demand curve condition, the price of import-able product in units of local currency is $E\bar{P}^*$. The currency downgrading enhances the imports prices to local inhabitants and it shows movement upward along with the demand curve.

Now we can see how the balance of trade is affected by change in rate of exchange in case of currency depreciation.

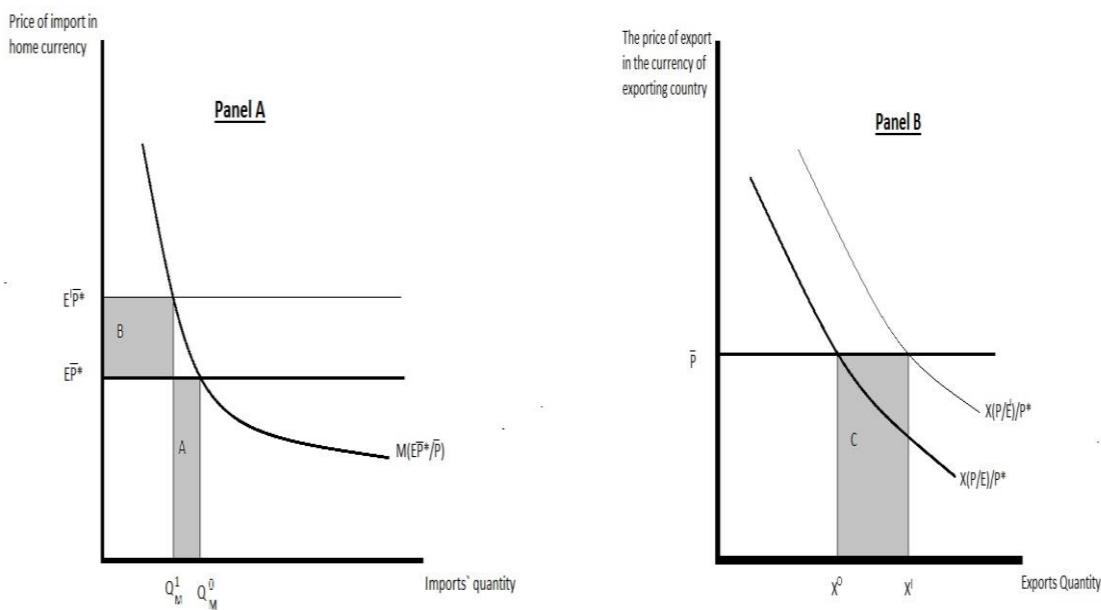


Figure 3

Devaluation Effect

The currency is devalued when the nominal rate of exchange change from $E^1 > E$. The local price of import-able product rise from $E^1\bar{P}^* > E\bar{P}^*$ and imports supply curve move up-ward shows in diagram 3.3A. The depreciation in currency creates exports inferior for those persons who demand export-able in local currency. So; the demand curve of exports moves to right-ward as in Diagram 3.3B.

We use 2 imports demand curves at that moment, the elastic curve $M_{elastic}$ & $M_{inelastic}$. Figure below 3.4 describes the idea of (MLRC) Marshall-Lerner Condition. According to MLC real depreciation of currency developed balance of trade, if the total elasticity of the export and import is superior to unity.

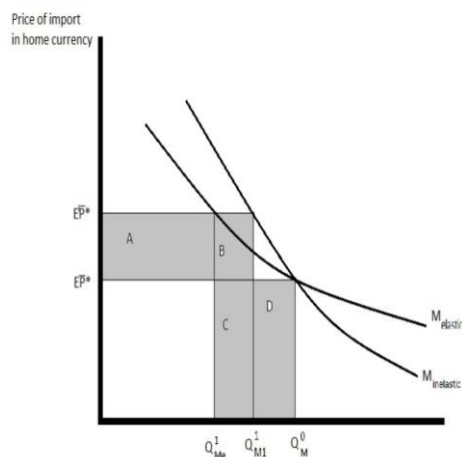


Figure 4

Imports Elasticity

EP^* is the imports of cost in-home currency .The amount of imports is similar to Q_M^0 on both Demand Curves. The cost of local currency increases to $E^1 P^*$ after depreciation, the amount of imports diminish to Q_M^1 , which is demand curve is elastic relate to inelastic Q_M^0 . The depreciation increases the comparative import price to local inhabitants and augmented the assessment of import’s additional for in-elastic Demand Curve.

This theory declared that; further the export & import demand curves are elastic; balance of trade will get better. Actually, it has been proven that depreciation develop balance of trade if the total elasticity of export demand and import demand is superior to unity. It can also be written as:

$$E_d \text{ for exports} + E_d \text{ for imports} > 1$$

The MLC is measured to be factual when exports and imports elasticity’s are exposed with respect to (RRE) Real Rate of Exchange rather than nominal rate of exchange.

The Methodology of the Study and Sources of Data

Brief Description of Variables

Trade Balance:

Trade balance represents the variance of the charges of goods which is sold to other state (Exports) for specific time duration and the goods which buy from other state (Imports).

Exchange Rate:

Exchange rate is the value of currency in the market of an economic zone to the value of currency of other economic zone where we are going to trade.

Inflation:

Inflation is a situation where people have less money to make monetary transactions. Things purchased fewer than before in inflation time period. It can also be measured in a fiscal year.

Foreign Direct Investment:

Foreign direct investment is defined as investment which is made by foreigners and controlled by a local body of an economy. It is the investment having enduring relation and imitating the permanent interest in foreign direct investor rather than affiliated bodies.

Gross Domestic Product:

GDP define as within an economy total worth of all goods and services which are sold in the market in a fiscal year.

Exchange Rate Square:

Exchange Rate Square is the square value of Exchange rate in one fiscal year.

4. Methodology

Data Sources

The current study used secondary panel data of selected SOUTH ASIAN countries. For analysis panel data set is collected by selecting seven SOUTHASIAN countries namely Bhutan, Maldives, Nepal, Pakistan, Sri-Lanka, Bangladesh and India. Moreover, time period for this research consists of 50 years from 1980 to 2020. Data will be compiled from World Development Indicator (WDI), International Monetary Fund (IMF), and Our World in Data (OWID), Statistical Review of World Economy and World Governance Indicators (WGI).

The General Equation of ARDL

The priority of ongoing research is to define Trade Balance and other variables of SOUTH ASIAN region. To check their impact the model will be used to examine the relationship between Trade Balance and Exchange Rate of selected SOUTH ASIAN countries, namely Bhutan, Maldives, Nepal, Pakistan, Sri-Lanka, Bangladesh and India. The dependent variable in this study is Trade Balance (TB) represents seven South Asian countries trade balances. Moreover, the independent variables are concerned and these are the fusion of economic variables like Exchange Rate, Foreign Direct Investment, Exchange Rate Square and Gross domestic product.

$$TB = f(ER, INF, FDI, GDP, ER^2)$$

The Econometric Model

$$TB_{it} = \beta_{0it} + \beta_1 ER_{it} + \beta_2 INF_{it} + \beta_3 FDI_{it} + \beta_4 GDP_{it} + \beta_5 ER^2_{it} + \mu_{it}$$

Whereas,

β_0 = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients of variable

ε = Error term

Hypothesis of Concerned Study

Null Hypothesis:

$$\mu_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$$

(Long run relationship between variables does not exist)

Alternative Hypothesis:

$$\mu_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$$

(Long run relationship between variables exist)

5. The Data Analysis, Empirical Results, and Interpretation

Descriptive Statistics

In data analysis and model estimation, descriptive analysis is usually beneficial since it provides the values of the mean, median, mode, standard deviation minimum and maximum of the variables'

values, as well as the values of the mode and standard deviation. To aid researchers in their work, the data range and fundamental properties are depicted in this study. The Table 1 demonstrates all of the variables' minimum and maximum values as well as their mean and standard deviation.

Table 1
Descriptive Statistics

	TB	ER²	INF	GDP	FDI	ER
Mean	-6.408589	1846.87287	7.691399	171.9067	1.322398	48.43193
Median	-3.003783	684.19000	7.505000	19.27100	0.744104	43.50500
Maximum	11.42700	2109.0400	27.90000	3050.000	17.03502	185.5900
Minimum	-52.28000	14.05757	-18.10900	0.042464	-6.008030	7.050000
Std.dev	9.785412	1920.42357	4.804714	463.9530	2.234526	35.60589
Skewness	-1.921747	0.887414	0.153721	4.202746	3.589653	1.124742
Kurtosis	6.674198	3.920114	7.396573	21.25461	20.39944	4.217157
Jarque Bera	338.0881	47.79297	232.2831	4829.770	4236.632	78.22723
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sum	-1839.265	13165.51	2207.432	49337.21	379.5281	13899.96
Sum Square	27385.73	97076.34	6602.388	61562187	1428.028	362586.8
Observation	287	287	287	287	287	287

Source: Author's own estimation by E-views

Table 2
Correlation Matrix

	TB	ER²	INF	GDP	FDI	ER
TB	1					
ER²	0.115	1				
INF	-0.001	-0.231	1			
GDP	0.176	0.4205	-0.0595	1		
FDI	-0.091	0.0856	-0.1254	0.0188	1	
ER	0.285	0.5469	-0.1136	0.1151	-0.124	1

Source: Author's own estimation by E-views

Correlation analysis is particularly useful for demonstrating the relationship between multiple variables, Cohen, et.al (2013). As seen in Table 2, there is a moderate correlation matrix between all variables. Additionally, while performing correlation analysis, it assists in determining whether or not variables are perfectly connected. Due to the lack of perfect correlation, the data are well-organized and can be used for future research.

Table 3
Variance Inflation Factors Unit Root Analysis

Variance Inflation Factors			
Sample: 1 410			
Included observations: 409			
Variable	Coefficient		
	Variance	Uncentered VIF	Centered VIF
ER	0.000106	2.623589	1.392605
GDP	7.68E-07	1.607494	1.316870
INF	0.000481	1.520555	1.070645
MS	0.000618	13.62106	1.765431
C	1.068644	10.42150	NA
TB(-1)	0.000757	1.089209	1.029437

Unit Root Analysis

Before relating the dissimilar econometric estimation method like panel OLS, Fixed Effect, and Random Effect techniques, first checked by the stationarity of the variables by different panel unit root tests. There are different tests of unit root available such as ADF (Augmented. Dickey-Fuller), PP (Phillips-Perron), Levin in and Chu and IPS unit root tests. Here IPS (2003) and Levin, Lin, and Chu (2002) are used of unit root perform to check the stationary of data set. Results are given in Table 4. Accurate estimation of data set requires constant mean and variance that is independent of time moreover; this situation leads to stationary of data set.

Table 4
Levin, Lin, and Chu Unit Root Test

Variable	LEVEL		First Difference		Order of Integration
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
TB	-3.30*	-3.44**	-7.26*	-7.18**	I(0)
ER²	-0.45	-1.93**	-5.57*	-5.63	I(0)
INF	-3.43*	-3.35**	-5.16*	-5.11*	I(0)
GDP	-2.57	-2.93**	-4.09*	-4.03	I(0)
FDI	-2.95**	-3.38***	-3.54*	-3.50**	I(0)
ER	-4.22*	-4.17*	-6.08*	-6.01*	I(0)

Source: Author’s own estimation by E-views

H0: indicates the stationary data set that is the null hypothesis (absence of unit root).

Critical values are 10%, 5%, and 2% and values of LM less than critical values indicate the acceptance of Ho (null hypothesis). This is again the case data set has no unit root.

*Significant at 10% level of significance

**Significant at 5% level of significance

*** Significant at 1% level of significance

Table 5 consists of the results of the LLC test and the unit root test is applied to variables separately. All variables are stationary at a level so, the order of integration is I(0) and we can suggest there is no issue of a unit root. Moreover, some variables are significant at 2%, and the remaining are significant at 5% or 10% level of significance. FP and inflation rate are significant at a 2% level of significance. The other variables HC, PCI, CO2, and TAX are significant at a 5% level of significance.

Table 5
IPS Unit Root test

Variable	LEVEL		First Difference		Order of Integration
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
TB	-3.32*	-3.34*	-8.24*	-8.06*	I(0)
ER ²	-0.35	-1.93**	-5.58*	-5.69*	I(0)
INF	-2.17**	-2.23**	-10.08*	-5.11*	I(0)
GDP	-2.11	-2.73**	-4.09*	-4.03	I(0)
FDI	-3.21**	-3.67**	-3.74*	-3.60**	I(0)
ER	-2.32*	-3.29*	-7.01*	-6.09*	I(0)

Source: Author's collection by Eviews

H0: indicates the stationary data set that is the null hypothesis (absence of unit root).

Critical values are 10%, 5%, and 2% and values of LM less than critical values indicate the acceptance of Ho (null hypothesis). This is again the case data set has no unit root.

*Significant at 10% level of significance

**Significant at 5% level of significance

*** Significant at 1% level of significance

Table 5 presents the results of the IPS (I'm Pessaran and Phillips Perron) test and the unit root test is applied on variables separately. All variables are stationary at a level so, the order of integration is I(0) and we can suggest there is no issue of a unit root. So, these results suggest fixed effect or random effect is an accurate method of estimation because variables are stationary at level.

Hausman Test of Model Selection

When employing the Hausman Test, additional information on the fixed or random effect is necessary. It does so by allowing for null and alternative hypotheses.

Ho: Random effect is an appropriate model

H1: Fix Effect is an appropriate model

Table 6
Hausman Test

Chi-Square	Chi-square df	Prob
20.022	5	0.0012

Source: Author's own estimation by E-views

Redundant Test

Table 7
Redundant Test

Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.094441	- 6,267	0.0006
Cross-section Chi-square	24.64559	6	0.0004

Source: Author's own estimation by E-views

Fix Effect

The principles of Hausman are employed due to the fact that the prob value is less than 5% and the null hypothesis is rejected; the test demonstrates that the Fix effect model is an adequate model for estimation.

Table 8
Fix Effect

	Coffi	Std.error	T-value	Prob.
ER ²	0.051506	0.035407	2.45	0.006
INF	-0.163994	0.090649	-2.809	0.0015
GDP	0.000951	0.001296	3.73	0.003
FDI	0.158405	0.233773	2.67	0.008
ER	0.048048	0.019727	2.43	0.015
Cons	-5.157589	1.55334	-3.32	0.001

Source: Author's collection by E-views

The Fix effect model is used to estimate the relationship between TB in selected South Asian countries. The above table displays the findings, the result of the above table shows that there is a positive long-run and short-run relation between ER² and TB and there is a positive and significant relationship between GDP and TB, FDI and TB, and ER and TB.

The results indicate that if 1% increase in Exchange Rate squares then 5% increase in the trade balance. The results indicate that if 1% increase in growth rate then 0.09% increase in the trade balance. The results indicate that if 1% increase in foreign direct investment then 15% increase in the trade balance. The results indicate that if 1% increase in exchange rate then a 4% increase will be witnessed in the trade balance. The results indicate that if 1% increase in Inflation then a 16% decrease in the trade balance. The above results indicated that the Exchange rate improves the trade Balance of selected economies but if we continue the devaluation of the exchange rate it will lead to more improvement

in Trade Balance as ER² improve Trade Balance by 0.051506 which is greater than 0.048048 (impact of ER on TB).

Heteroscedasticity Test

The Bruesch Pagan LM test is used to detect whether or not a sample is heteroscedastic (see Table 9). Due to the fact that the p-value is more than 5%, the null hypothesis is constant variance. As a result, this model is not heteroscedastic, and variance is always equal to one.

Table 9
Heteroscedasticity Test

Value	df	Prob
438.5048	5	0.0000

Source: Author's own estimation by E-views

Conclusion and Policy Advice

The existence of the J-Curve in South Asian Countries is an important topic, and more debate is needed to elaborate on additional features. Research has a limited number of studies regarding this area in South Asian Countries. This research is, therefore, done to examine the existence of J-Curve in South Asian Countries. The main objective of the present study is to investigate the impact of the Exchange Rate on the Trade Balance in the selected SOUTH ASIAN region. This study used the annual panel data of selected SOUTH ASIAN countries (Maldives, Bhutan, Pakistan, Nepal, Bangladesh, Sri Lanka, and India) over the period of 1980 to 2020 collected from different databases. The study employs the Fix effect method to find the results and the selection of an effective model by using the Hausman Test.

The study finds the result of descriptive statistics. Secondly, the present study analyses have no multicollinearity in the data. The study also analyses autocorrelation and heteroskedasticity results which indicate that the problem has been tackled. The problem was fixed by taking the lag of the dependent variable and applying the white test.

Empirical results indicate several crucial findings. Firstly, an Increase in Exchange Rate Square, Foreign Direct Investment, and GDP have Significant and positive long-run and short-run relationship and improve the Trade Balance of selected SOUTH ASIAN countries. On the other hand, Inflation worsens the Trade Balance in this region, because the Government policies have not effectively worked in the selected SOUTH ASIAN countries.

The empirical result shows that devaluation of the exchange rate is very important to encourage exports, enhance the net trade balance and improve the economic stability in Pakistan

In order to measure the non-linearity of the exchange rate, The study has incorporated the square root of the exchange rate that interprets the non-existence of the J-Curve in selected South Asian economies. Firstly, we have seen a positive sign of exchange rate (ER) indicates an improvement in Trade Balance but the situation remains the same in the case of non-linearity of the exchange rate, As exchange rate square also improves the Trade Balance (although very minimum). This scenario clearly represents the non-existence of the J-curve.

For selected SOUTH ASIAN countries, important consequences might be proposed. Governments must implement enough regulations that encourage investors to utilize investment effectively and efficiently, upgrade technology, or switch to innovative or demand-friendly exports. As seen in the present research Exchange rate is not a key element for improvement in TB. Even twice devaluation improves Trade Balance very minimum couple with imports of high pricing imported goods (price level increased after devaluation). Furthermore, there is a need to allocate their exports in a new

pattern so they can gauge the gap between imports and export. Government should revise tax policies for export quota holders so they can enhance exports and improve TB.

By following the above results the study found that increasing FDI will increase TB. So Government should take effective and positive steps toward updated technology adaptation, skill improvement and market management to increase FDI that will promote TB.

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