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THE EXCHANGE RATE VOLATILITY AND EXPORTS GROWTH OF THE SELECTED DEVELOPED ECONOMIES

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ABSTRACT

Exchange rate volatility plays a pivotal role in shaping the trade policy of a country. This paper utilized a yearly time series and panel data to explore the relationship between exchange rate volatility and export growth of the selected developed countries (Poland, Sweden, UK, Italy, Germany, France, Denmark, Austria, and Belgium) between 1980-2020. Pooled Mean Group (PMG) and individual cointegration techniques were applied to evaluate the impact of exchange rate volatility on export growth in two-time horizons, i.e., short-run and long-run. Results confirmed that, in the long run, exchange rate volatility was cointegrated with export growth. The study further validated that in case of panel data, in the short run, exchange rate volatility suppresses export growth. At the same time, in the long run, it aids in accelerating export growth. At disintegrate level, in the short run, results were relatively insignificant except for Sweden and Italy, which had shown negative and significant association with export growth. In contrast, the long-run analysis revealed a significant positive impact of exchange rate volatility in most of the cases. Also, in case of panel data, if estimated elasticity is negative, then real depreciation could lower the real exchange rate and widen the export base. As exchange rate volatility could promote or hinder export activity, therefore, it is important for policymakers to consider exchange rate volatility while formulating the trade policy of the country. Also, stable and sustainable management of the exchange rate would bring stability and promotes long-term growth in an economy.

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INTRODUCTION

It is believed that the exchange rate is one of the key ingredients in shaping the trade policy of the country. The breakdown of the Bretton-Wood agreement in 1973 inspired many researchers to explore the theoretical and empirical dimensions of exchange rate volatility on the trade balance. Exchange rate fluctuations could induce uncertainty in the business, which consequently affects trade across the border (Hall et al., 2010). Bahmani-Oskooee and Hegerty (2007) urged that subject to the risk aversion of traders, exchange rate volatility could halt or stimulate the trade activity within an economy. If the estimated elasticity is negative, a decrease in the real exchange rate would devalue the domestic currency in real terms and promote trade activity by increasing the country's export base. The studies had confirmed that, at the individual level, exchange rate volatility carried a significant and negative effect in the short run, while in the longer time period, exchange rate volatility was a significant positive contributor to exports growth of the most developed economies (Bahmani-Oskooee & Zhang, 2014).

Exchange rate volatility and trade flows remained in policy debate from time to time, and many studies have been conducted to analyze the relationship. The researchers have found mixed views on this; most of the studies have reported a negative relationship between exchange rate volatility and exports growth (Cushman, 1983; Koray & Lastrapes, 1989), and some have shown the theoretical possibility of both positive and negative relationship (Sercu & Uppal, 2006) while others concluded that they are not correlated with each other (Bacchetta & Van Wincoop, 2000). Caballero and Corbo (1989) studied the stated relationship by incorporating risk in their model, and they found that exchange rate uncertainty had a detrimental effect on Thailand's export growth. These results are independent of assumptions taken and estimation techniques applied. To tackle the issue of spurious regression, they had predicted that variables neither have integrating nor cointegrating properties.

Arize et al. (2000) addressed the issue of spurious regression by using the dataset of 13 developing countries, including Thailand, and employed Johnson's cointegration technique to analyze its impact on aggregate export demand. They found that even developing cointegration among variables in the model, the estimates of cointegrating vectors were still negatively related to the export growth for each country, including Thailand. The studies reviewed in the literature are classified into two subgroups; Aggregate levels studies and disaggregate level studies. This disaggregation of the literature into subgroups would be helpful in highlighting the contribution of different studies.

Magee (1973) looked into reasons for US trade balance deterioration, even after the devaluation of 1971. The study analyzed the implications of different adjustment factors, e.g., currency contracts of both kinds (signed after and before devaluation) and slower quantity adjustment. He argued that the main factor behind the deterioration of the balance of payment was adjustment lags. The study concluded that the long-run positive effects of devaluation covered the unfavorable short-term effects that devaluation generates. Because initially, the already signed contracts showed their results on the current account, while in the long run newer contracts started to dominate. However, buying patterns do not respond quickly to the devaluation explaining why the trade balance might be worse-off for a short time period; however, this pattern got reversed in the long run, and the net effect of devaluation becomes positive. Miles (1979) had a totally different conclusion about the sound effects of devaluation. Employing annual data of selected 14 economies for the time period of 1956-72. The study uncovered that devaluation did not result in balance of trade surplus, instead it resulted in a surplus in the capital account, improving BOP (balance of payment) by leaving the balance of trade ineffective.

Himarios (1985) criticized the findings of Miles' paper and supported exactly the opposite argument. The findings of the study were contrasted with previous studies and predicted the effect of devaluation in an untraditional way. The study criticized Miles' findings because he had used a nominal exchange rate instead of the real exchange rate, making results highly sensitive to measurement units. The study employed the absorption approach model and found out that exchange rate coefficients turned out to be positive and significant in 9 out of 10 cases and validated that real currency devaluation had a positive and significant impact on the trade balance. Bahmani-Oskooee (1985) developed J-curve analysis with different regimes of floating exchange rates. The analysis was conducted over the data of selected five countries, India, Korea, Germany, and Thailand over the time period of 1973 to 1980. It was one of the pioneer studies which inculcated J-curve analysis for investigating the impact of exchange rate devaluation on the trade balance. Balance of Trade is termed as the difference between exports and imports. The study found out that J-curve is only applicable for India, Korea, and Greece while it is invalid for Thailand. While the long-run effect of devaluation was positive and encouraging in case of Thailand. The duration of the worsening of trade balance was for just a short time and this period varies from country to country.

Bahmani-Oskooee and Malixi (1992) reinvestigated his previous work by redefining the policy variable, i.e., exchange rate. The study took the real exchange rate and foreign price level as an indicator of the exchange rate. Furthermore, the real exchange rate was also re-defined as domestic currency units as per unit term of foreign currency rather than foreign currency per unit term of the domestic currency. By taking into consideration these changes, the same sample is re-estimated, and the results were quite contradictory to the previous studies. This time findings indicated the presence of an inverse J-curve for the same set of the countries. However, long-run effect of devaluation was positive and encouraging for Thailand. Another study by Bahmani-Oskooee and Malixi (1992) reported interesting shapes of J-curve while applying the cointegration technique to the data of selected 13 LDCs over the time period of 1973Q1 to 1985Q4. The countries even tried to make use of a common currency, but even after that, they had to face extreme fluctuations in their exchange rate. To explain fluctuation in the real exchange rate, Almon Distributed Lag Model was employed. The output results reported J-curve for 4 out of 13 countries, namely India, Korea, Brazil, and Greece. It also reported some other interesting shapes like M, N, and L curves. While it was also noted that short-term ER fluctuations have an ignorable outcome while the long-term effects resemble that of Bahmani-Oskooee (1985).

Brissimis and Leventakis (1989) tried to investigate the influence of exports and imports elasticities and monetary approaches on Greece's balance of payment. Employing Almon lag technique on quarterly data of the country over the period of 1975-1984, the study estimated structural equations since autocorrelation and simultaneity bias appeared, leaving OLS estimates with a lack of consistency. To tackle the issues of the OLS technique, an instrumental variable technique was used. Studying the impact of a ten percent devaluation (hence not sustained) of the exchange rate on the balance of trade of the country depicted the presence of J-curve. The short-run deterioration period covered the duration of just one quarter. While the long-run results of the study were similar to the results of Bahmani-Oskooee (1985). Bahmani-Oskooeeand Alse (1994) conducted a J-curve analysis on quarterly data of 22 less developed and 19 developed economies over the period 1971-1990. Engle-Granger technique was employed with the purpose of conducting an analysis of the long run impact of devaluation on their trade balances. The results indicate no evidence of the long-term relationship between trade balance and devaluation in case of eight countries, USA, UK, Portugal, Sri Lanka, Canada, Spain, Germany, and Denmark and a positive long run impact in case of Brazil, Costa Rica and Turkey. However, the error correction model provided evidence of inverse J-curve for only a single country Ireland and J-curve for a total of four countries Ireland, Turkey, Netherlands and Costa Rica.

Bahmani-Oskooee (1995) re-explored his work done in 1992 and examined the stationarity of the time series data with a different methodology. For this study, he took motivation from Kim (1995) worked and adopted his Johansen-Juselius technique to test the different data sets. The results were contrary to his previous findings as he concluded that fiscal, monetary and commercial policies have long term relationship with the current account balance. The fiscal policy (full employment budget) turned out to be the most significant determinant among all three policies tested. Wong (2010) used an error correction model to estimate long term relationship between terms of trade and the real exchange rate. The study used the real variable and Johnson likelihood ratio to predict the stated relationship. Results supported evidence of the J-curve in the case of Japan.

Apart from this, some studies were also conducted at the disaggregate level. Backus et al. (1994) applied VAR (vector autoregressive) technique and impulse response functions to test the impact of the fixed exchange rate on the real trade balance in case of Japan for the period of 1955 to 1993. The country's imports and exports were highly volatile to the exchange rate as a sharp decrease had been seen in the export and import of the country after the devaluation; however, this relationship turned out to be positive in the long run. The results revealed that terms of trade were highly sensitive to the real exchange rate and had shown short-term and long-term variations in trade patterns and the J curve for the Japanese economy.

Backus et al. (1994) used the Vector Auto Regressive technique (VAR) and OLS technique to test the relationship. For this, US quarterly data for the time period between 1978-1993 for the variables of trade balance, real exchange rate and GDP were used. Each variable was determined by Z_t (the vector of the stochastic process) and the estimation results proved that depreciation in exchange rate posed a negative effect on the trade balance for up to five subsequent quarters. After that, it has a long-lasting positive impact on the trade balance of the country. The study also compared the two techniques and concluded high fluctuations in the exchange rate are better captured by the VAR model rather than the simple OLS technique. Zhang (1999) investigated the reaction of trade balance using Chinese monthly data. The study employed the counteraction technique to figure out the causality direction. The results were in contradiction with the results of Demirden and Pastine (1995) as the Granger causality test reported no evidence of the J-curve. Zhang noted that the exchange rate did not granger cause the trade balance, but the relationship holds vice versa.

Marwah and Klein (1996) analyzed the dynamic behaviour of trade balance for US and Canada with G-7 countries for the quarterly data over the period 1977 to 1992. For the estimation, the instrumental variable along with a polynomial distributed lag model was used. The empirical results depicted that depreciation of currency improved the trade balance just for a single quarter and for the whole remaining period, it affected the trade balance negatively. Wilson and Tat (2001) analyzed bilateral trade data for the time duration 1970 to 1996 for US and Singapore. The study claimed that the J-curve pattern is often conceivable among developed countries and has the least chance of appearing among developing economies. The reason for this outcome was the basic difference in the market power of these economies. They inferred that the real exchange rate was not correlated with the trade balance between US and Singapore countries.

Bahmani-Oskooee and Ratha (2004) examined quarterly data of India and its seven trading partners over the period 1977-1998. By employing the ARDL testing approach, Rose and Yellen (1998) failed to observe any J-curve pattern between India and any trading partner. At the same time, it found a positive impact of the depreciation of the Indian currency on its six out of seven trading partners. Poon et al. (2005) investigated the impact of exchange rate volatility on export growth for South East Asian countries. For analysis, a proxy variable for exchange rate volatility was introduced; by taking the average values for persistence in risk smoothing had been introduced in a vector auto regressive (VAR), error correction (ECM) and variance decomposition (VD) model. Results indicated that exchange rate volatility impacts significantly export volume and in the long run this relationship was relatively stable. They also validated that innovation of exchange rate volatility had minute impacts on the export patterns.

Hondroyiannis et al. (2008) had used real exports earing of oil exporting countries to investigate this relationship. The study took panel data of 12 oil exporting countries from 1977-2003 and applied the fixed coefficient panel data technique and generalized method of moments (GMM) for their analysis. The study further refined its estimations by employing the random estimates technique to correct any model misspecification, omitted variable bias and minimize measurement errors. The study revealed a negative relationship between exchange rate volatility and export growth due to specification bias only. Bahmani-Oskooee and Cheema (2009) had taken into consideration 3 & 2-Digit SITC commodity level trade data of bilateral trade between Sweden and US. They employed ARDL Bound testing approach to investigate the annual data for the duration of 1962-2004. The study took into account a total of 87 industrial sectors and found evidence that J-curve holds among a total of 28 industries. While later on, Bahmani-Oskooee and Harvey (2010) made some extensions in his previous work and employed the latest techniques to check unit root and cointegration among variables. By employing the Johansen-Juselius approach of cointegration, the study found interesting results as the existence of cointegration between all three policies and trade balance. However, fiscal policy was found to be a highly significant positive determinant of the trade balance.

Thuy and Thuy (2019) used the quarterly data to test the existence of the J curve for Vietnam. The study highlighted how exchange rate volatility influences domestic currency depreciation and export growth. To test the stated relationship, the ARDL model was used, and the results exhibited that exchange rate volatility impacts exports and currency depreciation in the short run positively while this relationship turned out to be positive in the long run. Rashid et al. (2021) further validated these findings by taking data of non-financial Pakistani firms listed in the Pakistan Stock Exchange from 2001-2016. The study used the system GMM model for empirical investigation, and the results indicated that an increase in real effective exchange is a positive contributor to the export; however, exchange rate volatility can suppress country exports. Tarasenko (2021) also analyzed the effect of exchange volatility on exports and imports of Russia along with seventy trading partners. To test this relationship, they had pooled export and import into eight categories, and the results revealed that exchange rate volatility affects negatively to the exports of agriculture raw material, manufacturing goods, transports equipment and machinery, whereas exchange rate volatility impacts positively and significantly imports of fuel, chemicals and textile

Most of the studies didn’t settle on a single conclusion. They gave mixed reviews as almost all the work cited either used the panel data or time-series data set for their analysis. Still, no one had tested this relationship by jointly taking time series and panel data sets in a single study. This paper also decomposed analysis on the aggregate and individual level by using the panel and time-series datasets, respectively, to determine how the exchange rate volatility behaves with export growth in two periods of time, i.e., short and long run. Exchange rate and exchange rate volatility are also incorporated in the model as they would aid in formulating a country's trade policy. The paper proceeds with data, methodology, results, and discussion, while the final section summarises the conclusion based on the empirical analysis of the stated relationship.

METHODOLOGY

The study had taken yearly panel data for the selected 09 developed countries, namely Poland, Sweden, UK, Italy, Germany, France, Denmark, Austria, and Belgium, for the period between 1980-2020. The variables of the study included exchange rate volatility, export growth, real GDP, and real effective exchange rate to test the short-run and long-run impacts of exchange rate volatility on the trade growth of the countries. Table 1 shows the sources for the data.

Table 1. Variables description.

Variables	Source	Period
Exchange rate volatility	World Development Indicators (WDI)	1980-2020
Export growth	World Development Indicators (WDI)	1980-2020
Real GDP growth	World Development Indicator (WDI)	1980-2020
Real effective exchange rate	World Development Indicators (WDI)	1980-2020

To study the impact of exchange rate volatility on export growth, yearly data on the mentioned variables were extracted from WDI for 09 selected developed countries. The information from each county was clubbed together, and Pooled Mean Group (PMG) technique was applied to test the stated relationship. This technique was preferred over Mean Group (MG) (generates consistent average estimates) and Dynamic Fixed Effect (DFE) estimator as Pesaran et al. (2001) urged that it allows estimates, coefficients and error variance to vary across the group in the short-run while long-run estimates are relatively constant. To test the relationship export growth was being regressed on exchange rate volatility, GDP growth and real effective exchange rate. GDP and real effective exchange rate were incorporated as the control variables in the model.

Pooled Mean Group Model

The econometric form of the model can be written as under.

$$\begin{aligned}\Delta \text{ GEXP i, t} = \text{a} + \sum_{k=1}^{n} b_k \ \Delta \ \text{GEXP}_{\ i,t-k} + \sum_{k=0}^{n} c_k \ \Delta\text{Y}_{\ i,t-k} \\ + \sum_{k=0}^{n} d_k \ \Delta\text{REX}_{i,t-k} + \sum_{k=0}^{n} d_k \ \Delta\text{VOL}_{\ i,t-k} \\ + w \{\text{Ln GEXP}_{\ i,\ t-1} \\ - (\beta o + \beta 1 \ \text{Y}_{\ i,\ t-1} + \beta 2 \ \text{VOL}_{\ i,t-1} \\ + \beta 3 \text{ Ln REX}_{\ i,t-1})\} + \mu t \qquad (1)\end{aligned}$$

The regression estimates indicated how exchange rate volatility impacts export growth in the short run. The bracket term represents the error term generated for the previous period, while parameter w represents the error term generated for the past period. The sign of the parameter w indicates deviation (convergence/divergence) of the error term, while its value quantifies the magnitude of divergence or convergence. The bracket term can be replaced with error term to get error correction model.

$$\begin{aligned}\Delta \text{ GEXP i, t} = \text{a} + \sum_{k=1}^{n} b_k \ \Delta \ \text{GEXP}_{\ i,t-k} + \sum_{k=0}^{n} c_k \ \Delta\text{Y}_{\ i,t-k} \\ + \sum_{k=0}^{n} d_k \ \Delta\text{REX}_{i,t-k} + \sum_{k=0}^{n} d_k \ \Delta\text{VOL}_{\ i,t-k} \\ + \lambda\text{i ECM}_{\ i,t-1} + \mu t \qquad (2)\end{aligned}$$

Where ECM was named as error correction term, now the equation (2) could be linearly regressed using the OLS technique and the estimates λi, would be used as an identifier to identify the coefficients of Eq. (2). Similarly, the above ARDL model could be tested at the panel as well as at the individual level.

RESULTS AND DISCUSSION

Short-run and long-run estimates are reported in Table 2. Results showed that in the short-run exchange rate volatility harms the country's export; however, for some countries, this relationship turned out to be the opposite, as exchange rate fluctuations contribute positively to the export growth of Sweden and Italy. In the short run, most of the results were insignificant, so to test the results' persistency, estimates were tested for the long run. In case of panel data, short-run volatility coefficients turned out to be negative and insignificant in most cases except Sweden and Italy, indicating that these two countries can benefit from exchange rate volatility by increasing exports even in the short run. The long coefficient of pooled data is positive and significant, indicating that exchange rate volatility can enhance the export growth of the panel countries. In case of the individual country, the coefficients of exchange rate volatility for Poland, Sweden, Germany, Denmark and Austria are positive and significant. This shows that in the long run, exchange rate volatility contributes to the export growth of the mentioned countries, which consequently leads to the economic growth of the country.

The coefficients of exchange rate have a negative sign for almost all countries; however, this coefficient is significant only for pooled data, Sweden, Italy, France and Belgium. A negative sign of the exchange rate indicates that appreciation of the exchange rate can reduce the competitiveness of the country by increasing the price of exports. Hence this can discourage export growth. The control variable GDP has positive and significant coefficients in case of panel data and for all individual country analysis, indicating that GDP contributes to enhancing the export growth for the countries under discussion. The coefficient of the lagged value of error term ECM (-1) is negative and significant in all the cases. The coefficient is less than one with a negative sign indicating that all the models are stable in the long run. If there is any divergence from the stable path in the short-run, error will be removed, and the values will converge to a stable path in the longer run.

Table 2. Impact of exchange rate volatility on export growth.

Country	Short Run Estimates			ECM (-1)	Long Run Estimates		
	d(Volatility)	d(Exchange Rate)	d(GDP)		Volatility	Exchange Rate	GDP
Pooled	-.174	-.0669	.599	-.933***	.001**	-.002***	1.44***
	(0.056)	(-1.00)	(0.025)	(0.000)	(0.021)	(-.006)	(0.000)
Poland	-.001	-.006	-.210	-.34***	.001**	-.002	1.096***
	(0.251)	(0.442)	(0.579)	(0.000)	(0.028)	(0.425)	(0.001)
Sweden	.118**	-.193	.211	-.888***	.465 ***	-.031**	2.42***
	(0.023)	(0.01)	(0.69)	(0.00)	(0.00)	(0.046)	(0.00)
UK	-.011	.170	.200	-.102***	.082	-.0372	.762**
	(0.72)	(0.11)	(0.62)	(0.00)	(.129)	(0.60)	(0.04)
Italy	.147*	.021	1.61	-.917***	.057	-.106**	.994*
	(0.09)	(0.91)	(0.003)	(0.00)	(0.286)	(0.043)	(0.06)
Germany	-.081	-.023	.716	-.871***	.295**	.083	2.19**
	(0.71)	(0.88)	(0.197)	(0.00)	(0.04)	(0.62)	(0.00)
France	-.319	.220	.428	-.102***	.415	-.089*	1.74***
	(0.44)	(0.29)	(0.51)	(0.00)	(0.12)	(0.056)	(0.001)
Denmark	-.602	-.624	.027	-.788***	1.244**	.374	1.487**
	(.100)	(0.05)	(0.94)	(0.00)	(0.014)	(0.26)	(0.02)
Austria	-.003	-.190	.428	-0.15***	.002*	.002	1.75**
	(0.98)	(0.15)	(0.57)	(0.00)	(0.097)	(0.97)	(0.01)
Belgium	-.31	.170	-.531	-0.36***	-.071	-.111**	1.813***
	(0.15)	(0.29)	(0.23)	(0.00)	(0.53)	(0.024)	(0.00)

Notes: Number inside the parenthesis is absolute value of the P-ratio. *, **, *** shows significance level at 10%, 5% and 1% respectively.

Table 3. Results of the Bound Testing and Diagnostic Tests.

COUNTRY	F	RESET	LM	CUSUM	CUSUMSQ	Adj. R2
Pooled	-4.91	1.17	0.41	S	S	0.141
Poland	7.3	3.35	0.13	S	S	0.36
Sweden	5.2	3.5	0.97	S	S	0.499
UK	5.27	0.30	0.11	S	S	0.408
Italy	4.77	1.63	2.24	S	S	0.193
Germany	1.88	0.14	2.52	S	S	0.288
France	4.16	0.32	0.79	S	US	0.264
Denmark	4.53	0.05	1.38	S	S	0.289
Austria	4.11	0.42	0.47	S	US	0.484
Belgium	3.44	0.04	3.94	S	S	0.104

Note: LM: Lagrange multiplier test of residual serial correlation. It is distributed as $\chi 2$; RESET: Ramsey's test for function form. It is distributed as $\chi 2$; CUSUM: Cumulative Sum of Recursive Residuals; CUSUMSQ: Cumulative Sum of Squares of Recursive Residuals.

The long-run results are only reliable in the presence of cointegration among the variables. Table 3 shows values for the F-statistics and the values of other diagnostic tests. These values are then compared with new critical values devised by Pesaran et al. (2001) for a large sample and Narayan (2006) value for a smaller sample. The estimates of F- statistics are compared with the upper bound tabulated value of 4.11 and almost for all the countries, and in case of the panel data, the calculated F- Statistic is greater than the upper bound critical value, which is 4.11. For country-level analysis, results confirmed the presence of cointegration in 7 out of 9 countries. The results are further revalidated by an alternative test discussed by Bahmani-Oskooee and Bolhasani (2008).

Other diagnostic statistics are also stated in Table 3. To test the serial correlation among the variables, a test for Lagrange Multiplier is applied, and each value is compared with Chi-square critical value at 5%, i.e. 3.84. The results confirm the absence of autocorrelation among the variables except for Belgium, where LM statistic is significant. Also, Ramsey's RESET test is used to detect any functional misspecification, and again results corroborate that model is correctly specified. To check the stability of the coefficients in the short-run and long-run, the CUSUM and CUSUMSQ tests are used. Stable models are indicated by "S" while the unstable models are labelled as "US" and values illustrate that all estimated coefficients are stable. Finally, the fitness of the model is tested by adjusted R2, and the results indicate that model has enjoyed a good fit.

Panel cointegration test of 1st and 2nd generations is also conducted for our Pooled Mean Group (PMG) model, and its results are reported in Appendix Table A. First-generation test takes the assumption of cross-sectional independence while the second-generation test assumes it to be cross-sectionally dependent. Pesaran (2007) Panel Unit Root test (CIPS) (reported in Appendix -Table-A) is employed on the testing variable, and almost all the selected variables are zero-order integrated.

CONCLUSIONS

This study empirically investigated the behaviour of exchange rate volatility on export growth in the short run and long run by using the time series and panel dataset of 09 selected developed countries Poland, Sweden, UK, Italy, Germany, France, Denmark, Austria, and Belgium for the time period from 1980 to 2020. To evaluate the stated relationship at two time period, Pesaran et al. (2001) bounds testing approach to cointegration, error-correction model and Pooled Mean Group (PMG) techniques were implied. The estimated results confirmed that exchange rate volatility had a negative and insignificant impact on export growth for the panel of countries in the short run. At disintegrate level, exchange rate volatility also had an insignificant impact on export growth for all countries except Sweden and Italy. While in the long run, it has a significant positive relationship with export growth of the panel countries and for the case of individual countries. The results also confirmed that in case of panel data and individual countries, the real exchange rate has a negative sign that indicates an increase in the real exchange rate can lower the competitiveness of the country and eventually reduce the exports of the country. Lastly, the presence of cointegration is necessary to hold this relationship which was also confirmed by F-statistics of bound testing analysis. Study findings had an important policy implication; according to the research results, however, the exchange rate volatility can enhance export growth, but exchange rate volatility arises uncertainty. Uncertainty can have some other type of adverse effect on the economy by hampering investment, so it is important to have sustainable and effective management of the exchange rate. Also, policymakers should focus on the behaviour of the exchange rate in the short run and long run while devising trade policy. By making trade policy align with the exchange rate policy, the country can get maximum benefits from exchange rate fluctuations.

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Appendix: Table A

Variables	Pesaran (2007) Panel Unit Root test (CIPS)			
	(Specification without trend)		(Specification with trend)	
	LAGS	P-VALUE	LAGS	Zt-bar
Exports	0	-9.4	0	-8.489
	1	-6.733	1	-5.387
	2	-3.037	2	-1.56
GDP	0	-6.658	0	-5.513
	1	-4.36	1	-3.421
	2	-3.074	2	-1.886
Exchange Rate	0	-1.572	0	-0.866
	1	-2.483	1	-2.498
	2	-2.099	2	-1.915
Volatility	0	-5.83	0	-5.663
	1	-2.039	1	-1.502
	2	-0.948	2	-0.221