Exchange Rate Risk and International Trade: The Role of Third Country Effect in Emerging vs. Developing countries

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Abstract

This study empirically explored the role of external exchange rate risk (third-country effect) along with the effect of bilateral exchange rate volatility on trade flows among countries for the time period of 2003-2019. The study relates to E7 ("Emerging 7") countries namely, China, India, Brazil, Mexico, Russia, Indonesia and Turkey, grouped together because of their major emerging economies, some developing countries namely, Malaysia, Pakistan, Poland, and Sri Lanka and their major trading partners. An autoregressive distributed lag (ARDL) approach to co integration has been used. Results suggested a trade-promoting impact of both bilateral and external exchange rate volatility. These findings supported the existence of Third Country Effect and co integration effects. Short run coefficients are found insignificant except for bilateral exchange rate and GDP of origin countries. It is a comprehensive cross-country analysis on the role of the third-country effect on international trade. Any trade adjustment programs that stimulate export expansion could be unsuccessful if exchange rates and third country exchange rates are unstable. Therefore, policy makers should take into consideration the volatility of real exchange rates between the currencies so policy actions aimed at stabilizing export markets can avoid the incidence of adverse outcomes.
Keywords: International trade, Exchange rate volatility, Third-country effect, ARDL

Introduction

International trade is a source of enhancement of interdependence among the countries as well as it increases the process of economic growth and development. One of the major determinants of international trade is the environment existing within and outside a country. Exchange rate developments and ongoing fluctuations are the part of such environment. Variability of bilateral exchange rate was the subject of investigation in most of existing studies, completely ignoring the instability effect of Third Country's exchange rate on trading activities (e.g. Baek, 2012; Wong & Tang, 2008; Baak, 2007; & Tenreyro, 2007).

Regarding the exchange rate risk-trade linkage, three different groups emerged as per the classification of extant literature. The first group was a supporter of a significantly positive impact of fluctuations in exchange rate on exports (e.g. Asseery & Peel, 1991), a negative influence of variability of exchange rate on exports was

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anticipated by the second group (e.g. Doğ˘anlar, 2002; Ariz *et al*., 2000), whereas the third group didn't find any evidence regarding presence of any sort of nexus (e.g. De Vita & Abbott, 2004; Bailey *et al*., 1986; Gotur, 1985). So, it is an ambiguous issue which raised the question i.e. what is the effect of fluctuations in exchange rate on global trade? So, further investigation is required.

Cushman (1986) was the first investigator who paid attention towards variability effect of external markets on trade flows and highlighted its role, while the previous investigation was related to bilateral rates only. It is denoted as the effect of Third-Country as well as the spillover effects from the external markets. Hodrick and Vassalou (2002) while analyzing the Third-Country approach favored the multi-country models as the best predictors of dynamics of exchange rate. The current study concentrates on the consequences of trade activities, pertaining to the discrepancies in exchange rate bilaterally and involves the Third-Country effect as well (Tunc et al., 2018; Soleymani et al., 2017; Baek, 2014; Choudhry et al., 2014; Bahmani-Oskooee *et al*., 2013).

Choudhry *et al*. (2014) inspecting the fluctuations in exchange rate as a determinant of real imports, encouraged to further explore "the third country effect" as a main subject of investigation in future research in other countries. Soleymani *et al.* (2017) explored the association between trade among four Asian countries and their trading partners and fluctuations in external exchange rate. Researchers were also motivated for doing further investigation in this field using disaggregated trade data. Tunc *et al*. (2018) empirically discovered the third country effect directing future investigation regarding this subject.

Based on past literature, the association between fluctuations in exchange rate and trade has offered mixed outcomes i.e. positive, negative and neutral. This contradiction in results motivates further investigation regarding this subject. Furthermore, mostly studies investigating the link between the international trade and exchange rate variations did not address the issue of "Third Country Effect". Few studies included this variable but it still could not be fully explored (Choudhry *et al.,* 2014; Bahmani-Oskooee & Xu, 2012; Hericourt & Nedoncelle, 2015), so, further analysis is required regarding the role and volatility effect of the external market, pertaining to emerging vs. developing economies.

The aim of the current investigation is to analyze the movements in nominal exchange rate bilaterally, with the main focus on the Third Country Effect for the exporting country on the value of exports. This investigation contributes to the literature in many ways. First, few studies regarding fluctuations in exchange rate and trade have included the Third Country Effect in their study (Choudhry *et al*., 2014; Bahmani-

Oskooee *et al*., 2013; Baek, 2014). Second, this study is unique as it covers the background of developing and emerging E7 countries. The past literature provides an evidence that up till now no such study has been conducted. Third, this study is a multi-country analysis as "the multi-country models" are deemed to be the best elaborator of "exchange rate dynamics" (Hodrick & Vassalou, 2002). It increases the generalizability of findings. Lastly, it is very helpful for international traders, market contributors, and strategy creators who have strong interest in risk generated by adverse movements in exchange rates globally (Arize, 1998; Choudhry, 2005).

The arrangement of the paper is as follows; a glimpse of relevant literature has been provided in the next section with data and methodology discussed subsequently. Then discussion regarding results is coded, next to which the ending remarks in the form of conclusion have been mentioned.

Literature Review

Mixed findings were provided in the earlier theoretical literature by various investigators. The supporters of fixed exchange rates believed on the trade discouraging effect of fluctuations in the exchange rate with increased risk (Barkoulas *et al*., 2002). This is a representation of attitude of risk averse traders as to protect themselves from losses attributable to exchange rates instability. De Grauwe (1988) opposed, by contrast, supporting the argument that highly risk-averse traders would show a trade promoting effect by increasing trade and profitability to offset any decrease in earnings due to uncertainty. Giovannini (1988) contended by putting forth an alternative evidence of absence of any trade related outcome of fluxes in exchange rate.

Diverse results were provided by empirical studies too. Daly (1997) and McKenzie and Brooks (1997) provided empirical evidence for positive and direct association between imports and exchange rate instability. While Rahmatsyah *et al*. (2002), Byrne *et al.* (2006), Bahmani-Oskooee and Kovyryalova (2008) confirmed this association to be indirect and negative instead of direct and positive.

Assessment of the existing literature put forth the fact that the exports are influenced in response to adverse movements in exchange rate and it was a theme of enquiry of a number of past works (i.e., Chalermsook, 2012; Chit & Judge, 2011; Tang 2011; Chit *et al*., 2010; Hall *et al*., 2010; Hudson & Straathof, 2010; Fang *et al*., 2009; Thorbecke, 2008; Chit, 2008; Wong & Tang, 2008; Tenreyro, 2007; Baak *et al*., 2007; Grier & Smallwood 2007). Lastly, the investigation theme of these studies does not cover the Third Country Effect.

Recently, Aftab, Syed, and Katper (2017) explored the link between Malaysian-Thailand mutual trade activities and exchange rate. They used mutual trade data of many exporting and importing industries. Using ARDL approach introduced by Pesaran, Shin,

and Smith (2001); they observed significantly positive influence of exchange rate for fifteen export industries. They provided a sector wise comparative analysis by including both exports and imports and their relative impact on trade balance.

By conducting a comparative study involving those countries having strong industrial base and using country-level export data, a practical evaluation of movements in external exchange rate and its role has been elaborated well in the earlier research work by Cushman (1986). For Pakistani context, the fluctuations in external exchange rate were tested by Kumar and Dhawan (1991). Chit *et al.* (2010) predicted that exports are influenced by exchange rate changes and trade is enhanced in response to effect of external market in five East Asian countries. Additionally, the real exchange rate bilateral influence (US money unit/Canadian money unit) on the trade actions between China and the US was inspected by Bahmani-Oskooee and Xu (2012). They showed significant short-period influence on trade by the effect of Third Country between China and the US.

M. Bahmani-oskoee *et al*. (2013) examined both the exports and imports between the US and Hong Kong. The empirical evidence for existence of a "Third Country Effect" was found. The short and long period outcomes of variations in exchange rate on trade activities between Korea and U.S., including "Third Country Effect" were observed by Baek (2014).

Choudhry *et al*. (2014) found that both sorts of tests (i.e. mutual and external) of exchange rate instability proved a significant causal link with imports of the UK. The external exchange rate affected the trade showing positive outcomes at firm level by Hericourt and Nedoncelle (2015) who utilized French firm-level data.

Bilateral exchange rate volatility and international trade

Theoretically a significantly negative association exists between international trade arrangements and instability of exchange rate. Greater cost for risk-averse dealers of international market and smaller volume of overseas trade were deemed to be the possible results of higher exchange rate instability (Arize, Osang, & Slottje, 2000). The opinion that reduction in international trade flows is the outcome of instability in exchange rates, is supported by numerous studies (Chowdhury, 1993; Arize, 1998,1995;Arize *et al*., 2000; Cheung & Sengupta, 2013; Tunc *et al.*, 2017) and the assessment of significantly productive influence of fluxes in exchange rate on trade arrangements globally, was stressed by many studies (e.g. Giovannini, 1988; Franke, 1991; Asseery & Peel, 1991; Sercu & Vanhulle, 1992; Dellas & Zilberfarb, 1993;Ozturk & Kalyoncu, 2009). While systematically indeterminate association between same variables was proved by De Grauwe (1988). Contingent on the fundamental source for the variation, Sercu and Uppal (2003) derived inconclusive results for explaining the linkage between trade flow in international market and exchange rate volatility. Cheung

(2005) derived same results of no effect. Same were the findings of Crosby (2004), Hondroyiannis *et al.* (2008), and Eicher and Henn, (2009) that there is no connection between instability and trade. So we can hypothesize it as

H1: *Bilateral exchange rate volatility has an impact on international trade.*

External exchange rate volatility (Third country effect) and international trade

The term, "third-country effect" was introduced by Cushman (1983, 1986) and measured as other trading partners' exchange rate variability other than to which a country is dealing. The same study on China's trade has been done by Bahmani-Oskooee, Hegerty, and Xu (2013). It was an expansion of the analysis done by Bahmani-Oskoöee and Hegerty (2008), who reviewed the link between disaggregated trade flows (export & import) and dollar-yen real exchange rate variability. The assumption of risk aversion of merchants was considered the main determinant of the outcome of augmented uncertainty of exchange rates on trade (Dellas & Zilberfarb, 1993; De Grauwe, 1988). The recent studies supported the judgment that higher external exchange rate volatility could compel traders to shift trade from one country to another country. Increase in exchange rate risk by introduction of external market effect is the reasonable explanation for such action (Baek, 2014; Bahmani-Oskooee & Xu, 2012). The role of external market effect for ASEAN-4 countries and their main trading associates was discovered by Soleymani *et al*. (2017). The study by Tunc *et al*. (2018) too provided a sound evidence of the trade-promoting external market effect on bilateral trade, using the Exporter Dynamics Database. More precisely, higher external exchange rate volatility opens new windows of opportunities for traders in the international market enabling them to exploit the circumstances for their interest by providing alternative marketplaces to shift trade from one market to another market in search of the most favorable destination. So we can hypothesize it as:

H2: *External exchange rate volatility has a positive effect on international trade.*

Methodology

The following section includes the description of sources used for data collection, the research framework and the econometric techniques used for this analysis.

Data collection

The dataset consists of data for 11 exporting countries (7 emerging and 4 developing) and 44 destination countries for the period from 2003 to 2019. The list of countries is presented in Table 1. Data collection has been done through World Integrated Trade Solutions, IFS and World Economic Outlook. It is purely an empirical analysis employing panel framework.

Table 1: *List of countries*

	Emerging countries		Developing countries
Exporting	Destination	Exporting	Destination
Brazil	Chile, China, Japan, Mexico	Malaysia	China, Singapore, Thailand, US
China	India, Japan, US, Pakistan	Poland	Australia, Pakistan, Russia, UK
India	China, Singapore, UK, Malaysia	Pakistan	China, Italy, Spain, UK
Indonesia	China, India, Japan, Singapore	Sri lanka	Australia, Singapore, Thailand, UK
Mexico	Brazil, Canada, China, Japan		
Russia	Belarus, China, Japan, UK		
Turkey	China, japan, Russia, Pakistan		

Variable Measurement

For current investigation, bilateral exchange rate volatility has been gauged through the standard deviation of the 12-monthly nominal exchange rate within a specific year. Various studies have employed this proxy while inspecting the link between volatility and trade such as Tunç, and Solakoglu (2016), Abdorreza-Soleymani and Soo. Chua (2014), Bahmani-Oskooee, Bolhasani,and Hegerty (2012), Bahmani-Oskooee and Hegerty (2009), Bahmani-Oskooee and Wang (2007), and De Vita and Abbott (2004) measured this variable in the same way.

The external exchange rate volatility (EV_{ij}) being representative of Third Country Effect, has been measured as, the trade-weighed volatility among all its destinations and exporting county (i) excluding the destination country (j):

$$EV_{ijt} = \Sigma\ tw_{ikt}*BV_{ikt} \qquad (1)$$

Where the trade weight tw_{ikt} is for specific destination k, of exporting country i at time t and BV_{ikt} represent bilateral exchange rate volatility. Recently, Tunc *et al*. (2018, 2020) measured external exchange rate volatility in similar way.

Econometric Model

Estimation is based on the econometric description given below:

$$lnX_{ijt} = \beta0 + \beta1 RCPI_{ij},\ t + \beta2 lnGDP_{i,t} + \beta3 BR_{ij},t + \beta4 lnBV_{ij},t + \beta5 lnEV_{i,t} + t + \varepsilon_{ijt} \qquad (2)$$

Here, the natural log signified by ln, the export's value is denoted by X_{ijt}, the relative consumer price indices are denoted by $RCPI_{ij,t}$, at a 2010 constant US dollar, the gross domestic products are represented by $GDP_{i,t}$ for exporting (i) country, the bilateral exchange rates (nominal) and bilateral exchange rate volatility (nominal) are represented by $BR_{ij,t}$ and $BV_{ij,t}$ respectively. $EV_{i,t}$ is the external exchange rate volatility for the country i (exporting) at time t. Finally, t signifies time-fixed effects.

Econometric Techniques

An improved version of the linear co integration method presented by Pesaran, Shin, and Smith (2001), the ARDL i.e. the asymmetric autoregressive distributed lag technique to co integration given by Shin, Yu, and Greenwood-Nimmo (2013) has been

used under in this study. The reason for choosing this method is that a single equation can be used for the assessment of short-period and long-period coefficients along with long run co integration test.

Data Analysis and Results

Data has been analyzed statistically. First of all descriptive statistics have been analyzed. Table 2 given below provides a glimpse of descriptive statistics concerning all the variables under contemporary enquiry.

Table 2: *Descriptive statistics*

Variables	Mean	Standard Deviation	Max	Min
Exports (bn US$)	18.2353	34.8867	180.5611	.1912
BV (%)	.0624	.2464	2.358	.0039
EV (%)	.0037	.0040	.0308	.0002
GDP-O (bn US$)	1471.6636	2002. 3167	1153.7160	37.1637
RCPI (%)	1.0102	.1689	1.3652	.5591
BR (US$)	24.6092	68.9594	146.7911	.0034

Current results show that on average the exports from emerging and developing countries to trading partners are worth 18.2353 billion US$ with 0.191 billion US$ as lowest and 180.5611 billion US$ as highest value. The value of standard deviation is 34.8867% which shows a greater deviation of values from mean value. Bilateral exchange rate volatility is on average 6.24%, and 24.64%. The external exchange rate volatility representing third country effect depicts on average 0.3 % volatility along with a standard deviation of 0.4%. The results for GDP of origin country are presenting 1471.6636 billion US$ as an average value for GDP of origin countries and the standard deviation of 2002.3167 billion US$. Table 2 presents mean value of 101.02% representing the average value, with the value of deviation from mean is 16.89% for relative consumer price index. Bilateral exchange rates possess an average value of 24.6092 US$. The value of standard deviation is 68.9594%.

To avoid biased and misleading findings, cross-sectional dependency tests have been applied. The results of the Breusch and Pagan (1980) LM test and scaled LM test (Pesaran, 2004) has been reported in the table below. Haseeb *et al.* (2018) and Lau *et al.* (2018) applied same two tests for checking cross-sectional dependency

Table 3: *Cross-sectional dependency Test*

Variables	Breusch-Pagan LM		Scaled LM	
	Stat	P-values	Stat	P-values
X	736.3388	.0000***	63.9142	.0000***
BV	444.4185	.0000***	36.0807	.0000***
EV	171.9363	.0000***	10.1006	.0000***
GDP-O	845.1626	.0000***	74.2902	.0000***
RCPI	697.4476	.0000***	60.2061	.0000***
BR	441.4044	.0000***	35.7934	.0000***

***$p<0.01$, **$p<0.05$, * $p<0.10$.

The highly significant p-values are an indication of presence of cross-sectional dependency in the panel data set under current investigation.

For data screening the data set for the stationary, the second-generation unit root tests have been applied. These tests have been selected as cross-sectional dependency exists panel data. Saud *et al.* 2019 adopted similar approach. Results for CADF and CIPS unit root tests introduced by Pesaran (2007) are stated in the table given below.

Table 4: *Panel Unit Root Test*

Variables	CIPS		CADF	
	At level	1st difference	P-values	1st difference
X	.0018***	.0010***	.0031***	.0046***
BV	.0002***	.0000***	.0015***	.0000***
EV	.0566*	.0000***	.0772*	.0000***
GDP-O	.4372	.0309**	.3127	.0740*
RCPI	.3880	.0000***	.4059	.0001***
BR	.7689	.0000***	.6918	.0000***

***$p<0.01$, **$p<0.05$, * $p<0.10$.

It is evident from Table 4, the order of integration for the RCPI, bilateral exchange rate and the GDP of origin countries is I(1) meaning that at first difference, they are stationary, while the integration order for the remaining variables is I(0) being stationary at level. So, Panel ARDL can be used as estimation technique.

Correlation matrix

Correlation matrix evaluates the rate of variation in dependent variable in response to a variation in the independent variable. This analysis is also helpful to detect the problem of multi-collinearity. The results of the correlation analysis are as given below:

Table 5: *Correlation Matrix*

	LNX	LNBV	LNEV	LNBR	LNGDP-O	RCPI
LNX	1					
LNBV	.0641	1				
LNEV	.1874	.2541	1			
LNBR	.3258	.1821	-.2071	1		
LNGDP-O	.7711	.1447	-.0685	.4765	1	
RCPI	.1297	.1664	.1672	-.0041	.1619	1

All the values displayed in the Table 5 are less than 0.65. It is an indication of the fact that the model does not suffer from the problem of multi-collinearity.

Optimal lag selection

The optimum number of lags is selected using hit and trial method. For the underlying VAR model, lag order was obtained and is offered in the subsequent table:

Table 6: *Statistics for Selecting the Lag Order*

Order of lags	AIC	SBC
0	14.7768	14.8897
1	-3.8374	-3.0468*
2	-3.9614*	-2.4931

As per the results presented in Table 6, the SC criteria favored the optimum number of lags that should be used for further analysis is one while the AIC favored maximum 2 lags. Based on AIC criterion, further analysis has been carried out.

Test of Cointegration

A test introduced by Kao (1999) has been used to confirm the presence of co integration among the variables. Framework of ADF has been utilized for this test and the value of t-statistic assumes homogeneity in panels. P-value and t-statistic for Kao test are presented below:

Table 7: *Results of panel cointegration test*

t-statistic	P-value
-3.2607	.0006***

At 1% level of significance the result is significant due to which the null hypothesis is discarded ensuring co integration exists. The alternative hypothesis is accepted, verifying the presence of co integration in the model supporting the argument that long-term relationships exist.

Long Run Model

The long period results for ARDL model are presented in the table given below.

Table 8: *Panel ARDL(2, 1, 1, 1, 1, 1, 1),Long Run Results; Dependent variable D(LNX)*

Regressor	Coefficient	Prob.
LNBV	.1857	.0001***
LNEV	.1825	.0000***
LNBR	-.9737	.0000***
GDP-0	-.1686	.2948
RCPI	-.4397	.1951

***$p<0.01$,**$p<0.05$,*$p<0.10$.

Table 8 demonstrates that the influence of the bilateral exchange rate volatility (BV) is significant and positive, that means the exports from the exporting country to the destination country increase due to a rise in the volatility (BV). Results support our H1 that **"**Bilateral exchange rate volatility has an impact on international trade". So, we have accepted H1, and under the current study it supports the positive influence of fluctuations in bilateral exchange rate (BV). The reason can be degree of risk aversion shown by exporters. The less risk averse exporters would increase their sales even in an uncertain environment believing that this uncertainty would be adjusted against the opportunity from price variability. While, instability of exchange rate generates more uncertain circumstances and exchange rate risk is aggravated which in turn raise cost of dealings for highly risk-averse traders and it results in lowering the foreign trade volume (Arize, Osang, & Slottje, 2000). Usually, traders try to avoid losses, especially, who are highly risk averse. They try to guard themselves against losses linked with exchange rate instabilities. This might be a possible cause of a negative influence of bilateral exchange rate unsteadiness on the international trade specifically exports. But in the recent era, the exporters show more flexibility, using hedging strategies and wisely reallocate their offerings among markets to maximize their profits from uncertain circumstances thus increasing volatility.

Empirically, an escalation in the volatility (BV) by 10 % results on average 1.857% increase in trade volume for the trading partners. This is in line with the findings of previous studies (Aftab, Syed, & Katper, 2017; Bahmani-Oskooee *et al.*, 2017; Ozturk & Kalyoncu, 2009; Broll & Eckwert, 1999) but contradicts the results of current empirical literature, that has reinforced the argument that exchange rate unsteadiness has a miserable influence on exports Kandilov (2008); Solakoglu *et al*. (2008); Cheung and Sengupta (2013); Hericourt and Poncet (2013); ,Tunc and Solakoglu (2016); Tunc *et al.* (2017).

Findings of current study display that the external exchange rate volatility (EV) also has significant and positive influence on exports, even though its magnitude is small.

Its mean exports increase because of an increase in variability of external exchange rate. These results also support H2 stating that fluctuations in external exchange rate have a positive influence on global trade. Hence, H2 is also accepted. The reason behind it is the currencies of all trading partners depreciate but this does not happen in the case of the currency of the destination j; more exports to the destination country j is the resulting outcome. As per results, if the all the destination countries' exchange rates increase by 10%, leaving the destination country j's exchange rate unchanged, then an increase is observed in exports to the destination country j by 1.825%. This interpretation of the result depicts the third-country effect on trade exists. Trade between two countries is influenced by the adverse movements in exchange rate of a third country and by the bilateral exchange rate too. Exports are positively influenced by the relatively stable exchange rate and its comparative volatility, as per the arguments built by Tunc *et al.* (2017) and Hericourt and Nedoncelle (2015).

Exporters are generally unhappy due to increased fluctuations in exchange rates, some may choose to be better off by increasing exports to other more favorable destinations. Increased external exchange rate volatility could compel traders to shift international trade from one country to another country by introducing more uncertainty. Though, the effect of the fluctuations in the exchange rate of external environment have smaller impact on export than the variations in bilateral exchange rate; the earlier one has indirect effect while the latter one affects export directly Significantly positive coefficient of external exchange rate volatility conjectures that as the exchange rate (bilateral) becomes more unpredictable, importers afraid of exporting country's imports shift to another country. Hence, it is better to diversify exporting destination to decrease the exposure.

As per the results displayed in Table 8 the bilateral exchange rate has a significant but negative effect on exports directing a decrease in exports against an increase in exchange rate. The possible reason could be a decline in the purchasing power of the destination country. As the currency of destination countries depreciates, a decline in the purchasing power of destination country occurs which result in lower exports to that destination country. Empirically, every increase in bilateral exchange rate would result in lowering exports up to 97.37 %. This is consistent with the findings of Ozturk and Kalyoncu (2009), but inconsistent with the findings of Soleymani and Chua (2017).

Short Run Dynamics

The short run dynamics for export model are given in Table 8. As supporting evidence of the presence of long period association, the error correction term must be significantly negative (Banerjee *et al.*, 1993). It is significantly negative in the projected export model, providing a sound signal for the presence of co integration. The coefficient

of error correction term signifies with how much speed long-run equilibrium is restored following a shock. The model indicates, the long run equilibrium is restored back up to 24.15% within one year. The results regarding short-run analysis reveals absence of significant volatility effects on exports.

Table 9: *Panel ARDL(2, 1, 1, 1, 1, 1, 1), Short Run Results; Dependent variable D(LNX)*

Regressor	Coefficient	Probability values
ECT (–1)	-.2415	.0003***
D(LNX(-1))	-.0436	.6110
D(LNBV)	-.0390	.1572
D(LNEV)	.0512	.7886
D(LNBR)	.8561	.0001***
D(LNGDP-O)	3.4414	.0570*
D(RCPI)	-.0149	.9855

***p<0.01, **p<0.05, * p<0.10.

Table 9 determines the short period results of proposed model, the GDP of origin countries and bilateral exchange rate which has significantly positive impact in the short period while all the other variables are insignificant as per the findings mentioned above. It means an undervalued bilateral exchange rate depresses exports up to 85.61 %   due to depreciation of currency which would decrease export earnings in the short run. The positive influence directs that with the bilateral exchange rate depreciation, the export demand increases. With the bilateral exchange rate's depreciation, export prices are reduced, and exports are enhanced. The result is in line with the study of Soleymani and Chua (2017), Di Nino *et al.* (2011) and Rodrik (2008).

The GDP of origin countries carries a significantly positive coefficient in export model suggesting that every increase in GDP of emerging and developing countries raises exports up to 34.41 %. It plays a key role in increasing earnings of emerging and developing countries from export to their trading associates. The result is harmonized with the study of Baek (2014).

Furthermore, to avoid model misspecification diagnostic tests were run and the noticeable econometric problems have been rejected through various diagnostic tests at 5% level of significance. The Breusch-Pagan test discarded the hypothesis justifying presence of heteroskedasticity and ensured the homoscedasticity in the disturbance term (Prob > $\chi2$ =   0.0617) and test for normality ensured residual normality. For the estimated model, the probability value for Ramsey's RESET test (Prob > F = 0.2494) indicated that there is no general misspecification. Though, the result of LM test (prob. χ^2 (1) = 0.0304) confirmed the existence of serial correlation in the residuals but it is not a serious problem as the estimates are not affected by the presence of autocorrelation.

The reason is the robustness of ARDL model against residual autocorrelation (Laurenceson & Chai, 2003).

Short Run Results :(Emerging Vs. Developing Economies)

Table 10a*: Panel ARDL (2, 1, 1, 1, 1, 1, 1), Short Run Results; Dependent variable D (LNX) (Emerging Economies)*

Variables	Brazil		China		India		Indonesia	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
ECT (-1)	-.0396	.0008***	-.0117	.0000***	-.7266	.0000***	-.2781	.0000***
D(LNX (-1))	.0134	.6246	-.0230	.6544	-.3175	.0238**	.0090	.6341
D(LNBV)	-.1211	.0040***	-.0546	.0001***	.1575	.0000***	-.0401	.0000***
D(LNEV)	.2580	.0016***	.0697	.0022***	-.3779	.0002***	.0259	.0019***
D(LNBR)	.6666	.0069***	.0602	.0000***	.2868	.3473	.8199	.0054***
D(LNGDP-O)	2.7086	.1516	3.2224	.2086	-4.6171	.4223	19.28	.3907
D(RCPI)	1.350	.2879	1.5295	.4130	2.3664	.4551	-1.560	.1376
	Mexico		Russia		Turkey			
ECT (-1)	-.5229	.0000***	-.0855	.0000***	-.2275	.0039***		
D(LNX (-1))	.0043	.1147	-.3268	.0000***	-.0261	.5309		
D(LNBV)	-.0134	.0000***	-.0408	.0000***	-.2158	.0010***		
D(LNEV)	-.2288	.0000***	.0995	.0000***	.2388	.0002***		
D(LNBR)	.2562	.0000***	.0902	.0043***	1.6056	.0804		
D(LNGDP-O)	.4149	.3702	.2894	.0006***	3.5393	.3113		
D(RCPI)	-6.890	.0626	-.3834	.0000***	.4834	.9086		

***p<0.01, **p<0.05, * p<0.10.

Table 10b*: Panel ARDL (2, 1, 1, 1, 1, 1, 1), Short Run Results; Dependent variable D(LNX) (Developing Economies)*

Variables	Malaysia		Pakistan		Poland		Sri Lanka	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
ECT (-1)	-.1963	.0000***	-.2274	.0001***	-.1403	.0000***	-.1950	.0025***
D(LNX (-1))	.1893	.0000***	.5680	.0019	-.0668	.0045***	-.5040	.0129**
D(LNBV)	-.02911	.0000***	-.0136	.0000***	-.0731	.0000***	.0151	.0007***
D(LNEV)	.1421	.0000***	.0251	.0018***	.03569	.0005***	-.0486	.0052***
D(LNBR)	.8191	.0001***	.6194	.0030***	1.9239	.0001***	1.2695	.0901
D(LNGDP-O)	2.2035	.0008***	-.4617	.7777	3.2162	.1819	6.0326	.34495
D(RCPI)	-.7541	.2078	.6878	.2254	3.2162	.0078***	0.7898	.6432

***p<0.01,**p<0.05,*p<0.10.

Both parts of Table 10 offers the short run dynamics of export model for emerging and developing countries separately for comparison. As shown in Table 10b

ECT (-1) is significant on 1 % level of significance in all emerging economies as well as developing countries indicating that the co integration exist in all cases. It means that long term relationship exists in all selected countries either they are emerging or developing economies.

The impact of fluctuations in bilateral exchange rate (BV) for emerging economies is significant and negative for all emerging countries except India. Thus it means that every rise in fluctuations in bilateral exchange rate draws diminution in exports of emerging economies to their trading allies. Similarly, the result is significantly negative in case of developing countries except Sri Lanka. These findings are reliable as this fact is also proved by previous studies such as Tunc *et al*. (2017). This represent the risk averse attitude of emerging economies in the short run that exporters reduce export due to higher exchange rate risk. Only India and Sri Lanka show the attitude of exporters that they boost up exports because of increase in bilateral exchange rate volatility, to compensate themselves in case of exposure to risk of exchange rate.

The volatility effect of external exchange rate is significantly positive for emerging economies except India and Mexico, representing an increase in exports as a result of increased instability in external exchange rate. Similarly, a significant positive influence of external exchange rate volatility is proved for developing countries except Sri Lanka. The reason is that the external exchange rate volatility aggravates over all exchange rate risk developing an attitude of exporting more shifting towards more favorable trading partner to realize more exports earnings. These findings are also in line with past research for instance the findings of research conducted by Hericourt and Nedoncelle (2015). The bilateral exchange rate has significantly positive impact in the short period for emerging and developing countries except India, Sri Lanka and Turkey. The positive influence directs that with the bilateral exchange rate depreciation, the export demand increases. With the bilateral exchange rate's depreciation, export prices are reduced, and exports are enhanced. Frequently the currencies of developing countries depreciate more and with larger magnitudes as compared to the currencies of emerging countries. The result is in line with the study of Soleymani and Chua (2017), Di Nino *et al.* (2011) and Rodrik (2008).

The GDP of origin countries is significant and positive only in the case of Malaysia and Russia, while insignificant in all other cases. The RCPI is significant for Poland and Russia and is insignificant for all countries.

Among these emerging and developing economies, China has a dominant position due to its fast-technological developments, introduction of financial marketization reforms, less financial constraints and barriers to exports. These unique characteristics of Chinese economy are gradually reducing the negative consequences of

exchange rate volatility on exports (Lucey *et al.,* 2019). Depending on the trading partner, differential effects of exchange rate risk have been documented. For China, Chinese inflation may have aggravated this currency risk, while internationalization of the Chinese currency, effective use of trade surplus and increasing availability of hedging instruments have mitigated its effects resulting an increase in exports to multiple destination countries (Smallwood *et al.,* 2019). For Chinese companies which rely on external finance, financial development in China is also less affected by the negative consequences of exchange rate volatility (Hericourt & Poncet; 2013). Due to these reasons China is in a position to easily cope with the negative consequences of exchange rate volatility and enhance their export level.

Conclusions

Following the research done by Tunc *et al.* (2018), the current study has investigated the effect of external exchange rates volatility in addition to the variations in bilateral exchange rate on trade, for developing and emerging countries. It is based on annual data collected from 2003 to 2019. The ARDL technique has been used.The main findings of the study suggest that trade among exporting country and trading partners is enhanced by the bilateral exchange rate volatility, as well as by the external exchange rate volatility as significantly positive effect on the trade is obvious. Furthermore, the results indicate that the exports are negatively influence by bilateral exchange rate in the long duration as currency depreciation rises the exports. The impact of GDP of origin country is significantly positive on exports. The study validates that about 24.15 % of fluctuations in exports is restored within a year, as per the short period dynamics analysis. In short period , the coefficients of all the variables are insignificant except GDP of origin countries and bilateral exchange rate thus having a significantly positive effect on exports.A comparative study of export model for emerging and developing economies has revealed that co integration exists in case of all emerging and developing economies, indicating that long term relationship exists among the variables for emerging and developing economies. The direction of association between bilateral exchange rate volatility is significant and negative while a positive influence of external exchange rate volatility is documented for all emerging and developing countries except India and Sri Lanka. The bilateral exchange rate has significantly positive impact in the short period for emerging and developing countries except India, Sri Lanka and Turkey. The GDP of origin countries is significant and positive only in the case of Malaysia and Russia, while the RCPI is significant for Poland and Russia. The findings of current investigation are in line with the existing literature.

Policy Recommendations

For maintenance of a steady trade environment in emerging and developing economies, policies should be devised for stabilization of exchange rates. It is a matter of major concern for policy makers. Moreover, exports contribute to the economic development, so in these emerging and developing countries, policy makers should pay due attention towards currency depreciation as it acts as a vital tool to enhance competitiveness and exports in the international market. The outcomes of this study confirm that it is better for emerging and developing countries to deal in their own currency instead of foreign exchange to mitigate the adverse impact of volatility while trading in international market. These findings are important for Pakistan, due to restricted trade only with specific countries. For expansion of Pakistan's exports with the rest of the world, potential prospects enhancing trade openness need to be discovered by policymakers. For Pakistan, there is a need that the policy makers should devise the prudent export promotion as well as import substitution policies. Moreover, the presence of forward exchange markets helps the exporters to cope with the hostile effects of variability of exchange rate on exports via hedging to guard against the risks in global trade. Policy makers should pay attention towards both the presence and the intensity of volatility of exchange rate because Pakistan's economic set up faces the problem of huge trade deficit every year. The impact of the exchange rate volatility for each trading companion be noticed separately while applying trade policies for the improvement in trade balance as well as for the growth of exports.

Limitations and Future Research Directions

The current investigation is limited to seven emerging and four developing countries alongwith their trading partners. The future research must be conducted under other contextual set ups. For current study, aggregated trade data has been used so disaggregated trade data should be employed in further research. The time period of currrent investigation consists of seventeen years from 2003 to 2019 due to data availability issue, a comprehensive future research should be conducted covering longer time period using some alternative database to retrieve data. Finally, the future research should address other antecedents of international trade and the other possible effects. Factors determining interest rate such as current inflation, specifically in the framework of the impossible trinity concept could be an interesting future research avenue.

References

Arize, A. C., Osang, T., &Slottje, D. J. (2000). Exchange-Rate Volatility and Foreign Trade: Evidence from Thirteen LDC's. *Journal of Business & Economic Statistics*, *18*(1), 10–17. https://doi.org/10.1080/07350015.2000.10524843.

Baek, J. (2014). Exchange rate effects on Korea–U.S. bilateral trade: A new look. *Research in Economics*, *68*(3), 214–221. https://doi.org/10.1016/j.rie.2014.05.002.

Bahmani-Oskooee, M., & Xu, J. (2012). Impact of exchange rate volatility on commodity trade between U.S. and China: is there a third country effect. *Journal of Economics and Finance*, *36*(3), 555–586. https://doi.org/10.1007/s12197-010-9126-y.

Bahmani-Oskooee, M., Hegerty, S. W., & Xu, J. (2013). Exchange-rate volatility and US–Hong Kong industry trade: is there evidence of a 'third country' effect? *Applied Economics*, *45*(18), 2629–2651. https://doi.org/10.1080/00036846.2012.654918.

Chit, M. M., Rizov, M., & Willenbockel, D. (2010). Exchange Rate Volatility and Exports: New Empirical Evidence from the Emerging East Asian Economies. *World Economy*, *33*(2), 239–263. https://doi.org/10.1111/j.1467-9701.2009.01230.x.

Choudhry, T., Hassan, S. S. U., & Papadimitriou, F. I. (2014). UK imports, third country effect and the global financial crisis: Evidence from the asymmetric ARDL method. *International Review of Financial Analysis*, *32*, 199–208. https://doi.org/10.1016/j.irfa.2013.11.003.

Cushman, D. O. (1988). U.S. bilateral trade flows and exchange risk during the floating period. *Journal of International Economics*, *24*(3-4), 317–330. https://doi.org/10.1016/0022-1996 (88)90040-2.

Doğanlar, M. (2002). Estimating the impact of exchange rate volatility on exports: evidence from Asian countries. *Applied Economics Letters*, *9*(13), 859–863. https://doi.org/10.1080/13504850210150906.

Grauwe, P. D. (1988). Exchange Rate Variability and the Slowdown in Growth of International Trade. *Staff Papers - International Monetary Fund*, *35*(1), 63. https://doi.org/10.2307/3867277.

Hericourt, J., & Nedoncelle, J. H. & C. (2015, February 2). *Relative Real Exchange-Rate Volatility, Multi-Destination Firms and Trade: Micro Evidence and Aggregate Implications, by Jérôme Héricourt; Clément Nedoncelle*. https://ideas.repec.org/p/cii/cepidt/2015-03.html.

Hooper, P., & Kohlhagen, S. W. (1978). The effect of exchange rate uncertainty on the prices and volume of international trade. *Journal of International Economics*, *8*(4), 483–511. https://doi.org/10.1016/0022-1996 (87)90001-8.

Kumar, R., & Dhawan, R. (1991). Exchange rate volatility and Pakistan's exports to the developed world, 1974–85. *World Development*, *19*(9), 1225–1240. https://doi.org/10.1016/0305-750x (91)90069-t.

Oskooee, M. B., & Harvey, H. (2015). Exchange rate sensitivity of the USA-Singapore trade flows: evidence from industry data. *International Journal of Trade and Global Markets*, *8*(2), 152. https://doi.org/10.1504/ijtgm.2015.069426.

Soleymani, A., & Chua, S. Y. (2014). Effect of exchange rate volatility on industry trade flows between Malaysia and China. *The Journal of International Trade & Economic Development*, *23*(5), 626–655. https://doi.org/10.1080/09638199.2013.803146.

Soleymani, A., Chua, S. Y., & Hamat, A. F. C. (2017). Exchange rate volatility and ASEAN-4's trade flows: is there a third country effect? *International Economics and Economic Policy*, *14*(1), 91–117. https://doi.org/10.1007/s10368-015-0328-9.

Tunc, C., Solakoglu, M. N., Babuscu, S., & Hazar, A. (2018). Exchange rate risk and international trade: The role of third country effect. *Economics Letters*, *167*, 152–155. https://doi.org/10.1016/j.econlet.2018.03.030.

Tunç, C., & Solakoglu, M. N. (2016). Does exchange rate volatility matter for international sales? Evidence from US firm level data. *Economics Letters*, *149*, 152–156. https://doi.org/10.1016/j.econlet.2016.08.008.

Yoon, H., & Hur, J. (2018). Industrial proximity and vertical integration of multinational firms. *Journal of Korea Trade*, *22*(1), 50–67. https://doi.org/10.1108/jkt-11-2017-0100.