**SPCRD GLOBAL
PUBLISHING**
Sustainable Solutions

RAMSS Review of Applied Management
and Social Sciences

Journal homepage: <http://ramss.spcrd.org>

ISSN (Print): 2708-2024

ISSN (Online): 2708-3640

The Nonlinear Relationship between Trade Balance and Income for Selected Asian Economies

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ARTICLE DETAILS	ABSTRACT
History: Accepted 19 Aug 2020 Available Online 30 Sep 2020	<p><i>This research study is an attempt to explore the nonlinear relationship between domestic and foreign income and deficit in the trade balance for a sample of 13 high deficit Asian countries from 1990 to 2019. Furthermore, the study also moderates the role of financial development and carbon emissions with trade balance. The study results validated the existence of a nonlinear relationship between trade balance and domestic and foreign income. For this purpose, three different types of model are formulated. The first model was of the benchmark type, which contains only the domestic and foreign income effect, while in the other two models, the role of financial development and carbon emissions is also included. The estimated results evinced the existence of U shape relationship for domestic income and inverted U shape curve for World income. The results revealed that it would be very suitable for selected countries to boost up domestic income. Because of it, the deficit in trade balance will start to decline. The financial development and carbon emissions are found to be a significant contributor to reduce the deficit in the trade balance.</i></p>
Keywords: Income – Trade Kuznets curve; J Curve Phenomenon; World Demand	
JEL Classification: F1	
DOI: 10.47067/ramss.v3i2,52	

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1. Introduction

By increasing the globalization, foreign trade is also increased among the nations of the World (Salvatore, 2016). No doubt, international trade has the potential to increase welfare (Marchand, 2017;

Deyshappria, 2018; Qadir & Majeed, 2018). But the undesirable aspect of international trade is for developing countries because they have to face a deficit in their trade balance (Jhingan, 2006; Salvatore, 2016). With the passage of time, this deficit in trade balance becomes a big burden for developing countries, and they have to move in search of foreign loans to finance their deficit in the trade balance. Moreover, the exports of the developing countries also consist of some basic and agricultural goods which have no high market value, and for this reason, these countries have to face the persistent deficit in trade balance (Gould et al., 1996). Sometimes international economic activities also increase inflation (Ahmed et al. 2018). Therefore, it seems that globalization has a negative impact on developing countries in the form of deficit in trade balance (Rahim et al., 2014). Figure 1 reflects the trade balance of some developing countries of Asia which are facing persistent deficit in trade balance.

Figure 1 – National Average of Trade Balance

The deficit in the trade balance is a phenomenon where the imports are greater than exports (Kyambalesa, 2019). As the income directly affects the trade (Feyrer, 2019) but sometimes an increase in income may be a reason to deteriorate the trade balance (Das, 2016; Ali, 2017; Yakubu et al., 2018). It happens when countries are in a growing phase. They are in need of imports of raw materials, fuel and capital goods. Moreover, an initial increase in income also caused to increase purchasing power due to this trade balance move towards a deficit. This pattern is not common in all the developing countries, but some countries are also facing an increase in income caused to improve trade balance (Gzaw, 2015; Azu & Abu-Obe, 2016; Mutana et al., 2018). Basically, the relationship which determines that deterioration in the trade deficit in this first phase and removal in the deficit of trade balance reflects the J-Curve approach (Backus et al., 1994; Akbostanci, 2004; Iqbal et al., 2019), which is commonly discussed regarding trade.

Another important aspect regarding trade balance is foreign income. Basically, exports of a country depend upon the income of the rest of the world, or the trade partner countries. So, an increase in the income of foreign countries caused an increase in exports (Alhanom, 2016; Mete & Bozgeyik, 2017; Akoto & Sakyi, 2019) if the goods are demand worthy. Usually, it happens when for the income of the rest of the world increases and they depend upon the imports that is why the trade balance of exporting countries improve. But, the persistent increase in foreign income can also be a reason of the deterioration of the trade balance (Tran & Dinh, 2014; Ari & Cergibozan, 2016). Because now these countries have started import substitution or domestic goods are inferior in nature.

As the exports and imports have deep relation (Syaparuddin & Zevaya, 2020), below figure 1 is presenting the average trend of imports, exports and trade balance of some developing Asian countries (Pakistan, India, Bangladesh, Turkey, Sri Lanka, Cambodia, Jordan, Tajikistan, Lebanon, Kyrgyz Republic, Armenia, Philippines, and Vietnam). This graph is showing that imports are greater than exports which mean that these countries are suffering from a deficit in the trade balance. Moreover, the graph is also showing the ratio of exports and imports from 1990 to 2019. This graph is clearly depicting that the values of trade balance in each year are less than one, indicating that these countries are suffering from the persistent deficit in the trade balance.

Figure 2 – Cross section Average Trend of Imports, Exports and Trade Balance

Another most important aspect of international trade is financial development. It reflects a well-developed financial system is a prerequisite for industrial growth (Gerschenkron, 1962), which was recognized by McKinnon (1973) and Shaw (1973). Financial development has a direct relationship with economic growth (Rahman et al., 2020), as the economic growth increase, all the economic aspects also boost up. Same is the case with trade balance, as the financial development increases trade balance also increases (Ahad, 2017; Yakubu et al., 2018; Rehman et al., 2020). In response to financial development, the finances are available for the production process, and consequently, it increases exports (He, 2014).

As the financial development caused to increases industrialization, there may be another consequence in the form of an increase in carbon emissions (Dogan1 & Inglesi-Lotz, 2020). Basically, when the process of an increase in exports takes place, it results in increased carbon emissions (Raza & Shah, 2018). In other words, international trade not only represents the improvement the economic structure but also indicate the deterioration of the environment (Raza & Shah, 2018; Sun et al., 2019; Mahmood et al., 2020). Increase in productivity has significant impact on exports, but this will leads to impact on environment quality (Huang & Liu, 2019). Basically the trouble is for the developing countries where the more production caused to deteriorate the environment more (Gill et al., 2018; Rana & Sharma, 2019).

Considering the role of foreign and domestic income, the objective of this study is to explore the quadratic role of foreign and domestic income regarding trade balance. Furthermore, two control

variables, i.e., financial development and carbon emissions, are also considered in this study that how these variables prove their role for a suitable policy. This study hypothesized that changes in the financial development and carbon emissions moderates the relationship of domestic income and world income with the trade balance.

This first section of this study contains the comprehensive introduction regarding trade balance along with some reasons and consequences and its relation with other variables. Later on, some studies of literature related to the subject matter are discussed. Subsequently, the data and methodology, along with estimated results, are presented. In the last section, conclusions and policy implications are discussed based on the estimated results.

2. Literature Review

The concept of trade deficit is discussed in studies like Jhingan (2006) and Todaro and Smith (2015). As the trade deficit is one of the major macroeconomic problems. In developing and developed nations, there are a number of research studies conducted to explore the specific reasons and remedies of trade deficit. Backus et al. (1994) explored the relationship for trade deficit and terms of trade. He also attempted to validate the existence of the J-shape trade deficit curve. Kim (1996) identified the income impact on the trade balance of the major developed economies like U.S., UK, Germany and Japan. Singh (2002) discussed in his study that domestic income is a significant determinants of trade balance while world income is insignificant.

Following some recent studies Ahmad and Geide-Stevenson (2012) identified the determinants of trade balance in the case of Mexico and U.S. The findings of the estimated results suggested that exchange rate and GDP are the significant factors to determine the trade balance and as increase in GDP also caused to improve trade balance. Ray (2012) identified the determinants of trade balance for the case of India. He identified that foreign direct investment, remittances, real effective exchange rate and GDP are the significant factors affecting the trade balance of India Moreover an increase in GDP also caused to improvement in trade balance.

However, in case of Tanzania, Shawa and Shen (2013) identified foreign direct investment, income of foreign countries, human capital, resource ability, household consumption expenditures, natural resource ability, and inflation and government expenditures as the significant determinants. Moreover an increase in world income also caused to improve the trade balance of Tanzania. Tran and Dinh (2014) used panel data for Asian economies and identified that foreign direct investment; real effective exchange rate and foreign income are the key determinants of trade balance. Moreover an increase in the world income trade balance of selected countries also improves. However, in case of Pakistan, Shah and Majeed (2014) identified the key determinants of trade balance which includes GDP, real effective exchange rate and money supply. Moreover an increase in GDP causes to deteriorate the trade balance.

For the case of Ethiopia, Gzaw (2015) identified GDP, real effective exchange rate and money supply as the key significant determinants of trade balance. Sertoglu and Dogan (2016) explored the determinants of agricultural trade balance in case of Turkey. The estimated results revealed that real exchange rate, agricultural product prices and national income are the key determinants of trade balance.

Azu and Abu-Obe (2016) used the data set of the Nigerian economy. They explored the

determinants of trade and found that foreign direct investment, GDP and real exchange rate are the significant determinants of trade. Alhanom (2016) explored the determinants of the trade balance for Jordan and identified that World economy is significantly improving the trade balance for Jordan. So, as world income improves the trade balance of Jordan also improves. Das (2016) used panel data for 27 developed nations, 32 emerging economies and 47 developing economies of the world. The estimated results identified that net foreign assets, real effective exchange rate, GDP and trade openness are significantly affecting the current account deficit.

Mete and Bozgeyik (2017) had identified domestic consumption rate, real exchange rate, foreign income, R&D expenditures and real interest rate are the key determinants of the foreign trade of Turkey. So, foreign income is found significant determinant to improve trade balance. Hassan et al. (2017) identified the GDP per capita, trade balance, real effective exchange rate and money supply as the key significant determinants for trade balance for comparative analysis consisting of three countries for Bangladesh, India and Pakistan. However, in case of Sudan, Ali (2017) estimated that the exchange rate, GDP per capita, inflation, cost of finance, investment and credit to the private sector are the major determinants of the trade balance.

In the case of the Croatian economy, Bošnjak et al. (2018) explored the determinants of the current account deficit. The major finding of the research was the need for fiscal policy measures and relaxing the liquidity problems, specifically the exporters of the Croatian economy. In the case of European countries, Bucevska (2018) identified the factors of current account imbalance. The study results indicating that domestic investment, foreign exchange reserves, financial development, fiscal deficit, GDP growth rate, foreign direct investment inflows and initial net foreign assets are the key determinants.

However, in case of Turkey, Adem and Vuran (2018) used monthly data for different variables and identified that industrial production index, credit default swaps and real effective exchange rate are the significant variables for the trade deficit. In case of Jordan-Turkish economies, Jaloudi and Harb (2019) identified that real effective exchange rate, money supply and GDP has a significant but weak impact on the trade balance. However, in the case of the Malaysian economy, Manual and San (2019) explored that GDP, CPI and exchange rate are significantly impacting the trade balance. Using panel data for three South Asian countries, i.e., Pakistan, Bangladesh and India, Iqbal et al. (2019) identified the determinants of trade balance which includes the significant variables like domestic income, trade balance and foreign income. The domestic income revealed an inverted U-shape relation, while foreign income reported the U-shape impact.

Among the most recent studies Rehman et al. (2020) have explored the determinants of the trade balance for South Asian countries from the period 1990 to 2017. According to the estimated results infrastructure is playing a valuable role in boosting the exports in the selected countries. Moreover, variables like exchange rate, human capital, per capita GDP and institutional quality have sufficient potential to improve the trade balance. So, above discussed studies have focused on the determinants of trade balance. Majority of above discussed studies have used economic growth or domestic income as a key factor determining the trade balance though some of them have also used foreign income. In this way this study has found a way to construct a model which includes both domestic and foreign income and their impact on trade balance. It would be helpful in formulating the hypothesis of this study.

2.1 Literature regarding Control Variables

There are many other indicators, which can improve the trade balance; financial development is also one of them. Basically, financial development results increase in investment which can increase production and subsequently, it increases exports. Following some recent studies like; Ahad (2017), Yakubu et al. (2018) and Rehman et al. (2020) have proved the improvement in financial development can improve the trade balance. This literature about financial development would be helpful regarding hypothesis development.

To improve the trade balance production must be increased this phenomenon is known as Pollution Haven Hypothesis (PHH) (Tasri & Karimi, 2019). So, more production means more carbon emissions, following some recent studies like; Raza and Shah (2018), Andersson (2018), Sun et al. (2019), Hasanov et al. (2018), Mahmood et al. (2020), Mutascu and Sokic (2020) have proved an increase in production can harm the environment. This literature about PHH would be helpful regarding hypothesis development.

The above-presented literature has discussed the subject matter very deeply. But the missing aspect is that no studies have discussed the nonlinear role of domestic and world income in the trade deficit countries of Asia. Moreover, the role of financial development and carbon emission was also missed for this region. However, some studies have discussed the pollution heaven hypothesis or simply the role of carbon emissions for trade but they did not discuss it for trade balance. These are the missing things in the literature which this study is trying to fulfill.

3. Data and Methodology

This study has utilized the secondary data for analysis from World Development Indicators (WDI). For this purpose, we have selected the countries like, Pakistan, India, Bangladesh, Turkey, Sri Lanka, Cambodia, Jordan, Tajikistan, Lebanon, Kyrgyz Republic, Armenia, Philippines, and Vietnam. These are the countries which are suffering from a consistent deficit in their trade balance. Moreover, the sample period is from 1990 to 2019. Below Table 1 is presenting the symbols and definitions of the variables which are the part of this analysis.

Table 1 –Variables used in this study

Variable (symbol)	Definition	Source
Trade Balance (TB)	Natural log of (Exports / Imports as % of GDP * 100)	WDI
Domestic income (YD)	Natural log of Gross National Income (constant US\$)	WDI
World income (YW)	Natural log of World GNI – Domestic GNI (Constant US\$)	WDI
Financial Development (FD)	Natural log of Domestic credit provided by the financial sector (% of GDP)	WDI
Carbon Emissions (CE)	Natural log of Volume of Total Carbon Emissions (kt)	WDI

This study has used the ratio of exports and imports as a percentage for estimating trade balance. There are several studies in the literature which have used the ratio of imports and exports (Phan & Jeong, 2015; Sharif & Ali, 2016; Ari & Cergibozan, 2017; Olczyk & Kordalska, 2018; Akoto & Sakyi, 2019). Moreover, this study has used gross national income as the independent variable (Iqbal et al., 2019). But some studies have used economic growth as a proxy of national income, these are (Azu & Abu-Obe, 2016; Ali, 2017; Jariya & Hassan, 2018; Weerasinghe & Perera, 2019). Moreover, this study hypothesized that increase in income caused to improve the trade balance. This study has also used

foreign income (Ari & Cergibozan, 2016; Mete & Bozgeyik, 2017; Iqbal et al., 2019). Basically foreign income is calculated by subtracting the income of sampled countries. This study hypothesized that increase in foreign income caused to increase trade deficit in selected countries. This study has incorporated the square term of both foreign and domestic income to check its nonlinear impact on trade balance (Chiang & Wainwright, 2005).

This study has also incorporated financial development using domestic credit provided by the financial sector. Several studies have proved that financial development can play a vital role for the trade balance (Ahad, 2017; Bilas et al., 2017; Yakubu et al., 2018; Rehman et al., 2020). In the perspective of financial development, this study hypothesized that an improved/increased level of financial development caused to reduce trade balance. As increase in domestic credit leads to increase in domestic investment, increase in access to financial market, and reduction in risk to acquire domestic debt for firms and government. This study also hypothesized that an increase in international trade may be linked to the pollution haven hypothesis (Andersson, 2018; Hasanov et al., 2018; Sun et al., 2019). In this context, this study has estimated three equations.

$$TB_{it} = \beta_{10} + \beta_{11} YD_{it} + \beta_{12} YD_{it}^2 + \beta_{13} YW_{it} + \beta_{14} YW_{it}^2 + e_{it} \quad -- (1)$$

$$TB_{it} = \beta_{20} + \beta_{21} YD_{it} + \beta_{22} YD_{it}^2 + \beta_{23} YW_{it} + \beta_{24} YW_{it}^2 + \beta_{25} FD_{it} + e_{it} \quad -- (2)$$

$$TB_{it} = \beta_{30} + \beta_{31} YD_{it} + \beta_{32} YD_{it}^2 + \beta_{33} YW_{it} + \beta_{34} YW_{it}^2 + \beta_{35} CE_{it} + e_{it} \quad -- (3)$$

While comparing the equation 1 with equation 2 and 3, this is a setup of with and without approach to estimate the effect of moderator variables such as FD and CE. The difference between β_{11} & β_{12} with corresponding slopes of same variables in other equations will identify the effect of inclusion moderator variables (Heyes, 2013).

To test the co-integration, below Table 4 is presented, where two co-integration tests are applied first one is Pedroni (Pedroni, 1999) co-integration test and second is Kao co-integration test (Kao, 1999) for all the three estimated models. Basically, Pedroni test is based on the residual auxiliary regression as presented in equation 7. So, this test calculated seven test statistics which are used to determine the presence of co-integration in the light of probability values.

$$e_{it} = \rho_i e_{i,t-1} + \sum_{j=1}^{p_i} \psi_{ij} + \Delta e_{it,j} + v_{it} \quad -- (4)$$

To estimate these coefficients, basically, two methods of estimation are used i.e., FMOLS (Fully Modified Ordinary Least Square) and DOLS (Dynamic Ordinary Least Square). Mujtaba et al. (2020) applied second generation unit root test due to the presence of strong cross sectional dependence, furthermore, the FMOLS and DOLS methods for estimation of coefficients are used for comparison of the results.

Basically to estimate the long run coefficients FMOLS and DOLS techniques are useful. FMOLS considered the issues pertaining to endogeneity, heterogeneous intercept term and removes the missing variables biases and homogeneity restrictions. On the other hand, to calculate robust results, DOLS can be applied even when the sample size is small, and it also removes the issue of simultaneity from the results. Additionally, the co-integrating vectors resulting from the DOLS techniques are asymptotically

efficient (Kovačević, 2017; Rehman et al., 2020).

4. Theoretical Model

In figure 2 the theoretical justification for the presence of non-linear relationship based on framework of (Haans et al., 2016). Firstly with the increase in the domestic income people will have higher purchasing power they will increase imports from abroad (shown in Figure 2a) (Rehman et al., 2020), along with this domestic income will motivate domestic producers to local substitutes to the imports which will gradually matures and gets exported (shown in Figure 2b) (Weerasinghe & Perera, 2019). The additive aggregation of these two phenomenon will lead to an inverted U shaped relationship. Similarly, when world income increases, it will increase domestic exports (shown in figure 2d) (Phan & Jeong, 2015) but simultaneously their businesses will also develop substitutes which may gradually become our imports (shown in figure 2c) (Mete & Bozgeyik, 2017). The additive aggregation of these two phenomena will lead to a U shaped and inverted U shaped relationship (Iqbal et al., 2019).

Figure 2: Theoretical Model

5. Results and Discussion

Below Table 2 contains a descriptive analysis of this study, for this purpose mean median, minimum, maximum and standard deviation for all the variable series are presented. The noticeable thing is the value of standard deviation is low from the mean in all the cases, which represents that the data is under dispersed. Moreover, the median is representing the central value of the data. To check the range minimum and maximum value is also reported in this table.

Table 2 – Descriptive Statistics

	TB	YD	YW	FD	CE
Mean	3.665700	24.67630	31.68084	3.744787	10.35938
Median	3.769366	24.60613	31.70623	3.895482	10.03883
Maximum	4.629618	28.66512	32.01615	5.312610	14.62126
Minimum	2.134511	21.58251	31.27055	1.666457	7.339629
Std. Dev.	0.567511	1.778350	0.227882	0.826169	1.788845

Figure 3 and 4 are presenting the relation of trade balance between domestic and foreign income. Figure 3 is showing as increase in domestic income trade balance deteriorates. And the figure 4 is showing an increase in foreign income improve the trade balance but later also deteriorate it.

Figure 3

Figure 4

To check the cross-sectional dependence table 3 is reported with CD test (Pesaran, 2004) for all variables of the model. As the results are significant so, the null hypothesis would be rejected, and the conclusion is that there is an existence of cross sectional dependence. So, the second generation unit root test cross-sectionally augmented IPS (CIPS) is applied (Pesaran, 2007). The significant test statistic of this unit root test is revealing all variables are stationary at first difference except world income. So, the mix order of integration is a sound base for long run coefficients.

Table 3 – Unit Root Test

	Pesaran CD Test	CIPS Unit Root Test	
Variables	Statistic	At Level	At First Difference
TB	2.478***	-0.781	-4.708***
YD	45.068***	2.430	-5.064***
YW	46.284***	-2.621***	-5.686***
FD	18.585***	1.560	-7.392***
CE	35.838***	2.294	-1.712**

***, **, *, is showing significance level; of 1%, 5% and 10% respectively

For the model 1 Group PP-Statistic and Group ADF-Statistic are confirming the existence of co-integration. For model 2, tests like Panel PP-Statistic, Panel ADF-Statistic, Group PP-Statistic and Group ADF-Statistic confirming the co-integration. For the model 3, Panel PP-Statistic, Panel ADF-Statistic, Group PP-Statistic and Group ADF-Statistic are confirming the existence of co-integration.

Table 4 – Co-integration test

	Model 1	Model 2	Model 3
Pedroni Co-integration Test			
Panel v-Statistic	-0.223	0.041	-0.592
Panel rho-Statistic	1.468	1.437	1.637
Panel PP-Statistic	-0.419	-2.022**	-1.717**
Panel ADF-Statistic	-0.683	-1.428*	-1.335*
Group rho-Statistic	2.614	2.789	3.003
Group PP-Statistic	-1.404*	-4.338***	-3.012***
Group ADF-Statistic	-1.402*	-3.099***	-1.447*
Kao Co-integration Test			
ADF	-2.519***	-2.353***	-2.902***

***, **, *, is showing significance level; of 1%, 5% and 10% respectively

For the long run estimated results, below Table 5 is presented, which contains two types of estimated models i.e., FMOLS and DOLS and both of these estimating techniques are showing consistent results. The coefficient of domestic income and its square have negative and positive signs respectively and it is a U-shaped relationship. It means that initially, an increase in income begun to deteriorate the trade balance but later on the increase in income caused to improve trade balance (Das, 2016; Hassan et al., 2017; Ali, 2017; Yakubu et al., 2018). The signs of these coefficients are confirming the theory discussed earlier. It could infer that initially when income increases economies have to depend on imports and due to this trade balance deteriorates. But when economies reach at the specific level of income, now they become economically efficient and start to increase exports (Jhingan 2006; Iqbal et al., 2019).

As the foreign income and trade balance as a deep connection. The estimated results of foreign

income and the square of foreign income are positive and negative respectively, and it is an inverted U-shaped relationship. The reason is very simple, when the income of the world economies increases, it results to increase in import goods and services and the trade balance of the selected countries improves as it has a positive sign (Ray, 2012; Alhanom, 2016; Mete & Bozgeyik, 2017; Chan, 2017; Akoto & Sakyi, 2019). But after a specific time period an increase in the income of the rest of the world is responsible for deteriorating the trade balance as the square of the world income is negative. The reason is very simple; now the world economies are producing import substitutes rather than depending upon imports (Iqbal et al., 2019).

The long run results also contain the impact of financial development for trade balance in both model of FMOLS and DOLS as they have confirmed the same signs. The positive sign of financial development means that an increase in financial development in the selected countries can improve the trade balance. Its economic reasoning is quite understandable as an increase in financial development means more investment which leads to more production and more production can improve the trade balance by increasing the exports (Ahad, 2017; Yakubu et al., 2018; Rehman et al., 2020).

The estimated results also confirmed that an increase in carbon emissions can improve the trade balance. The economic theory behind this finding basically has indirect relationship. An increase in production improves the trade balance but at the same time it also causes to increase carbon emissions as globalization in the perspective of trade is harming the environment by releasing the carbon emissions (Raza & Shah, 2018; Sun et al., 2019; Mahmood et al., 2020; Mutascu & Sokic, 2020). Though an increase in production causes to significantly improve the international trade but it can deteriorate the environment (Andersson, 2018; Hasanov et al., 2018).

Here it can be seen that with the addition of the financial development (FD) and carbon emissions (CE), the coefficients of domestic income and world income has changed which shows that both variables are causing significant moderation effect. For the case of financial development, the coefficient of domestic income decreases while world income increases. Similarly it increases the square of domestic income and square of world income. This means that for the trade of Asian economies, initially financial development is promoting imports that are why the effect of domestic income in trade balance is reduced and world income has been increased. But it is also promoting the sellers to develop products for export but that effect is very small as compared to import promotion.

For the case of carbon emissions, its inclusion has led to a significant decrease in coefficient of domestic income only. While it has increased the coefficient of square of domestic income only. It hints that pollutions firstly increases the imports of goods which help in retention of health, further increase in CO₂ indicate weak institutional quality leading to exports via pollution haven hypothesis.

Table 5 – FMOLS and DOLS Estimated Results

FMOLS			DOLS		
Model 1					
Variables	Coeff.	T-Stat	Variables	Coeff.	T-Stat
YD	-2.091***	-3.659	YD	-2.318***	-4.021
YD ²	0.048***	4.300	YD ²	0.049***	4.368
YW	61.964**	2.219	YW	55.867**	2.023
YW ²	-0.984***	-2.226	YW ²	-0.883**	-2.019
Model 2					
YD	-2.358***	-4.019	YD	-2.528***	-4.349
YD ²	0.051***	4.538	YD ²	0.056***	4.872
YW	79.756***	2.972	YW	64.062**	2.373
YW ²	-1.266***	-2.980	YW ²	-1.018**	-2.383
FD	0.178***	3.557	FD	0.140***	2.749
Model 3					
YD	-2.367***	-4.219	YD	-2.367***	-4.219
YD ²	0.046***	4.137	YD ²	0.046***	4.137
YW	46.545*	1.715	YW	46.545*	1.715
YW ²	-0.735*	-1.711	YW ²	-0.735*	-1.711
CE	0.273*	2.366	CE	0.273***	2.365

***, **, *, is showing significance level; of 1%, 5% and 10% respectively

6. Conclusions and Policy Implications

The purpose of this study is to empirically test how domestic and foreign income are affecting the trade balance of those countries which are facing persistent deficit in trade balance. The nonlinear relationship of the deficit in trade balance and domestic income (sample countries) and world income was tested by using the FMOLS and DOLS estimation technique. The study results validated the existence of U shape curve for the domestic income and inverted U shape curve for World income. The U shape curve for domestic income denotes that the deficit in trade balance initially decreases with the increase in income and after a certain level of income the deficit in trade balance starts improving. However, an opposite situation is revealed by the inverted U shape curve for world income which denotes that initially increase in trade balance and after a certain level of income, the deficit in trade balance starts increasing.

The whole interpretation of a U curve for domestic income and inverted U curve for foreign income represents important information in the sense when the relationships tend to change. The role of financial development is positive and significant, which evinced that the improved financial development reduces the deficit in trade balance. Furthermore, the carbon emissions also reported the positive and significant coefficient indicating that the increased carbon emissions is the sign of increased production activity in the form of exports, which ultimately reduces the deficit in trade balance.

The foremost important aspect of the analysis is the expansion in the income with special focus for increase in exports. Therefore, the finance and the planning divisions of the developing countries must pursue policies based on the relative position of domestic and world income. The role of financial development is highly important to facilitate the economic activity, which ultimately is very helpful in reducing the deficit in trade balance. To achieve the higher level of financial development, it is necessary that the central banks of the developing countries in collaboration with finance divisions must introduce such policies that must promote rapid growth in the financial development sector.

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