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Explaining Trends and Factors Affecting Export Diversification in ASEAN and SAARC Regions: An Empirical Analysis

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Abstract:

This paper examines the role played by country-specific factors in the determination of export product diversification process. To meet this objective, the paper begins by constructing a time series data for export diversification using the Herfindahl index. Then, it applies the fully modified OLS co-integration model to a panel of selected ASEAN and SAARC countries to find out the main determinants of export product diversification. Export diversification pattern shows that since the mid-1980s the ASEAN countries have continuously witnessed export diversification and the SAARC countries embarked on export diversification journey since the early 1990s. Analysis of the determinants suggests that foreign direct investment, domestic investment, competitiveness, real depreciation of domestic currency, financial sector development and institutional strength are significantly and positively related to export product diversification in both regions. These findings have important policy implications for the two regions. They call upon the policymakers for further diversification of exports, especially in the areas of their specialization that are vital for their smooth and sustained foreign exchange earnings as well as economic development. The study also recommends improving international competitive strength via improving business environment to achieve the goal of export product diversification.

***Keywords*:** Export Product Diversification, Economic Development, ASEAN and SAARC Regions

1. INTRODUCTION

Developing countries have been experiencing export product concentration. This is mainly because they produce and export raw

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materials and semi-manufactured products. Whereas, such products, in general, do not face market access problem, they have inelastic demand in foreign markets and their close substitutes are easily available. Finished manufactured products exported by developing countries face high trade barriers in foreign markets. Consequently, exports of these countries have highest concentration upon raw materials and semi-manufactured products. Global experience reveals that countries who have failed to diversify exports have grown slower than those who have executed right policies for export diversification. Moreover, countries facing export concentration are more vulnerable to external shocks [see, De Ferranti, *et al.* (2002), Hausmann, *et al.* (2007), Herzer and Nowak-Lehmann (2006), Lederman and Maloney (2003), and Matthee and Naude (2007)].

Mindful of the negative repercussions, developing countries have been targeting export product diversification as a means to achieve the goals of export expansion and higher per capita income. Besides globalizing their economies, these countries have been striving hard to introduce structural transformation by moving away from exporting primary and intermediate products to export finished products. Consequently, they realized higher economic growth as sustained foreign exchange earnings were available.

Paradoxically, a non-linear relationship between income and export diversification exists. This is because (at low levels of income) countries tend to export a narrow range of products and are thus exposed to increased volatility in export earnings and terms of trade. This volatility exposure is mitigated through export diversification, which in turn potentially helps them achieve stability in their economic performance. Once countries achieve a certain higher level of income through export diversification, they then start producing differentiated products by internalizing economies-of-scale. With such transformation, these countries tend to move towards re-concentration in export products. Such products usually have relatively higher elastic demand in international market, which enables countries to expand their economies and achieve higher growth on sustainable basis [see, Carrere, *et al*. (2007), Hesse (2008), Imbs and Wacziarg (2003), Klinger and Lederman (2004), Koren and Tenreyro (2007)].

Export product diversification can be achieved by changing the mix in export products (adding new products or product variety in the existing export basket) or by adding value (quality) to existing export products. In this regard, developing countries have been vigorously introducing reforms. Whereas some of them have been successful, many are meeting with limited success. This is mainly because of lack of clear understanding about the main drivers and patterns of export diversification. Paying attention to the underlying pattern and determinants of export diversification should provide valuable research and policy inputs for active government intervention. Lack of studies at the regional level in the South Asian Association for Regional Cooperation (SAARC) and Association of Southeast Asian Nations (ASEAN) countries motivated us to conduct an in-depth analysis of the pattern and determinants of export product diversification.

Rest of this paper is planned as follows: Section 2 provides a brief overview of SAARC and ASEAN regions; Section 3 presents the theoretical framework; Section 4 presents the empirical model and data sources; in Section 5, empirical results are discussed; and Section 6 concludes the paper with some implications for policy.

2. OVERVIEW OF THE SAARC AND ASEAN REGIONS

In terms of population, SAARC is one of the biggest economic blocs in the world. It accommodates 23 percent of the world population. However, it accounts for merely 6 percent of the world GDP and 4 percent of the world trade. Intra-regional trade is hovering around 6 percent. All in all, the region is not very successful in terms of achieving its objectives.

Growth record of the SAARC countries has remained satisfactory despite weak performance in regional and international trade. The SAARC countries grew at an average annual rate of 6.22 percent between 1985 and 2013, whereas the GDP per capita grew at 4.17 percent during the same period. Bhutan experienced the highest growth rate of 7.89 percent during 1985-2013, followed by India 6.56 percent, Bangladesh 5.30 percent, Sri Lanka 5.29 percent, Nepal 4.59 percent and Pakistan 4.49 percent (Table 1).

Table 1. Economic Indicators of SAARC Countries: 1985-2013

Country	GDP Growth between 1985 and 2013	Exports to GDP Ratio (%)		Imports to GDP Ratio (%)		GDP per Capita Growth between 1985 and 2013
		1985	2013	1985	2013	
Bangladesh	5.30	5.55	19.54	13.23	26.76	3.34
Bhutan	7.89	15.0	40.08	51.1	62.9	6.01
Nepal	4.59	11.53	10.70	19.99	37.51	2.50
India	6.56	5.16	24.81	7.51	28.41	4.72
Pakistan	4.49	10.42	13.23	22.81	19.93	1.98
Sri Lanka	5.29	26.01	22.47	37.97	32.00	4.29
Total SAARC	6.22	6.22	23.16	10.27	27.67	4.17

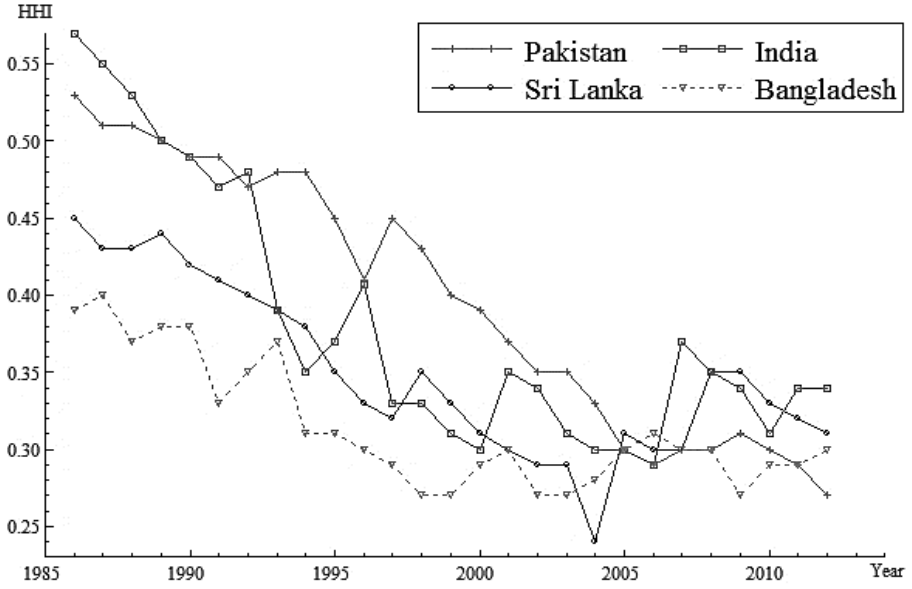
Source: World Bank (2014).

Note: Afghanistan is a new SAARC member who joined the SAARC in 2007. Due to non-availability of data we have excluded Afghanistan from this analysis.

At the time of the SAARC establishment in 1985, the degree of openness (imports and exports as a percentage of the GDP) of its members was quite low (16.5 percent). This was mainly because the SAARC countries used import substitution industrialization strategy and virtually ignored export promotion. These economies were then branded as non-trading economies. Since the late 1980s, however, almost all the SAARC countries reformed their industrialization strategies by using not only export promotion and trade liberalization policies but also focused on policies to diversify exports. These policies resulted in a significant rise in the degree of openness from 16.5 percent in 1985 to 50.8 percent in 2013 (Table 1). Concomitantly, a significant rise in export product diversification occurred. This can be noted from Table 2 and Figure 1. Both openness and export diversification have enabled the SAARC countries to stabilize their foreign exchange earnings.

Policies that facilitate export product diversification include tariff protection, subsidies, concessional export credit, technical assistance, and skill and product development. In addition, the SAARC countries introduced more flexible labour laws to assist export firms working in non-traditional industries. They also provided incentives to enhance participation of local firms in global markets. All of them also sought technical assistance from international institutions to diversify trade.

Figure 1. Export Diversification Trend for the Selected SAARC Countries: 1986-2012



Source: Based on author's calculation using UNO (2014).

Table 2. Export Diversification in Selected SAARC Countries: 1986-2012

Country	1986-1990	1991-2000	2001-2006	2007-2012
Bangladesh	0.384	0.310	0.277	0.267
India	0.528	0.375	0.322	0.338
Pakistan	0.508	0.457	0.332	0.307
Sri-Lanka	0.434	0.353	0.310	0.320
SAARC (Average)	0.464	0.374	0.310	0.308

Source: Based on authors' calculations using United Nations (2014) data set.
Note: Herfindahl index (HHI) is used here to estimate export diversification in selected SAARC countries. HHI values approaching one show complete specialization and zero show complete diversification in exports. For the estimation of HHI, we used annual exports of SAARC countries on the 4-digit level SITC-codes.

With the implementation of these policy measures, almost all the SAARC countries witnessed a structural transformation in their exports from primary commodities towards manufactured goods. For instance, the share of primary commodities in total exports of Pakistan declined from 45 percent in 1972 to 15 percent in 2013. During the same period,

the share of manufactured goods increased from 28 percent to 71 percent (GOP, 2013). Similar trends can be noted for other SAARC countries.

Table 2 and Figure 1 show that export diversification in the SAARC countries has been increasing since the mid-1980s. During 1986-1990, the Herfindahl index (HHI) value for the SAARC countries was 0.464, it fell to 0.374 during 1991-2000 and further down to 0.310 during 2007-2012 (see, Appendix for a detailed discussion on the measurement of export diversification). Fall in HHI shows that there is an increasing trend in export product diversification in the SAARC countries. The table further shows that Bangladesh experienced relatively more diversification than any other SAARC country. Bangladesh recorded a decline in HHI from 0.434 during 1986-1990 to 0.267 during 2007-2012. Whereas, in India HHI declined from 0.528 to 0.340 for the same time period; while Pakistan and Sri Lanka experienced a decline from 0.508 to 0.307 and 0.434 to 0.320, respectively.

The ASEAN countries have a collective population of about 600 million people accounting for 8.8 percent of the global population. In 2012, this region had a combined GDP of US$2.3 trillion. The ASEAN countries are considered a single entity and ranked as the seventh largest economy of the world after China, US, Japan, France, Germany and UK.

Table 3 shows that GDP in the ASEAN countries grew at an average annual rate of 5.41 percent between 1980 and 2013, whereas the GDP per capita grew at an annual average rate of 3.93 percent over the same period. The table also reveals acceleration in the GDP growth rates for Singapore and Malaysia at an average annual rate of 6.84 and 6.01 percent, respectively. The two countries are higher growth economies compared with the rest of ASEAN countries. On the other hand, major achievers in the ASEAN region, in terms of the GDP per capita are Thailand and Singapore who recorded growth rates of 4.34 and 4.18 percent, respectively.

All of the ASEAN countries are very open economies by international standards. Most of them experienced a sharp rise in their shares of exports and imports to GDP. This was achieved through the adoption of export orientation, trade liberalization and export diversification policies.

Table 3. Economic Indicators of Selected ASEAN Countries: 1980-2013

Country	GDP Growth Rate between 1980 and 2013	Exports to GDP Ratio (%)		Imports to GDP Ratio (%)		GDP Per Capita Growth between 1980 and 2013
		1980	2013	1980	2013	
Indonesia	5.53	34.18	23.74	20.21	25.74	3.76
Malaysia	6.01	56.69	81.68	54.27	72.40	3.51
Philippines	3.45	23.57	27.91	28.47	31.98	1.12
Singapore	6.84	202.05	190.22	208.98	167.51	4.18
Thailand	5.48	24.11	73.57	30.37	70.28	4.34
Total ASEAN	5.41	44.85	65.10	40.93	61.18	3.93

Source: World Bank (2014) and ASEAN (2013).

In the 1970s, the ASEAN countries experienced rapid growth when they shifted their development strategy to export-oriented industrialization. All of them used trade liberalization measures to diversify their economies. These measures included tax incentives and subsidies to export firms, incentives to attract foreign direct investment, increased public and private investment in export sectors, improved trade facilitation and reduced bureaucratic inefficiencies, bringing down of the domestic costs, and increased infrastructure investment. In addition, they provided manufacturing, financial and communications facilities for multinational firms to promote exports. They also developed labour skills by providing technical education and promoted labour-intensive activities.

With the adoption of above mentioned policies, the share of industrial sector in GDP accelerated in the ASEAN countries between 1970 and 2013: from 19 to 46 percent in Indonesia, from 23 to 43 percent in Thailand and from 27 to 41 percent in Malaysia. As a result of export diversification policies, the export share of machinery and industrial products in the ASEAN countries increased from 20 percent in 1995 to 50 percent in 2010 [Sabhasri, *et al.* (2013)].

Table 4 and Figure 2 show that export diversification in the ASEAN countries increased since the 1980s. During 1986-1996, export diversification was 0.186; it fell to 0.176 during 1990-2000 and further down to 0.152 during 2007-2012. Fall in HHI shows an increasing trend

in export diversification. The table further reveals that Malaysia experienced relatively more diversification in exports than every other ASEAN country. Malaysia recorded a decline from 0.150 during 1986-1990 to 0.128 during 2007-2012. Whereas, in Thailand HHI declined from 0.185 to 0.175 for the same time period; while, Philippines, Singapore and Indonesia recorded a decline from 0.172 to 0.160, 0.192 to 0.156 and 0.230 to 0.14, respectively. Interestingly, Malaysia and Philippines experienced a reversal in export diversification trend after the financial crisis, which lasted till 2000. However, afterwards the reversal in the trend was stemmed.

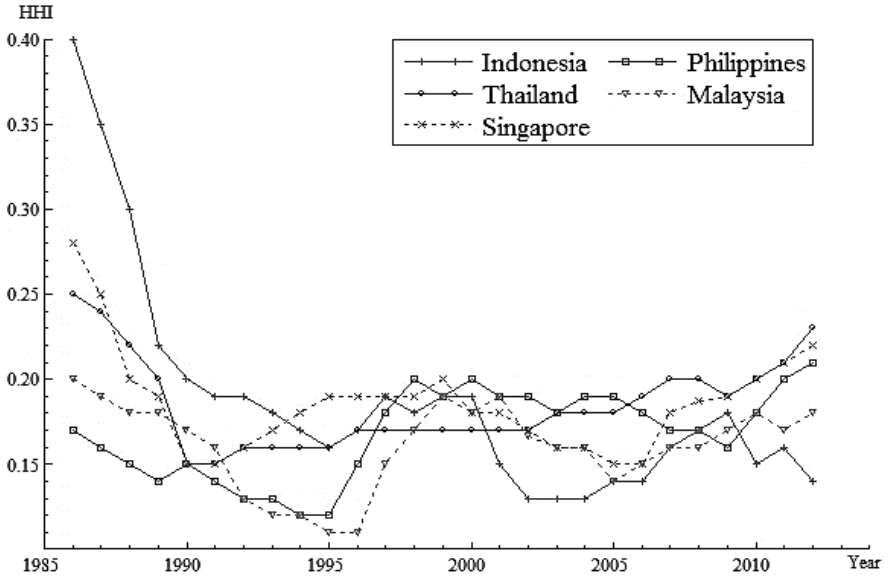
Table 4. Export Diversification in Selected ASEAN Countries: 1986-2012

Country	1986-1996	1997-2000	2001-2006	2007-2012
Indonesia	0.230	0.155	0.145	0.140
Malaysia	0.150	0.168	0.159	0.128
Philippines	0.172	0.200	0.187	0.160
Singapore	0.192	0.190	0.174	0.156
Thailand	0.185	0.170	0.176	0.175
ASEAN (Average)	0.186	0.176	0.168	0.152

Source: Based on author's calculation using United Nations (2014) data set.
Note: HHI is used here to estimate export diversification, HHI values approaching one show complete specialization and zero show complete diversification in exports. We considered 5 out of 10 ASEAN countries due to non-availability of complete data.

On the basis of discussion above, it can be concluded that policies of export diversification have enabled the SAARC and ASEAN countries to increase their exports and economic growth. Despite progress achieved by the two regions on account of export diversification, there is still room for improvement in the on-going policies. To understand the exact areas for future policy intervention, a comprehensive analysis of export diversification is needed. In this regard, this paper examines the determinants of export diversification in both regions so that future policy formulation is guided by the analysis.

Figure 2. Export Diversification Trend for Selected ASEAN Countries: 1986-2012



Source: Based on author's calculation using United Nations (2014).

3. THEORETICAL FRAMEWORK

Export diversification is one of the oldest concepts in the theory of economic development. Traditional international trade models of Smith (1776), Ricardo (1817), and Heckscher-Ohlin-Samuelson (HOS) argued that countries specialize and export according to their comparative advantage. This idea was challenged by Prebisch (1950) and Singer (1950). Both argued that the specialization in exporting products raises the dependence of developing countries on export of raw materials and agricultural products and import of consumer and manufactured products from developed countries. They argued that income elasticity of demand for primary products is lower as compared to manufactured goods. Consequently, developing countries have been missing the opportunity to grow faster. Thus, they need to diversify their export products to ensure stability and growth in their foreign exchange earnings, as diversification minimizes the risk of price volatility and decline in terms of trade.

The Prebisch-Singer hypothesis was supported by Carrere, *et al.* (2007) who stated that diversification from primary products is desirable for developing countries. Hesse (2008) also argued in the favor of Prebisch-Singer hypothesis by giving illustration from the OECD resource rich countries such as Canada, Australia and the Scandinavian countries. These economies are now more developed as a result of export diversification.

Bonaglia and Fukasaku (2003) studied the idea of Prebisch-Singer hypothesis by analyzing that real exchange rate appreciate due to specialization in the exports of natural resources. In such countries if industrialization takes place then instead of specializing in knowledge products they generally specialize in physical capital-intensive products. Consequently, human capital growth and wage equality are adversely influenced.

Matthee and Naude (2008) identified countries specializing in goods experience export uncertainty due to negative demand shocks in global markets. In such situations, export diversification makes the country less vulnerable to shocks and as a result exports become stable.

3.1. Determinants of Export Diversification

Determining the true factors of export diversification is difficult as there is no available extensive theoretical or empirical structure to cover all potential factors. There are many reasons to believe that export diversification and overall economic development level is to be positively connected. One of the most important variables for measuring the impact of export diversification is the country's GDP per capita that captures the institutional strength. As GDP per capita of a country grow, preference to consume more rises in the country, as suggested by both demand side and supply side growth theories [Aghion and Howitt (1992)].

Hausman, *et al.* (2007) found that foreign direct investment is an indicator of macroeconomic efficiency by enhancing the growth rate of the firms in the country. Theoretically, FDI through direct and indirect way has a positive impact on export diversification. Direct way is when foreign firms use advanced techniques of production to export advanced products in the host country. Indirect way is when Multinational Corporations (MNCs) transfer advanced techniques of production to

local firms. By accumulation of these advanced techniques of production and improved skills, they will be able to produce a variety of products for exports.

Devaluation in the real exchange rate of a country increases the external demand of a country's tradable goods. This increases the opportunities of producing and exporting new goods and expanding the production of existing exports. Real exchange rate and its volatility affect the production of exportable goods. Real devaluations in the exchange rate have become an important factor in the diversification of the export supply [Rodrik, (1998) and Krugman (1987)].

Theoretically, gross fixed capital formation affects the export growth in two ways either by increasing the physical capital stock in domestic economy or by promoting the technology. Recently many empirical studies estimate the positive role of gross fixed capital formation in diversifying the export [Khan and Kumar (1997)].

Lederman and Maloney (2003) estimate that the best way of improving economic efficiency for developing countries through export diversification is to focus more on industrial sector by improving its structure. They determined a positive relationship between export diversification and the share of manufacturing sector for developing countries.

Acemoglu and Zilibotti (1997) found that the private sector can also play an important role in diversification by driving innovation and economic activity in non-developed sectors. It can invest in research and development for new activities as private companies frequently stand at the frontier of new sectors and bring innovation to the economy.

4. EMPIRICAL MODEL AND DATA

Determining the real factors of export diversification is difficult as none of the available theoretical or empirical models try to capture them in totality. Nevertheless, following de Benedictis, *et al.* (2009) and Parteka (2010), we argue that the low levels of GDP per capita are associated with a low degree of relative economic structures' heterogeneity (i.e., high overall concentration and specialization). Therefore, the basic model has the following general form:

$$HHI = f(GDPP) \quad \ldots (1)$$

where, *HHI* is the export diversification rate (Herfindahl index) and *GDPP* is the GDP per capita.

Following Parteka and Tamberi (2011) and Bebczuk and Berrettoni (2006), we further argue that the country-specific effects are relevant and important in the export diversification process. The additional variables can also determine the process of export diversification. Thus, the model (1) can be modified as:

$$HHI = f(GDPP, FDI, GFCF, CPS, REER, MANU, H\text{-}CAPITAL, EXP, R\text{-}DUMMY, FUEL) \quad \ldots (2)$$

where, *FDI* is foreign direct investment to *GDP* ratio, *GFCF* is the gross fixed capital formation to *GDP* ratio, *Manu* is manufactures exports to total exports ratio, *H-Capital* is human capital, *EXP* is export to GDP ratio, *REER* is the real effective exchange rate, *R-Dummy* is the regional dummy, *CPS* is the credit to the private sector, and *FUEL* is the fuel exports to total exports ratio.

Equation (2) provides us with the general specification, which is transformed into a behavioural equation for the purpose of estimation.

$$HHI_{it} = \alpha_0 + \beta_1 FUEL_{it} + \beta_2 GDPP_{it} + \beta_3 CPS_{it} + \beta_4 MANU_{it} + \beta_5 GFCF_{it} + \beta_6 REER_{it} + \beta_7 FDI_{it} + \beta_8 H.Capital + \beta_9 EXP + \beta_{10} R.DUMMY + \mu_{it} \quad \ldots (3)$$

where, μ_{it} is the error term, *t* represents the time period and *i* indicates countries under study.

In addition to the standard variables explaining export diversification covered in the available literature, we are also interested in analyzing the effect of several reforms, such as financial and trade liberalization, macroeconomic policies on export diversification. For that purpose, variables used in this study are: export to GDP ratio a proxy for competitiveness, manufacturing exports to total exports ratio a proxy for the industrial sector's growth, *REER* a proxy for depreciation, per capita GDP a proxy for institutional strength, gross fixed capital formation to GDP ratio a proxy for growth in domestic investment, credit

to the private sector to GDP ratio a proxy for financial sector development, net foreign direct investment to GDP ratio a proxy for macroeconomic efficiency, and fuel export to total exports ratio a proxy for *natural resource curse*. Natural resource curse negatively affects the export diversification, then potential long-term benefits of export diversification will downplay otherwise it has a positive impact on export diversification.

These variables not only indicate macro-economic efficiency and strength; they also enhance growth prospects of firms, which in turn have implications for export diversification. Several studies like Benedictis, *et al.* (2009), Parteka (2010), Ferdous (2011), Agosin, *et al*. (2012), Arawomo (2014), Elhiraika and Mbate (2014) had also used these variables. Table 5 provides expected theoretical signs for each of the explanatory variable in their relationship with the dependent variable.

4.1. Data Sources

Main data source for all aforementioned variables is World Development Indicators (World Bank). Time period of the study is 1986-2012.The dataset is a balanced panel. The data used to estimate HHI are at 4-digit level SITC-codes obtained from the United Nations Commodity Trade Statistics Database [United Nations (2014)].

Due to the non-availability of data for all the years and for all the required variables, the regression analysis is limited for the SAARC region countries to Bangladesh, India, Pakistan and Sri Lanka, and for the ASEAN region the selected countries are Indonesia, Malaysia, Philippines, Singapore and Thailand.

5. RESULTS AND DISCUSSION

To identify the long-run relationship between export diversification and each of the explanatory variables, we are required to check the order of integration for all variables in the panel dataset. A balanced panel dataset is used, which includes five ASEAN and four SAARC countries, for a period of twenty seven years [1986-2012].

Table 5. Theoretical Expected Signs of Explanatory Variables with Export Diversification

Explanatory Variable	Abbreviated as	Proxy as	Expected sign +/-	Data Source
Fuel Exports to Total Exports Ratio	FUEL	Resource Curse	+, -	WDI, World Bank
Manufactured Exports to Total Exports Ratio	MANU	Industrial Sector's Growth	+	WDI, World Bank
Per Capita GDP	GDPP	Level of Development, or Institutional Strength	+,-	WDI, World Bank
Gross Fixed Capital Formation to GDP Ratio	GFCF	Growth in Domestic Investment	+	WDI, World Bank
Credit to the Private Sector to GDP Ratio	CPS	Financial Sector Development	+	WDI, World Bank
Net Foreign Direct Investment to GDP Ratio	FDI	Macroeconomic Efficiency	+	WDI, World Bank
Real Effective Exchange Rate	REER	Real Depreciation	+	WDI, World Bank
Human Capital	H-CAPITAL	Human Capital	+	WDI, World Bank
Export to GDP Ratio	EXP	Competitiveness	+	WDI, World Bank
Regional Dummy	R-DUMMY	Region's Differentiation	+, -	

5.1. Empirical Result of Panel Unit Root Test

As time units are sufficiently large and also greater than cross sections, it is imperative to examine the unit root properties of data. The selection of the test for examining unit root properties of data depends on the presence (or absence) of cross-sectional dependence among selected countries. For this purpose, Pesaran (2003) test is applied. This test suggests an easy way of getting rid of cross-sectional dependence than estimating the factor loading. This method with the lagged cross-sectional mean and its first difference is based on the ADF regression to

capture the cross-sectional dependence which arises from a single factor model. The result of Pesaran (2003) test is reported in Table 6.

H_0: No cross-sectional dependence
H_1: Cross-sectional dependence

Table 6. Test for Cross Sectional Dependence

	Test -statistics	Probability
Pesaran test of cross sectional dependence	1.189	0.2345

Given the acceptance of null hypothesis, we proceed towards the examination of unit root properties of data. When cross sections are independent then certain widely unit root tests options are available. For instance, see Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003). We have applied Im, Pesaran and Shin (2003) here as it avoids the limitations of LLC test such as LLC is restrictive in the sense that they do not allow for the heterogeneity within the panel as far as unit root properties are concerned. The null hypothesis of LLC is that each individual time series contains a unit root against the alternative that each time series is stationary. IPS (2003) test shares this limitation by allowing for a heterogeneous coefficient and proposes an alternative testing procedure based on averaging individual unit root test statistics. The null hypothesis of IPS is that each series in the panel contains a unit root and the alternative hypothesis allows for some (but not all) of the individual series to have unit roots. The results of IPS test are reported in Table 7.

Panel Unit Root Test: Summary

H_0: Presence of unit root.
H_1: Absence of unit root.

Kao and Pedroni tests are the most advanced form of Engle Granger. Pedroni tests investigate whether there is co-integration or not but do not provide an estimate for the long run. We have applied Kao test, as it follows the same basic approach as the Pedroni tests and also estimates a long run relationship between variables [Baltagi (2008)].

Table 7. Im, Pesaran and Shin Test

Variable	Level		First Difference		Order of Integration
	Intercept and Trend	P-Values	Intercept and Trend	P-Values	
CPS	-2.5103	0.5417	-11.5310	0.0000***	I(1)
REER	-0.0591	0.4764	-4.449	0.0013***	I(1)
Manu	-3.5103	0.534	-9.6341	0.0001***	I(1)
FDI	-1.2573	0.1042	-4.3571	0.0023***	I(1)
GDPP	-3.7505	0.9991	-7.3124	0.0000***	I(1)
EXP	-3.723	0.2147	-9.6431	0.0000***	I(1)
GFCF	-1.30371	0.3021	-2.5543	0.0011***	I(1)
FUEL	-2.0173	0.4593	-7.3114	0.0000***	I(1)
H. capital	-1.5371	0.4371	-3.5121	0.0021***	I(1)
HHI	-3.1036	0.0016	-5.3672	0.0001***	I(1)

*** shows statistical significance at 1%.

Table 8. Kao Residual Co-integration Test Estimation

Kao Residual Co-integration Test Included Observation: 107 Null Hypothesis: No co-integration				
Variable		t-statistic		P-value
ADF		-3.0113		0.0031***
Augmented Dickey-Fuller Test Equation (Dep. Variable: D(RESID)				
Variable	Coefficient	Std. Error	t-statistic	P-value
RESID(-1)	-0.257	0.07137	-3.711	0.0001***

*** shows statistical significance at 1%.

Kao ADF-t test shows that there is a long-run relationship between the variables at the 1% level of significance (Table 8). Thus, the possibility of spurious regression is ruled out.

Based on the Kao (1999) co-integration test, we established that there exists a linear combination. In view of this, OLS estimators will be biased and inconsistent if applied to a co-integrated panel and thus an alternative method needs to be adopted. For this reason, we run the panel by using the Fully Modified OLS (FMOLS) developed by Pedroni (2000).

FMOLS can be used which uses a correction approach to deal with the nuisance parameters and thus gives the long-run coefficients for the estimated model free of endogeneity and serial correlation. The major advantage of FMOLS is that it allows for estimation of common co-integration vectors while allowing for heterogeneity both across time and cross-sections.

Thus, to obtain long-run impact of the variables free of serial correlation we use FMOLS estimations. These estimations not only generate the consistent estimates of the parameters with small samples but help controlling for the serial correlation and accommodate considerable heterogeneity across individual members.

5.2. Empirical Results of Fully Modified Least Squares

Explanatory variables are one-year lag values under the sensible presumption of a delayed impact on diversification. Results of fully modified ordinary least square model show that export diversification is significantly and positively dependent on explanatory variables included in the model for the selected economies of SAARC and ASEAN regions (Table 9).

Negative sign of export to GDP ratio indicates a positive relationship between export diversification and competitiveness of the economy for both regions in the global market (Table 9). Results support the hypothesis that increases in competitive strength of the SAARC and ASEAN countries in global markets enable them to diversify their exports. This statistically significant and positive relationship between competitiveness and export diversification is also supported by the findings of Lewis (2004), Bolivian (2009) and Lim (2012).

Negative sign of credit to private sector to GDP ratio supports the hypothesis that financial development in the two regions reduces export product concentration (Table 9). In other words, financial developments assist regional countries to diversify their exports. The estimated relationship supports the findings of Acemoglu and Zilibotti (1997).

Foreign direct investment and export diversification are positively associated in both the regions (Table 9). The relationship shows that as FDI bring in macroeconomic efficiency and production diversification. Consequently, countries experience export diversification. In this regard, Moran (2010) argued that since FDI brings new ideas and best knowledge and practices for starting new activities; therefore, it is expected that with FDI inflows export diversification will take place. Besides, FDI can easily build up networks and promote forward and backward linkages with firms in their home countries. Moreover, by providing technological spillover, it can enable host countries to

diversify production and exports base. Studies by Ekholm, *et al*. (2007), Hausmann, *et al.* (2007) and Gourdon (2010) support the findings of our study.

Table 9. Fully Modified Ordinary Least Square (FMOLS) Results

Dependent Variable: HHI
Method: Fully Modified Least Squares (FMOLS)
Sample (adjusted): 1986-2012Period included: 26 Cross- sections: 9
Included observations: 234

Variable	Coefficient	Std. Error	t-Statistics	p-values
CPS	-0.000545	0.000273	-2.9937	0.0047*
REER	-0.000961	0.000317	-3.0319	0.0002*
FUEL	0.002275	0.001127	2.0178	0.0588**
FDI	-0.004826	0.005319	-3.1020	0.0071*
GDPP	-0.001847	0.001934	-5.9548	0.0000*
GFCF	-0.001722	0.000122	-2.9121	0.0051*
R-DUMMY	-0.077288	0.019536	-3.9562	0.0001*
H-CAPITAL	-0.005226	0.005577	-4.0541	0.0018*
MANU	-0.000146	0.000371	-3.9562	0.0001*
EXP	-0.000112	0.000151	-3.0421	0.0009*
C	0.259022	0.038861	6.6654	0.0000*
R-squared	0.835107	Mean dependent variable		-0.169692
Adjusted R-squared	0.815077	S.D. dependent variable		0.052147
S.E. of regression	0.05052	Sum squared residual		0.007585
Durbin-Watson stat	1.87574	Long-run variance		0.000979

*, ** significant at 1% level and 5% level, respectively.
Note: Here, 'export diversification' increases as we move from 1 towards 0, hence a negative sign of a coefficient indicates an increase in export diversification say because of increase in credit to the private sector.

In almost all regions of the world, the pattern of trade has changed from primary exports to manufactured exports and hence increases export diversification. As export diversification becomes essential for effective participation in the global trading system and development, ASEAN economies also diversify their manufactured sector by taking structural reforms aimed to improve economic performance [Ferdous (2011), Arip, *et al.* (2010), Matthee and Naudé (2007)]. ASEAN economies are more developed than SAARC economies by giving high priority to export diversification in their development strategy [Shepherd (2009), Voon (1998) and Wu (1991)]. Results of our study are also consistent with these findings. Regional dummy is included in the estimated model reported in Table 9, which

represents an arbitrary benchmark to the ASEAN region. A positive and significant impact shows higher and relatively better process of export diversification in ASEAN region than SAARC region.

Growth in domestic investment result shows positive and significant relationship with export diversification (Table 9). Khan and Kumar (1997) support our findings.

Human capital and export diversification shows a positive and significant relationship for both regions (Table 9). Agosin, *et al.* (2012) support our findings.

GDP per capita captures the institutional strength of countries. Results show that GDP per capita is positively and significantly linked with export diversification in SAARC and ASEAN economies (Table 9). Results of our study are consistent with the findings of Acemoglu and Zilibotti (1997), Aghion and Howitt (1992) and Imbs and Wacziarg (2003).

The results suggest that manufacturing export to total export ratio is favorably and significantly related to export diversification (Table 9). These results are supported by the studies of Agosin (2007), Lederman and Maloney (2003), Lim (2012) and Carrere, *et al.* (2007).

Positive sign of the real effective exchange rate coefficient indicates that real depreciation of domestic currencies motivates SAARC and ASEAN countries for export product diversification (Table 9). This is because depreciation by improving competitive strength promotes exports and induces even non-exporting firms to export, and thus reduces specialization. Results of this study support the findings of Rodrik (1998) and Krugman (1987).

The sign of coefficient for *FUEL* is positive and the relationship is significant, which indicates a negative outcome of natural resource exports on export diversification. This basically confirms the presence of 'resource curse' paradox, where natural resources create lethargy or goofing-off effect in countries; as a result, they do not make efforts to improve export diversification. Similar results are found by Lederman and Maloney (2003), Bebczuk and Berrettoni (2006), and Qaiser and Mahmood (2016).

6. CONCLUSION AND POLICY IMPLICATIONS

This paper has analyzed the role played by country-specific factors in the determination of export diversification process. We were particularly motivated by the fact that earlier studies presented single country analysis. They did not use a panel of countries (SAARC and ASEAN) to identify country-specific factors driving changes in export diversification. Specifically, we analyzed the effect of institutional strength, competitiveness, growth in domestic investment, financial sector development, natural resource curse and macroeconomic efficiency on export diversification.

Empirical findings of fully modified OLS co-integration model show that all factors are positively and significantly associated with export diversification in both the regions, with the sole exception of the fuel-intensity variable, which shows that as the ratio of fuel exports to total exports increases the diversification of exports decline. In other words, dependence on export of natural resources reduces intensives for diversifying exports. Thus, for the ASEAN countries we found the presence of natural resource curse.

An important finding of the analysis is that the institutional strength enables countries to fast diversify their exports. In other words, a country is in a better position to diversify its exports if it has a well-developed soft and hard infrastructure and viable institutions.

Inflow of foreign direct investment, which creates macroeconomic stability and contributes to economic efficiency by transferring knowledge and know-how, also facilitates export diversification. Likewise, growth in domestic investment, which provides required domestic resources to diversify production base in turn helps economies to diversify export. At the same time, financial sector development, which provides required credit to private establishments, becomes a facilitation source to diversify exports.

Real effective exchange rates have also played an important role in the export diversification. The empirical findings suggest that the real depreciation of national currencies is profitable as it strengthens competitiveness required for export diversification.

Based on the above conclusion, we can draw implications for policymaking in the SAARC and ASEAN regions, these are as follows:

- Reform institutions and strengthen their mechanisms to facilitate export diversification. This should include strengthening of institutional capacity to develop right policies and create conducive business environment.
- Attract FDI by providing appropriate incentives and policies aimed at simplifying tax structure, flexible labour markets, and improved infrastructure.
- Further develop financial markets to fulfill the credit and financial products needs of private industries especially diversifying exports.
- Policy makers in natural resource rich countries need to be cautious in efficiently managing resources for their inevitable use to restructure economies and exports instead of misusing them. They must ensure macroeconomic stability and strengthen all the sectors of the economy to diversify exports.
- Stabilize domestic currencies as well as inflation to gain competitive strength in international markets for attaining the objective of export diversification.

APPENDIX
Measurement of Export Diversification

There are different ways to measure the degree of export diversification. The choice of a measure usually depends on different definitions, dimensions, forms, and levels of diversification. Measures of diversification or specialization can be obtained through determining different variety of specialization/concentration indices. The most typical in this respect are Herfindahl, normalized-Hirschmann and overall difference measures [Petersson (2005) and Pineres and Ferrantino (1997)]. The export diversity of different regions is measured through these three types of indices. The first diversity index is the Herfindahl index, which defines the changes in export revenue or concentration of the regions. Following Petersson (2005), it can be calculated as:

$$SPEC_{jt} = \sum_i \left(\frac{E_{jit}}{\sum_j E_{jit}} \right)^2 \quad \ldots \text{(A-1)}$$

where, E_{jit} is the exports of the *j*th country in the *i*th product (sector) in a given period *t*. Index value ranges between zero and one. Where index value one shows full degree of export concentration (or specialization), while zero value indicates complete degree of export diversification.

Following Al-Marhubi (2000), the normalized-Hirschmann index can be calculated as:

$$H_{jt} = \frac{\sqrt{\sum_{i=1}^{n} \left(\frac{x_{it}}{X_{jt}} \right)^2} - \sqrt{\frac{1}{n}}}{1 - \sqrt{\frac{1}{n}}} \quad \ldots \text{(A-2)}$$

where, x_{it} is the value of exports of industry *i* located in country *j* and X_{jt} is the total exports of country *j* in a given period *t*. The number of industries is shows by *n*. An index value of one shows complete concentration whereas the values nearer to 0 indicate high diverse mixture of exports [Al-Marhubi (2000) and Naqvi and Morimune (2005)].

A third technique to calculate the export diversification is the total deviation of the country's share of the world's overall exports [e.g., Al-Marhubi (2000)]. This can be measured as follows:

$$S_{jt} = \frac{\sum_i | h_{ijt} | - | h_{it}}{2} \quad \ldots \text{(A-3)}$$

where, h_{ijt} is the share of industry *i* in total exports of country *j* and h_{it} is the share of industry *i* in world exports in a given period *t*. The calculated value of the index ranges from 0 to 1. Where, 1 indicates complete concentration and 0 designates complete diversification [Al-Marhubi (2000)].

Following Matthee and Naude (2007), Bebczuk and Berrettoni (2006), we use Herfindahl index to examine the degree of export

diversification in SAARC and ASEAN regions. This is because this index is useful when export diversification is apparent due to changes in export composition within sectors. Besides this index allows catching both the intensive[3] and the extensive[4] edges of diversification.

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[3] Different quantities of the same products, i.e., the intensive margin.
[4] Different quantities of different products, i.e., the extensive margin.

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