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## New Direction to Evaluate the Economic Impact of Peace for Bilateral Trade among World Economies

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Earlier researchers have been working to relate globalisation, trade or free trade as an instrument for bringing peace and reducing conflict in the world. But this study attempts to open up a new debate that how social unrest in terms of lack of pace in nations leads to failure of economic policing and outcomes. In past, few researchers have tried to show peaceful environment as a generator for economic progress by building theoretical models, but limited empirical analysis has been conducted so far. This brings a novelty in the present study that for the first time a large set of data covering 155 nations has been used to explore the relationship between these two desired variables i.e. trade related variables and peace, in new direction and employing new indicators defining extent of peace in nations. Panel co-integration technique has been applied along with Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) models to know the parametric and non-parametric point estimates of variables. Data has been extracted from Economic Institute of Peace and World Bank for the time period 2008-2014. Results showed that lesser number of attacks are associated with more volume of trade among nations and better relations with neighbouring countries are linked positively with trade performance of nations. Nations involved more into hostility acts like conflicts are unable to maximise the benefits from bilateral trade.

*JEL Classification:* F10, D74, L33, C23.

*Keywords:* Globalisation, Trade, Conflict, Terrorism, Panel Model.

### 1. INTRODUCTION

Globalisation has been a source of free flow of capital, information, technology, goods and services, and labour has benefited the greater economies considerably well integrating themselves in economic, political, and social affiliations. Hence, this led to the promotion of peace, liberty, freedom of thoughts and speech among the masses through this interconnectedness. But story does not end here because on the one side where this trans-nationalism has converted the world into ‘global village’ and helped in reducing starvation and improving the living standard of people of the world but on other side this has increased the threats to the security related matters of the nations. Because freedom of expression, easy immigration policies and duty free trade has made it convenient to indulge into

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malpractices and catastrophic activities. This is the reason that now the world is experiencing conflicts, and violent activities not only at internal level but this has been phrased by world analysts as 'transnational terrorism' which is sabotaging the real essence of globalisation. Disruptions, due to such social cause retard economic activities even being globalised at world level. Developing nations are the evident specimen of such crucial link between integration of economies and increased rate of terrorist activities. All this resulted in less confidence by the investors, and traders to enter into the markets of these nations because of such uncertainties and environmental insecurities. Usual perception is that terrorism increases risks and instils fears among masses, which lessens trade and investment activity through imposing high transaction costs on the targeted nations. Such events also effect capital mobility and expected profit rates in financial markets. And it is being proved that in economies, where such attacks become large in number, then the governments divert its expenditure from development projects towards military and defense which does not help in increasing the GDP size of the economy [Eldor and Melnick (2004)]. Hence peace can be considered as one of the most important driving force for motivating the economic players for starting some activity. Trade is such a dynamic sector of any economy which deals with two major economic actors i.e. exporters and importers. Both are very sensitive to the political and economic security concerns regarding their investment plans. In case of any such issue, both will show reluctance to participate in income generating activities, which will ultimately hinder the economic growth. It is perceived that trade may have a welfare effect for both the exporting and importing nations, through co-operation among them which may lead to more peace and prosperity on both sides. These were the liberals who after WWII actually tried to divert the attention of the world that co-operation among economies bring 'peace' in the world. This co-operation helps to interconnect nations with each other changing the world into more globalised place. However, at present times, world is experiencing again a 'realist's behaviour' from different capitalist nations to influence and extract the resources of poor and underdeveloped economies. On the one side, international regimes like WTO, World Bank and IMF are trying to offer such policies to developing nations, for an easy access to the world markets. But on the other side, different conflicts and wars initiated by developed economies, for their personal interests are creating insecurities in their internal market structures which are proving hazards for their survival. International trade no doubt had surpassed the boundaries of globalisation. It is worth saying that free trade has not only been served as an engine of growth, but it also accelerated the nation's standards of living. Nowadays almost all of world nations are involved in trading goods and services across their boundaries, but also prone to transnational violent activities within the national boundaries. Such contradiction between economic policy and social behaviours has forced the world to make reconciliation. The questions that lie in the heart of that reconciliation is that as to how conflict and economic management of resources are inter-related, and in what ways such activities can be minimised by making regional blocks, so that the reservoirs of such parasites could be destroyed. This study is an attempt towards this thought that how peaceful nations are attracting more traders and investors within the nations. With the

passage of time the direction of the connection between these two variables has changed i.e. now it is from peace to trade not as trade to peace. The reason is at present times the most critical issue for developed and developing nation is not the 'choice of policy', rather it is about the social evils among which 'terrorism' is heightened off late. Conventional perception is that this act infuses 'fear factor' in the minds of economic actors, which ultimately stops them to enter into such environmentally hazardous nation. Hence, this study tries to explore a relationship by using various indicators for measuring the extent of peace among nations and trade volumes and flows. The novelty of this study, is that earlier research have relied on the relations between conflicts and trade for concluding that trade helps in minimising such violence and increase peace within the nation. But for the first time, this study employed a new set of variables for measuring peace which include relations with neighbouring countries, imports of weapons of destruction and reported terrorist attacks per year. Analysis is covering maximum number of nations of the world in general for which data is available.

### 1.2. Objectives

Following are the three main objectives of the study:

- To explore the effects of neighbouring country relations for different dimensions of trade i.e., exports, imports and trade openness.
- To analyse the relationship between terrorist activities, trade volume and trade openness in the world.
- To investigate that how much the extent of conflicts among nations is affecting trade volumes and openness process in world economies.

### 1.3. Hypotheses

- **H<sub>1</sub>**: There is a significant effect of neighbouring relations on trade volumes and trade openness.
- **H<sub>2</sub>**: There is a significant relationship between terrorist activities, trade volumes and trade openness.
- **H<sub>3</sub>**: There is a significant relationship between the conflict, trade volumes and trade openness.

## 2. LITERATURE REVIEW

This research aims at finding out the relationship between trade and peace in a direction different from tradition, one which has been this that more trade connections lead to more peace. This study focuses on how more peaceful environment help in making more trade relations among economies. Much literature exists on the former link, while on the behalf of later, only few attempts have been made which have been discussed below in this section.

Nitsch and Schumacher (2003) observed the effects of violence, terrorism, conflicts, and warfare on bilateral flows at global level. These authors analysed the

relationship by using augmented gravity model for 200 countries for a time period of 1960-1993. Large scale violence, terrorist activities, external conflicts has been taken as independent variable while the effects of these variables were investigated on trade. They investigated that as number of terrorist activities within a nation increases results in decline in bilateral trade flow. While, as we double the number of terrorist activities, the amount or level of bilateral trade decreases by 4 percent.

McKenna (2005) observed short term and long term effect of transnational terrorism on trade and concluded that terrorism acts like a transaction costs upon the economies and leaves a strong negative impact on intra and inter industry trade. And this negative implication of terrorism can be more for South-South trade relative to North-North trade. Moreover author suggested that more liberal and democratic system can be helpful in avoiding deleterious effects of terrorism quickly.

Bandyopadhyay and Sandler (2013) observed the economic burden of terrorism by analysing 78 developing countries for the time period 1984-2008. The authors argued that terrorism could have repercussions in the form national income loses, growth retarding effects, dampened foreign direct investment and disparate effects on international trade. The study also found out that on average a small increase in domestic terrorist incidents per 100,000 reduces net foreign direct investment by a considerable amount. In addition smaller developing economies are more vulnerable to terrorism than rich and diversified economies.

Bandyopadhyay and Sandler (2014) attempted theoretically using factor-supply approach to relate terrorism with trade flows, and concluded that terrorism necessarily affects negatively to the traders and investors. However, this effect can be reduced by introducing effective counter terrorism strategies.

### **3. THE VIRTUOUS CYCLE: A LINK BETWEEN PEACE AND ECONOMIC ACTIVITY**

Bhagwati and Srinivasan (2002) have described that when a nation opens to free trade, it exhibits high growth rate and poverty alleviation measures become the radical standpoint of the government. More peace means less terrorist attacks, more harmonious relationship among neighbouring nations and lesser conflicts. Moreover, economic interdependence greatly reduces the chances of conflicts among states [Oneal, *et al.* (2003). Lee and Pyun (2013) also studied that bi-lateral trade and economic openness among states deters military conflicts. Basing on such findings of different researchers, this study builds its framework which aims to relate various indicators of peace with trade related measures in terms of its volume and flow overall, but in a different direction i.e. peace to trade. The mechanism through which these indicators affect economic activity is trust building and confidence level. These two mediating factors open up the doors for trade and investment activities. And when the environment will be considered safe for doing business, then it will ultimately lead to more employment opportunities, increased foreign direct investment (FDI), more exports, lesser dependence on imports and trade not only inter industry, but intra industry will be boosted up. This can be understood with the help of the diagram given below.

**Fig. 1. Author Own Compilation of Idea: Virtuous Cycle of Trade, Conflict and Peace Level**



Here, trade has been used as economic outcome specifically. The schematic diagram is displaying that how these three factors can contribute in generating economic activities smoothly in the economies. If all these three indicators are moving in the desired direction then size of the economy will start increasing, lesser incidence of poverty and few chances of corruption will be found. When evils like poverty and corruption will start coming to end or at least minimising then the society will enter into its 'Virtuous Circle' where economic activities lead to prosperity in terms of more income levels and this prosperity will again add more to the generation of wealth. This is what the present study intends to find that how peace conditions help nations to come out of their 'Vicious Circle' and prove themselves as the competent one by their sound and satisfactory environment for traders and investors.

#### 4. METHODOLOGY

As the aim of the study is to find that whether conflict, peace and trade are related to each other or not; for this purpose the designed methodology in literature is Panel Co-integration. Using panel of 155 nations of the world and time span ranging from 2008-2014, this study attempts to find not only co-integration among desired variables, but also the nature of the relationship among these variables. For this purpose, parametric and non-parametric techniques fully modified ordinary least squares (FMOLS) and Dynamic ordinary least squares (DOLS) have been employed. Panel unit root test is used to check the stationarity of the data. For this purpose, two types of tests are used i.e. Levin, Lin and Chu (LLC) and Im, Peasran, and Shin (IPS). However, the estimation is done by developing three models in log-linear form. We transformed the dependent variable in to log, because there may be a chance of non-linear relationship among the dependent and independent variables. In addition, a highly skewed variable can easily be transformed in to normal variable with the help of log.

$$\text{Log } T_{i,t} = \alpha + \beta WI_{i,t} + \gamma TA_{i,t} + \lambda NCR_{i,t} + \text{Controls}_{i,t} + e_{i,t}$$

Here  $T$  shows various measures of trade i.e. Exports, Imports and Openness. For measuring Peace three variables have been used which indicates the extent of stable and peaceful environment of an economy. These include Number of terrorist attacks (TA), Weapon imports (WI) and relations with neighbouring country (NCR). Weapon imports also help us in measuring the effect of conflict. Below is given the detailed structured methodology along with sources and definition of variables.

#### 4.1. Panel Unit Root Tests

This is the pre-requisite for applying co-integration techniques. For this purpose various tests have been proposed with varying null hypotheses. But this study employs the following two given below which have the null hypothesis that there does not exist unit roots.

##### 4.1.1. Common Unit Root Process: (LLC)

##### 4.1.2. Im, Peasran, and Shin (IPS)

#### 4.2. Panel Co-integration

Second step is to find the long run co-integration among proposed variables, and for this purpose Pedroni test has been used in this study. It is based on seven statistics, out of which first four are based on within dimension, and last three are grounded on between dimensions. For panel co-integration within dimension, the procedure for testing the null hypothesis of no co-integration test is as follows:

$$H_0 : y_i = 1 \text{ for all } i$$

$$H_1 : y_i = \gamma < 1 \text{ for all } i$$

For between dimensions, no co-integration null hypothesis for panel co-integration test is

$$H_0 : y_i = 1 \text{ for all } i$$

$$H_1 : y_i < 1 \text{ for all } i$$

We compute the residual of regression from the hypothesised regression of co-integration:

$$y_{i,t} = \alpha_i + \delta_i t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2i,t} + \dots + \beta_{Mi} x_{Mi,t} + e_{i,t} \quad t = 1, \dots, T; i = 1, \dots, N \quad (1)$$

$N$  shows number of individual members in panel,  $T$  shows number of observation over time,  $M$  refers to number of regression variables.  $Y$  and  $x$  are considered to be integrated of order 1.

To estimate the residual from Equation 1 Pedroni seven statistics are:

$$1. \text{ Panel } v\text{-statistics: } T^2 N^{3/2} Z_{\hat{\rho}_{N,T}} \equiv T^2 N^{3/2} (\sum_{i=1}^N \cdot \sum_{t=1}^T \cdot L_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-1}$$

#### 2. Panel $\rho$ -statistics

$$T\sqrt{N} Z_{\hat{\rho}_{N,T-1}} \equiv T\sqrt{N} (\sum_{i=1}^N \cdot \sum_{t=1}^T \cdot \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-1} \sum_{i=1}^N \cdot \sum_{t=1}^T \cdot \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$$

**3. Panel t-statistics**

$$Z_{t,N,T+1} \equiv (\hat{\sigma}_{N,T}^2 \sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-\frac{1}{2}} \sum_{i=1}^N \sum_{t=1}^T L_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

(Non Parametric)

**4. Panel t-statistics**

$$Z_{t,N,T+1}^* \equiv \tilde{s}_{N,T}^{*2} \sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-\frac{1}{2}} \sum_{i=1}^N \sum_{t=1}^T L_{11i}^{-2} \hat{e}_{i,t-1}^* \Delta \hat{e}_{i,t}^* \text{(Parametric)}$$

**5. Group p-statistics**

$$TN^{-1/2} \tilde{Z}_{\hat{\rho}_{N,T-1}} \equiv TN^{-\frac{1}{2}} \sum_{i=1}^N (\sum_{t=1}^T \hat{e}_{i,t-1}^2)^{-1} \sum_{t=1}^T (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

**6. Group t-statistics**

$$N^{-1/2} \tilde{Z}_{t,N,T+1} \equiv N^{-\frac{1}{2}} \sum_{i=1}^N (\hat{\sigma}_i^2 \sum_{t=1}^T \hat{e}_{i,t-1}^2)^{-\frac{1}{2}} \sum_{t=1}^T (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

**7. Group t-statistics**

$$N^{-1/2} \tilde{Z}_{t,N,T+1}^* \equiv N^{-1/2} \sum_{i=1}^N (\hat{s}_i^{*2} \sum_{t=1}^T \hat{e}_{i,t-1}^2)^{-1} \sum_{t=1}^T \hat{e}_{i,t-1}^* \Delta \hat{e}_{i,t}^* \text{(Parametric)}$$

Where,

$$\begin{aligned} \hat{\lambda}_i &= \frac{1}{T} \sum_{s=1}^{ki} (1 - \frac{s}{ki+1}) \sum_{t=s+1}^T \hat{\mu}_{i,t} \hat{\mu}_{i,t-s}, \hat{s}_i^2 \equiv \frac{1}{T} \sum_{t=1}^T \hat{\mu}_{i,t}^2, \hat{\sigma}_i^2 = \hat{s}_i^2 + 2\hat{\lambda}_i, \hat{\sigma}_{N,T}^2 \\ &\equiv \frac{1}{N} \sum_{i=1}^N L_{11i}^{-2} \hat{\sigma}_i^2 \\ \hat{s}_i^{*2} &\equiv \frac{1}{T} \sum_{t=1}^T \mu_{i,t}^{*2}, \hat{s}_{N,T}^{*2} \equiv \frac{1}{N} \sum_{i=1}^N \hat{s}_i^{*2}, \hat{L}_{11i}^{-2} = \frac{1}{T} \sum_{t=1}^T \hat{\eta}_{i,t}^2 + \frac{2}{T} \sum_{s=1}^{ki} (1 - \frac{s}{ki+1}) \\ &\quad \sum_{t=s+1}^T \hat{\eta}_{i,t} \hat{\eta}_{i,t-s} \end{aligned}$$

Residuals  $\hat{\mu}_i, \hat{\mu}_{i,t}, \hat{\eta}_{i,t}$  are found from the following:

$$\begin{aligned} \hat{e}_{i,t} &= \hat{y}_i \hat{e}_{i,t-1} + \hat{\mu}_{i,t} \hat{e}_{i,t} = \hat{y}_i \hat{e}_{i,t-1} + \sum_{k=1}^{Ki} \hat{\rho}_{i,k} \Delta \hat{e}_{i,t-k} + \hat{\mu}_{i,t}^* \Delta y_{i,t} \\ &= \sum_{m=1}^M \hat{b}_{mi} \Delta x_{mi,t} + \hat{\eta}_{i,t} \end{aligned}$$

The first statistics of panel co-integration is a form of non-parametric variance ratio statistics. The second is non-parametric statistics, Phillips Peron rho statistics. The third one statistics is non-parametric, Phillips and Peron t-statistics. The fourth one is statistics of simple panel co-integration, corresponding to Aug- dickey-fuller t-statistics and the remaining three are based on group mean approach.

**4.3. Variables and Data Sources**

The following list of variables has been used in this study where the data has been collected thereby from the world bank and vision of humanity.

**4.3.1. Variables for Measuring Extent of Peace**

- Weapons Imports (WI)

It is defined as the transfer of equipment or technology from a country’s rebel force or organisation to another country. This may include aircraft, armoured vehicles, radar system, missiles and engines. Source: Vision of humanity (2014).

- Terrorist Activities (TA)

It is being calculated by using weighted average of last five years of number of properties damaged, number of fatalities, and number of injuries from such attacks. Source: Vision of humanity (2014).

- Neighbouring Country Relation (NCR)

This variable is measured as the qualitative assessment of countries relationship with one another. They are ranked qualitatively as (1-5) very low and very high respectively. This ranking has been done by the Economists Intelligent Unit. Source: Vision of humanity (2014).

#### 4.3.2. Variables for Trade

- Trade (T)

It is defined as the trade in goods and services i.e. exports and imports of these goods and services as a percentage of GDP. Source: World Bank Indicators (2013).

- Imports (M)

Imports of goods and services have been selected from WB dataset. It can be illustrated as inflow of goods and services from other countries to one's own country. Imports may be comprises of merchandises, transport, freight, license fees, and other services like financial, business, and government. Source: World Bank Indicators (2013).

- Exports (X)

It is defined as outflow of goods and services from own country to other countries. Source: World Bank Indicators (2013).

#### 4.3.3. Control Variables

Following variables have been used as control variables in the designed model specification.

- Foreign Direct Investment (FDI)

It is defined as: "Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP". Source: World Bank Indicators (2013).

- Real Effective Exchange Rate (RER)

It is defined as: "Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs". Source: World Bank Indicators (2013).



- Country Size (CS)

Population has been used to measure the size of nation. It is defined as: “total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship—except for refugees not permanently settled in the country of asylum—which are generally considered part of the population of their country of origin”. *Source*: World Bank Indicators (2013).

- Growth Rate of GDP (GGDP)

It is defined as: “annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources”. *Source*: World Bank Indicators (2013).

## 5. ESTIMATION

Now after discussing in detail the methodology and variables, this section covers the estimation results. For this purpose, following procedure has been made stepwise.

### 5.1. Panel Unit Root Tests

In the first stage, we applied tests to observe the stationarity of the selected desired variables. This has been done by employing those two test discussed with detail in above section. For applying co-integration technique, all variables are supposed to be stationary at first difference. However, the results for both cases i.e. at level and first difference of the variables have been reported. Table 1 shows the stationarity of variables both at level

Table 1

*Panel Unit Root Test at Level*

Variable	Situation	Level		First Difference	
		Common Unit	Individual Unit	Common Unit	Individual Unit
		Root	Root	Root	Root
		LLC-ADF	ADF-IPS	LLC-ADF	ADF-IPS
Imports (M)	Individual	-0.4850	195.2991	-54.9195***	1660.0190***
	Intercept	(0.3137)	(1.0000)	(0.0000)	(0.0000)
Exports (X)	Individual	0.5146	196.4134	-47.2243***	1484.5817***
	Intercept	(0.6966)	(1.0000)	(0.0000)	(0.0000)
Trade (T)	Individual	-0.1478	199.2712	-52.6197***	1599.5312***
	Intercept	(0.4409)	(1.0000)	(0.0000)	(0.0000)
Weapons Imports (WI)	Individual	0.1356	44.0612	-8.8298***	135.5839***
	Intercept	(0.5540)	(0.9730)	(0.0000)	(0.0000)
Terrorist Activities (TA)	Individual	2.9783	90.0167	-22.4995***	507.6310***
	Intercept	(0.9986)	(1.0000)	(0.0000)	(0.0000)
Neighboring relation (NCR)	Individual	-1.9037	104.4610	-18.7120***	200.8471***
	Intercept	(0.1280)	(1.0000)	(0.0000)	(0.0000)
Foreign Direct investment (FDI)	Intercept and	3.7645	12.0074	-27.8810***	-33.8610***
	Trend	1.0000	1.0000	0.0000	0.0000
Growth of GDP (GGDP)	Intercept and	7.0303	10.7221	-11.4130***	-16.8456***
	Trend	1.0000	1.0000	0.0000	0.0000
Country Size (CS)	Intercept and	13.0975	11.9553	-50.0974***	-69.0710***
	Trend	1.0000	1.0000	0.0000	0.0000
Real Exchange rate (RER)	Individual	5.8864	17.6621	-17.8542***	-23.6210***
	Intercept	1.0000	1.0000	0.0000	0.0000

and at first difference. Probabilities of proposed tests at level are unable to reject null hypothesis of the test and confirming that there exists unit roots in each case. While in the last columns on very right the P-values are supporting the alternative hypothesis of the tests and conclude that all series are stationary at first difference.

## 5.2. Panel Co-integration

After evaluating whether the series are stationary of one order, the next step is to analyse, whether variables are integrated with each other or not; so that we could move on to observe the nature of relationship among these as well. For this purpose, two type of tests have been applied i.e. Pedroni co-integration test and Kao test with the null hypothesis i.e. Series have no co-integration. The result can be shown in a tabulated form as follows:

Table 2

*Imports with Peace Indicators*

Within-Dimension	Imports	Between-Dimension	Imports
Panel v-statistics	-160.0578 (1.0000)	Group $\rho$ -statistics	2.1174 (0.7620)
Panel $\rho$ -statistics	-10.0061*** (0.0000)	Group pp-statistics	-7.7441*** (0.0000)
Panel pp-statistics	-9.6648*** (0.0000)	Group ADF-statistics	-8.0096*** (0.0000)
Panel ADF-statistics	-11.9865*** (0.0000)		

\*\*\*, \*\*, \*Shows level of significance at 1 percent, 5 percent, 10 percent respectively.

Results from the Table 2 shows that imports are co-integrated with the peace indicators of any nation which have been measured through a nation's relationship with its neighbouring nation, its terrorism activities and conflict ideology rejecting the null hypothesis of the test.

Table 3

*Exports with Peace Indicators*

Within-Dimension	Exports	Between-Dimension	Exports
Panel v-statistics	-127.8756 (1.0000)	Group $\rho$ -statistics	-7.0412*** (0.0000)
Panel $\rho$ -statistics	4.3655 (1.0000)	Group pp-statistics	-8.0007*** (0.0000)
Panel pp-statistics	-9.8456*** (0.0000)	Group ADF-statistics	-3.7106** (0.0006)
Panel ADF-statistics	-7.0875*** (0.0000)		

\*\*\*, \*\*, \* Shows level of significance at 1 percent, 5 percent, 10 percent respectively.

Similarly Table 3 shows that exports are also co-integrated with peace and conflict indicator at 1 percent level of significance.

Table 4

*Trade Openness with Peace Indicators*

Within-Dimension	Trade openness	Between-Dimension	Trade Openness
Panel v-statistics	-100.9602 (1.0000)	Group $\rho$ -statistics	-5.0980*** (0.0000)
Panel $\rho$ -statistics	-10.8660*** (0.0000)	Group pp-statistics	-3.0006*** (0.0034)
Panel pp-statistics	-9.0079*** (0.0000)	Group ADF-statistics	-7.6890*** (0.0000)
Panel ADF-statistics	-3.8096*** (0.0045)		

\*\*\*, \*\*, \* Shows level of significance at 1 percent, 5 percent, 10 percent respectively.

Table 4 explains the same tests statistics, but for evaluating the co-integrating level between trade openness and many variables related to peace level, conflict intensity and terrorist activities. Results again reject the null hypothesis of the test and confirm that there exists co-integration among the specified variables at 1 percent level of significance.

**Table 5.3. Kao Test**

This is also one of the tests to confirm that whether these variables imports, exports, and trade openness are co-integrated with peace, terrorism and conflict intensity or not? Results from Table 5 again prove the existence of long run relationship among these variables i.e. exports and imports and trade openness are related to peace, terrorism and conflict. Table given below shows these results and statistics help to reject the null hypothesis at 1 percent level of significance.

Table 5

*Results from Kao Test*

Null Hypothesis	Exports	Imports	Trade Openness
No Co-integration	-19.5720*** (0.0000)	-17.4500*** (0.0000)	-22.8645*** (0.0000)

\*\*\*, \*\*, \* Shows level of significance at 1 percent, 5 percent, 10 percent respectively.

**5.4. Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) Estimation Techniques**

Technically, it is believed that when long run association is found among desired variables then we can work on finding the strength and nature of those variables in terms of long run coefficients. For this purpose, literature suggests two approaches; out of which one is parametric and the other is non-parametric. Non-parametric is called Fully Modified OLS developed by Pedroni (1996, 2000) and parametric is Dynamic OLS

developed by Kao and Chiang (1999). The imperative advantage of these panel group estimators is that these allow the pooling of data in the presence of heterogeneity of co-integrating vectors. Results from both of these models are reported in Tables given below.

#### 5.4.1. Estimates Using Fully Modified OLS (FMOLS) Model

Table 6

*Results with FMOLS Model for All Three Dependent and Independent Variables*

Variables	Exports Volume (Model 1)	Imports Volume (Model 2)	Total Trade Flow (Model 3)
Intercept	1.6590*** [22.7710] (0.0000)	1.2297*** [21.0956] (0.0000)	2.6109*** [19.9961] (0.0000)
Weapons Imports (WI)	-0.0928*** [2.6219] (0.0007)	-0.0601 [1.5109] (0.1109)	-0.0719*** [4.8916] (0.0000)
Neighbouring Relation (NCR)	0.5018*** [-5.6729] (0.0000)	0.3710*** [-3.8819] (0.0000)	0.6291*** [-9.9120] (0.0000)
Terrorist Activities (TA)	-0.6209*** [-3.7109] (0.0000)	-0.4390*** [-7.8185] (0.0000)	-0.5721*** [-8.9018] (0.0000)
Foreign Direct Investment (FDI)	0.4543*** [11.0097] (0.0000)	-0.5765*** [-4.9110] (0.0000)	0.6096*** [3.9412] (0.0003)
Growth of GDP (GGDP)	0.2908*** [3.9567] (0.0000)	0.6654* [2.7129] (0.0598)	1.7021*** [4.9123] (0.0000)
Country Size (CS)	1.9970*** [4.7756] (0.0000)	-0.7865*** [-2.8196] (0.0030)	0.6104* [1.7009] (0.0891)
Real Exchange Rate (RER)	0.1357*** [7.7869] (0.0000)	-0.4508*** [-2.9012] (0.0021)	0.8104*** [3.0111] (0.0054)

\*\*\*, \*\*, \* Shows level of significance at 1 percent, 5 percent, 10 percent respectively. [ ] shows t-statistics while ( ) shows their respective probabilities.

Table 6 shows three models with respect to independent variables, i.e. model for exports, imports and total trade flow in terms of openness. In all the models main focused variables and controls have been kept same. For measuring peace among nations, three indicators have been employed i.e. import of weapons from a country's rebel force or organisation, relations with neighbouring countries and number of terrorist attacks reported per year. Expected relationship between these variables with respect to

dependent variables is that nations having more import of such weapons, will be considered less peaceful and its impact will be negative on each variable of trade dimension. Similarly, increasing better ties among world nation will bring more interconnectedness and harmonised relation with each other and this will lead to more peace. Therefore, its impact is expected to be positive for all three dimensions of the trade related variables. Likewise, for the last indicator number of terrorist activities measuring the peace extent among world economies, the expected nature of the relation is negative i.e. more activities reported lesser will be trade activity due to reduced security and confidence for investor and trader to visit the accused nation. In case of control variables being used in all three models, the anticipated relationship between FDI, growth of GDP and population with respect to trade volumes and flows is positive, while, for real exchange rate it is conditioned as to whether we could consider it for imports or exports. Most developing nations (which are larger part of dataset chosen for this study) are experiencing continuous depreciation of their currencies in exchange of foreign currencies, that is why, in this case this foreign exchange variable can have positive effect on exports and negative on imports, and this can lead to improve current account balance by increasing overall trade flows.

Now relating the estimated results with expected ones, it can be examined that signs of all three indicators measuring peace extent are in line with expectations. Variables Imports of weapons which are indicating the conflict situation of nations as well and terrorist activities are showing negative impact on both trade volumes and trade flows overall. Results suggests that one unit in the imports of destructive weapons affects exports negatively by 9 percent, imports by 6 percent and overall trade openness by 7 percent. It means that if nations are involved more in such exchange of such weapons, which disrupts the peace environment of the economies, then in such nations exporters are affected more, because they lose confidence of their foreign trading partners due to insecurities. Likewise, 1 unit change in terrorist activities is affecting 62 percent exports, 43 percent imports and 57 percent overall trade openness. While on the other side, the indicator measuring peace through relations with neighbouring nations is showing positive impact on each dependent variable confirming that harmonised relationships among nations region-wise can help them to increase their trade volumes and flows easily. Here 1 unit change in this variable is contributing directly to exports, imports and trade flow overall by 50 percent, 37 percent and 62 percent respectively. From the results, it can be concluded that the positive impact of this variable is quite high as compared to negative influence of earlier discussed two variables. It also shows the dire importance of developing such regional relations for improving conditions of the economies. In case of control variables for all models results are again supporting the theory that more FDI, GDP and population, can be helpful in increasing trade activities within the nations, but among all the more positive impact on exports and overall trade is of population. Similarly this factor is also affection most negatively on imports out of these three variables. Which informs that increasing population can also result in increasing demand, and which ultimately leads to have more burden on the current account of the BOP of nations. Impact of real exchange rate is found to be positive both for exports and overall trade flows, but negative for imports. As this study is using the data for all those nations for which, we could have the opportunity to extract peace related data, not focusing

specifically on developing of developed nations' scenario. But the number of developing nations is large in the selected panel, which are actually involved the persuasion of devaluation for correcting their disequilibrium in balance of payments. That is why the consequence of their exchange rate policy outweighs the other policy effects. Hence, basing upon this perception it can be concluded that these results are confirming the theory that devaluation makes exports cheaper and imports dearer. Moreover, mostly coefficients are found significant at 1 percent level of significant. All these results supports the three hypotheses of the study that peace related indicators have significant impact on trade volumes and total trade flows.

#### 5.4.2. Estimates Using Dynamic OLS model (DOLS) Model

Now to check the robustness of the estimates, a different panel data model technique has been applied on the same model specification. Reported coefficients for all variables are having the same signs as in case of above non-parametric technique FMOLS rather the significance has been improved of many variables in this model. Table 8 reports the results from the Dynamic OLS model (DOLS):

Table 7

#### Results with DOLS Model for all Three Dependent and Independent Variables

Variables	Exports Volume (Model 1)	Imports Volume (Model 2)	Total Trade Flow (Model 3)
Intercept	1.0960*** [26.6998] (0.0000)	2.2118*** [22.9719] (0.0000)	2.0012*** [30.7109] (0.0000)
Weapons Imports (WI)	-0.0893*** [4.6610] (0.0000)	-0.06290*** [3.0930] (0.0000)	-0.0719*** [3.9041] (0.0000)
Neighbouring Relation (NCR)	0.5209*** [-7.8910] (0.0000)	0.4310*** [-5.9180] (0.0000)	0.6317*** [-4.1940] (0.0000)
Terrorist Activities (TA)	-0.6190*** [-5.1901] (0.0000)	-0.4470*** [-3.3021] (0.0000)	-0.5729*** [-3.1983] (0.0000)
Foreign Direct Investment (FDI)	0.4590*** [9.9854] (0.0000)	-0.5990*** [-6.5109] (0.0000)	0.6190 [7.5110] (0.0000)***
Growth of GDP (GGDP)	0.2919*** [5.0912] (0.0000)	0.6781*** [5.5289] (0.0000)	1.7310*** [2.6728] (0.0005)
Country Size (CS)	1.9871*** [4.4567] (0.0000)	-0.7509 [-1.5197] (0.2870)	0.6298* [1.6810] (0.0980)
Real Exchange Rate (RER)	0.1489*** [6.7209] (0.0000)	-0.5064*** [-4.6718] (0.0000)	0.8123*** [-5.7719] (0.0000)

\*\*\*, \*\*, \*Shows level of significance at 1 percent, 5 percent, 10 percent respectively. [ ] shows t-statistics while ( ) indicates their probabilities.

Overall from the results given in Table 7, it can be concluded from all three models that those nations, where peace is being observed as a consequence of minimum terrorist activities, good relations with neighbours, and less conflicted nations, there will be high volume and flow of trade leading towards more economic prosperity. Hence on the basis of these findings, the study confirms all of three alternative hypotheses that there exists significant relationship between peace measuring indicators and trade volumes and trade openness.

## 6. CONCLUSIONS

This study has tried to analyse that how at present times, the effect peace-related indicators which have been captured through terrorist activities, interdependence of neighbouring countries, and intensity of conflict among nations is contributing to economic outcomes like trade volumes and flows. Employing the dataset of 155 nations for the time period 2008-14 and using the technique of panel co-integration along with FMOLS and DOLS models, the study reports that there exists long run co-integration between peace indicators and trade generation process. Moreover, the nations with more number of terrorist attacks, and those involved in imports of weapons of mass destruction are affecting negatively both to the trade volumes and trade flows of the economies of world. But on the other side, the effect of relations with neighbouring countries is showing very optimistic scenario, and indicating that the positive impact of this variable is more on the trade outcomes as compared to negative effect of other two variables measuring the extent of peace in the economies confirming the beggar-thy-neighbour argument in case of trade. Furthermore, the findings proved that in case of all three indicators measuring level of peace in a nation, impact on export volumes is more as compared to import volume and overall trade openness.

## 7. RECOMMENDATIONS

On the basis these findings, this study endeavours to give few suggestions for overall economies of the World that:

- Firstly these should try to avoid internal and external turbulence, and conflicts so that investors could find these nations more secure for realising their investment plans.
- Secondly all nations should also try to improve their relations with their neighbouring nations because this can help in building confidence among traders and investors.

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