



# IMPACT OF ENVIRONMENT, ENERGY AND FOREIGN DIRECT INVESTMENT ON EXPORTS OF SELECTIVE SAARC COUNTRIES

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## ABSTRACT

*This study focused on the relationship of environment, energy used and foreign direct investment inflows on exports of selective SAARC countries including Pakistan, Bangladesh, India, Sri Lanka and Nepal from 1980-2018. The results revealed that environment has significant positive impact on exports. Energy has also positive impact on exports except Pakistan and Nepal where results showed negative relationship. The FDI inflow in India and Sri Lanka has not significant impact on exports while other three countries has significant impact on exports of those countries. Overall environment, energy used and foreign direct investment inflows have positive impact on export while controlling the impact of inflation, GDP growth, reserves and domestic credit to private sector in SAARC countries.*

## INTRODUCTION

SAARC comprises of eight South Asian nations and was made in 1985 to improve financial collaboration in region. Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka are the founder members of SAARC and later in 2005 Afghanistan has joined the organization. The interesting factor of SAARC is that there is one giant nation (India) and all others are moderately little. Subsequently, possibility of financial participation among SAARC nations can be a one of a kind contextual analysis of the capability of South-South Cooperation. The Export, Environment pollution, energy use and FDI inflow has altogether expanded right now the previous decade, particularly, in India. Other part states are additionally actualizing different arrangements, for example, concession on charge, decrease in taxes, credit offices, etc., to pull in increasingly outside capital through FDI to boost exports.

The worldwide network has worry for ecological degradation too, however it just spotlights on the exercises or productions responsible for an Earth-wide temperature boost and environmental change. The

outflows of greenhouses gases (GHG) have suggestions for a dangerous atmospheric deviation, environmental change, and natural uneven characteristics. Since the mechanical transformation, there has been a persistent increment in GHG and carbon outflows, which comprise a significant segment of agribusiness, and ranger service are significant segments of GHG emanations. One can accuse a locale or a nation for an unnatural weather change and atmosphere. Foreign Direct Venture (FDI) has, to an enormous degree, supplanted remote guide as a wellspring of money for creating nations to connect the customary two holes for example .reserve funds speculation send out import whole. In the process FDI, rather than keeping the generation just to home nation (or hardly any created nations), has globalized the creation. Therefore the absolute generation by worldwide is currently fundamentally contributing towards the GDP (Gross domestic product) at world level. At present, worldwide companies likewise rule the world exchange as a result of their inclination for intra global types of exchange. This pattern may change throughout the years as undertakings of creating nations likewise achieve mechanical and administrative development.



Zhang et al. (2013) investigated the associations among China's monetary development and its vitality utilization, air discharges, and air ecological security venture during 2000–2007. The outcomes show that vitality utilization quickly ascends with China's quick monetary development; be that as it may, vitality effectiveness and natural stacking force from vitality utilization are diminished all the while, and their upgrades fall a long ways behind their financial development rate. Effect of air outflows on human wellbeing (particularly dust) is diminished. The presentation of air natural insurance speculation is declined in the investigation time frame. Tan et al. (2013) examine the since quite a while ago run and the causal connection between ozone harming substance discharges, monetary development per unit of vitality use, and vitality utilization in Pakistan over a 36-year timespan, i.e., somewhere in the range of 1975 and 2011. The discovering proposes that vitality utilization goes about as a significant driver for the expansion in ozone harming substance discharges in Pakistan. The outcomes demonstrate that by and large, causality runs from vitality utilization to ozone depleting substance emanations, however not the other way around as indicated by Tan et al. (2013).

Akhmat and Zaman (2013) investigate the causal relationship among nuclear essentialness use, business imperativeness usage (i.e., oil use, gas use, power use, and coal use), and monetary improvement in South Asian countries, to be explicit, Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, over the hour of 1975–2010. The results reveal that nuclear essentialness use Granger causes budgetary improvement in Nepal and Pakistan, while business imperativeness use, i.e., oil use Granger causes money related advancement in Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka; gas usage Granger causes monetary improvement in Bangladesh, Bhutan, India, and Maldives; influence use Granger causes budgetary improvement in India and Sri Lanka; finally, coal use Granger causes monetary advancement in Bangladesh, Bhutan, Nepal, and Sri Lanka.

Akhmat et al. (2014) study results demonstrate that vitality utilization goes about as a significant driver to increment ecological contaminations in SAARC nations. Granger causality runs from vitality utilization to natural contaminations, yet not the other way around, with the exception of carbon dioxide (CO<sub>2</sub>) discharges in Nepal where there exists a bidirectional causality among CO<sub>2</sub> and vitality utilization. Methane outflows in Bangladesh, Pakistan, and Sri Lanka and extraordinary temperature in India and Sri Lanka don't Granger cause vitality utilization by means of the two

courses, which holds lack of bias speculation. Fluctuation decay investigation shows that among all the ecological markers, CO<sub>2</sub> in Bangladesh and Nepal applies the biggest commitment to changes in electric force utilization. Normal precipitation in India, methane emanations in Pakistan, and outrageous temperature in Sri Lanka apply the biggest commitment.

Zhang (2005) in an exhaustive report, in light of full example of various types of businesses, demonstrates that FDI contributed around 57 percent in send out from China. As per Zhang (2005) 'FDI have the dominating effect on China's fare execution. In all cases, the FDI variable has moderately enormous and factually noteworthy coefficients [as illustrative variable for trades from China] (p/1)'. This is a persuading proof of positive and solid effect of FDI on sends out. Be that as it may, there is a requirement for additional examination to see whether FDI could be considered as the sole factor for expanding trades by such a major edge. It is notable that China has customarily utilized its underestimated money to advance fares (and FDI is profiting by the approach). Sharma (2000), utilizing yearly information (1970-1998), in a synchronous condition model, didn't watch a factually huge connection between inflows of FDI and fares of India. The investigation arraigned different components (for example conversion scale) are progressively significant in advancing fares. As it were, FDI in India has basically satisfied household need instead of sending out. Curiously, in another investigation by Sudershan et al. (2012) watched a negative connection between FDI inflow and Pharmaceutical Fares from India.

If there should arise an occurrence of Pakistan, Siddiqui et al. (2013) found a long unidirectional negative connection between inflow of FDI and current record of equalization of installments. In the short run inflow of FDI has, be that as it may, demonstrated no association with Taxi. The long haul negative impact is clearly could be the consequence of repatriation of benefit emerging from combined FDI. In any case, the examination has not inspected the effect independently on significant components of Taxi for example trades, imports. Shahbaz et al. (2013) discovered positive effect of capital fare, vitality utilization, budgetary improvement, imports, and universal exchange on financial development in China from 1971 to 2011. Uni and bi directional Granger causality was found from vitality utilization to monetary development; and between budgetary advancement and vitality utilization, and among exchange and vitality utilization individually. Pradhan (2011) discovered short run what's more, since a long time ago run bidirectional



causality between government spending and financial development in five SAARC nations from 1970 to 2007 with the exception of Pakistan and Sri Lanka. Yousuf et al. (2012) observationally broke down the effect of FDI and found a negative connection among FDI and fares. Tabassum et al. (2012) additionally demonstrated a statically powerless however positive connection among FDI and fares. A typical shortcoming of these investigations is disregarding the major financial interruptions occurring in Pakistan during the period for which the information has been examined.

Tang and Tan (2015) examined non-linear connections among GDP and carbon discharges for Vietnam. Tang and Tan (2015) found that carbon emission, usage of energy, and FDI were cointegrated over the long run. Nguyen et al. (2012) while exploring connection between bank advertise force and income broadening in four South Asian nations (Bangladesh, India, Pakistan, and Sri Lanka) from 1998 to 2008 discovered manages an account with more noteworthy market power center more around ordinary premium income producing exercises. Be that as it may, differentiating across both intrigue and non-intrigue pay exercises help them more settle. Kreishan and Sami (2012) discovered positive effect of FDI and trades on

monetary development in Jordan from 1970 to 2010. They discovered since quite a while ago run causality from fares and FDI to monetary development. Perera and Wickramanayake (2012) found that both stock also, security returns were co-coordinated inferring normal stochastic patterns. The investigation was directed in money related markets of four significant South Asian nations for example Bangladesh, India, Pakistan, and Sri Lanka. Alam et al. (2015) uncovered through board co-reconciliation test recommend that the factors are co-incorporated and have a since quite a while ago run connection between them. Furthermore, three distinctive board information strategies for example pooled least square, fixed impacts and irregular impacts have been utilized to test the legitimacy of the "vitality development nexus by means of budgetary improvement" in the SAARC.

## DATA AND METHODOLOGY

We used data for five countries of SAARC including Pakistan (PAK), Bangladesh (BGD), India (IND), Sri Lanka (LKA) and Nepal (NPL) from 1980-2018. The table below showed the variable used in this study along with sources of data.

Sr no	Variable	Description	Source
1	lnexport	Log natural of Exports of goods and services (current US\$)	WDI
2	lnco2	Log natural of CO2 emissions (kt)	WDI
3	lnenergy	Log natural of Energy use (kg of oil equivalent per capita)	WDI
4	lnfdi	Log natural of Foreign direct investment, net inflows (% of GDP)	WDI
5	lncredit	Log natural of Domestic credit to private sector (% of GDP)	WDI
6	lnreserve	Log natural of Total reserves (% of total external debt)	WDI
7	Inflation	Inflation rate	WDI
8	Gdp growth	GDP growth (annual %)	WDI

Equation is representing the model used in this study as follows

$$\ln export_{it} = \alpha + \beta_1 \ln co2_{it} + \beta_2 \ln energy_{it} + \beta_3 \ln fdi_{it} + \beta_4 \ln reserve_{it} + \beta_5 \ln credit_{it} + \beta_6 \ln inflation_{it} + \beta_7 \ln gdp growth_{it} + \varepsilon_{it}$$

lnexport represents log of the dependent variable export at time t, while the betas show the elasticity of the independent variables and  $\varepsilon_{it}$  represents the error term in time t. We have compared the results of different techniques like pooled Ordinary Least Square (OLS) regression, Panel fixed effect along with random effect model, and Hausmann test significant result suggested fixed effect models are adequate. Also results of are obtained through panel Generalized Least Square (GLS) regression model and also compared by dynamic panel regression model. In addition OLS regression independently for each country is ran to

check each countries individual pattern of exports as well. We have used Stata 15 to analyze the models.

## RESULTS AND DISCUSSIONS

Figure 1 showed the exports of SAARC over 1980-2018 for selected five counties, India is the largest exporter. While figure 2 explained co2 emission of SAARC over 1980-2018 for selected five counties with India is emitting more co2 and boosting their exports. Figure 3 is about energy used of SAARC over 1980-2018 and showed that again India is leader in usage of energy while Pakistan and Sri Lanka are also using more energy which is not translated in their exports.

Table 1 reported the overall descriptive of all variables used in study with 167 total observations. Descriptive showed mean, standard deviation, minimum and maximum for all variables. Table 2 reported correlation coefficients of all variables, the



correlation among all dependent variables is below 0.6 which indicated no Multicollinearity among predictors.

We also check Durbin Watson test and found the values around 2, which indicated no serious auto correlation.

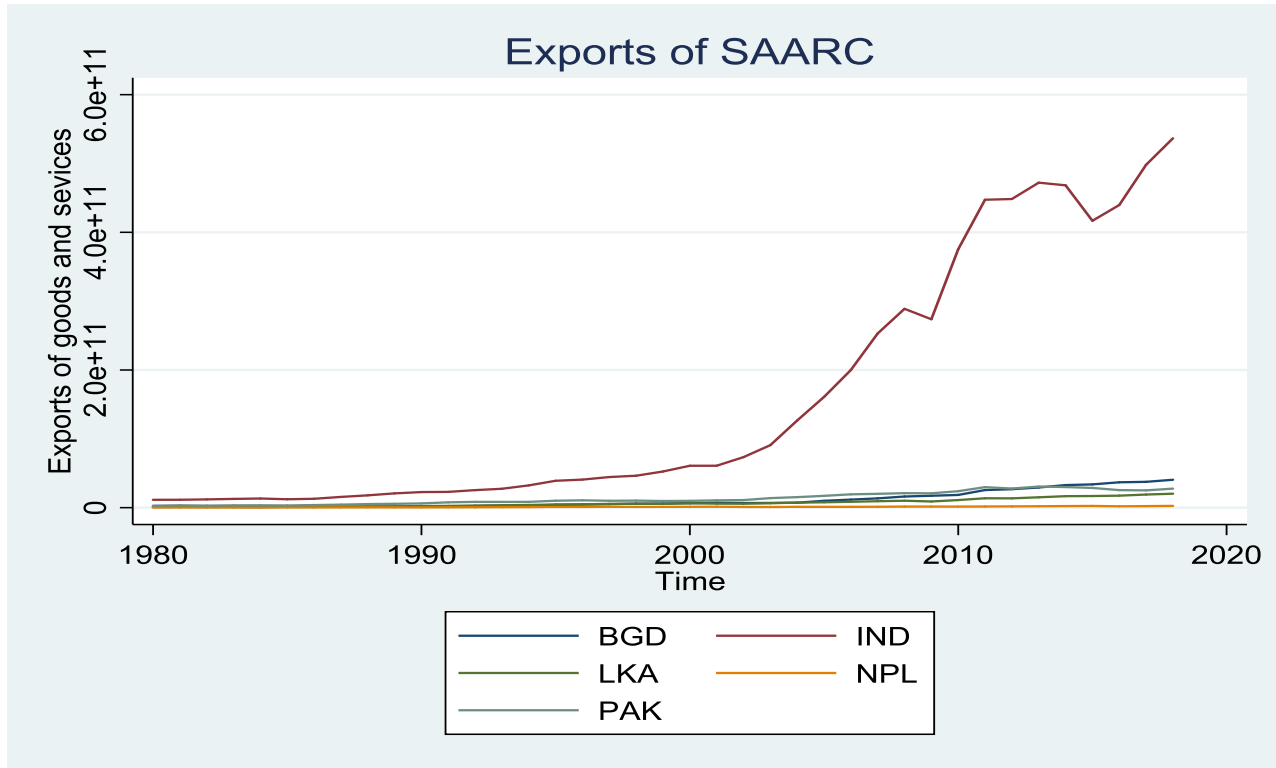


Figure 1. Exports of SAARC over 1980-2018

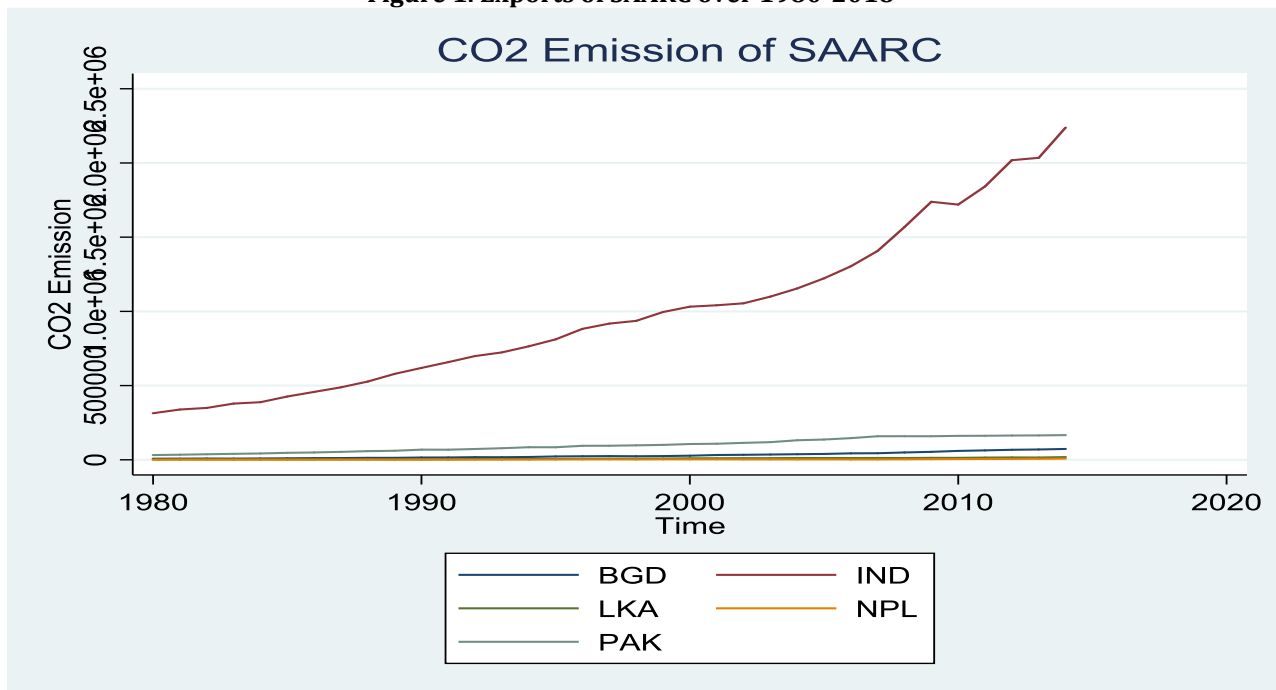


Figure 2. CO2 Emission of SAARC over 1980-2018

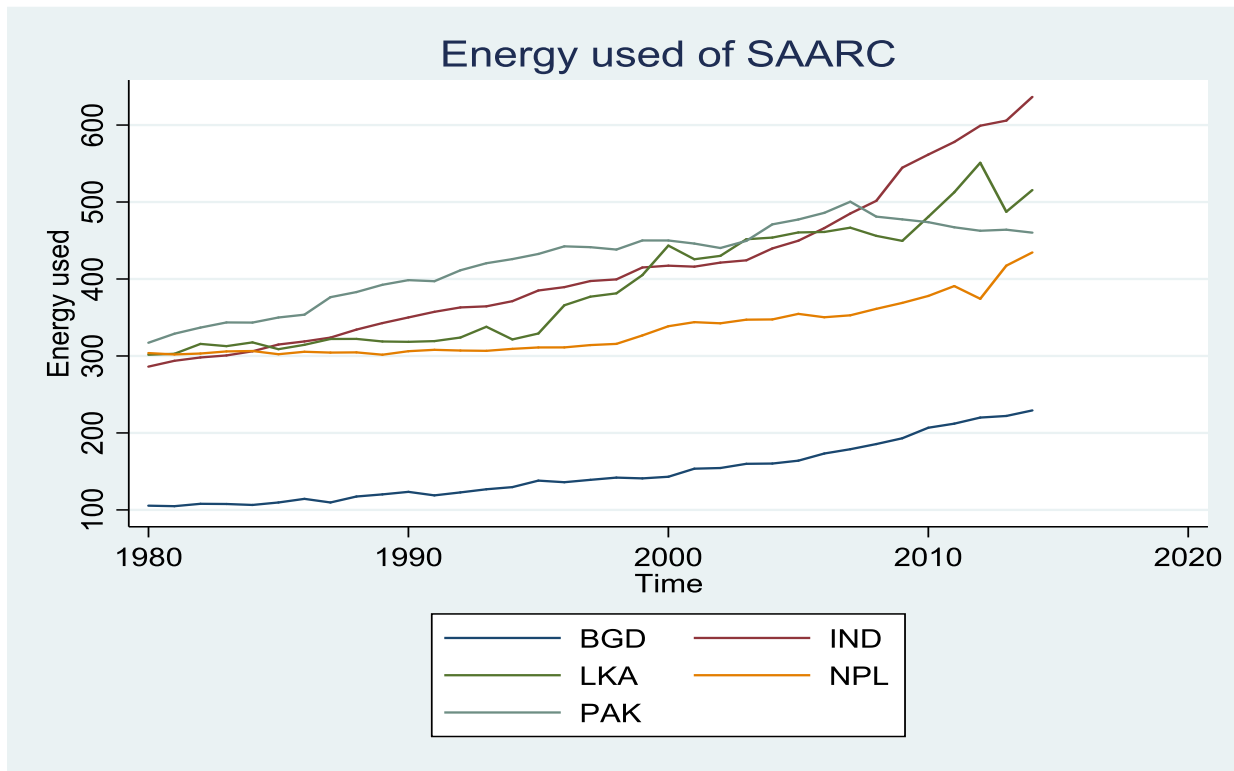


Figure 3. Energy used of SAARC over 1980-2018

Table 1. Descriptive Analysis over 1980-2018.

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Reserves	167	35.842	37.364	3.793	202.93
Domestic credit to private sector	167	26.71	15.00	2.508	87.02
Exports	167	3.215e+10	9.313e+10	1.851e+07	5.366e+11
FDI inflow	167	0.756	0.844	-0.655	6.175
Energy use kg	167	339.6	119.9	104.9	636.6
Gdp growth	167	5.481	2.893	-2.977	28.70
co2emissions	167	188,683	423,315	22.00	2.238e+06
Inflation	167	8.137	4.322	0.156	24.89
Number of countries	5	5	5	5	5



**Table 2. Correlation Matrix of all five countries over 1980-2018.**

Variables	Lnexport	lnco2	lnenergy	lnfdi	lnreserve	lncredit	Inflation	Gdp growth
Lnexport	1.000							
lnco2	0.953***	1.000						
lnenergy	0.434***	0.301***	1.000					
lnfdi	0.459***	0.252***	0.575**	1.000				
lnreserve	-0.230***	-0.357***	0.355**	0.085	1.000			
lncredit	0.660***	0.595***	0.499**	0.493**	-0.063	1.000		
Inflation	-0.084	-0.006	0.118	-0.056	-0.199***	-	1.000	
Gdp growth	-0.050	-0.116*	0.095	0.225**	0.302***	0.135**	-	1.000
				*		-0.074	0.219***	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 3. Regression results using all five countries over 1980-2018.**

VARIABLES	(1) Lnexport	(2) Lnexport	(3) Lnexport	(4) Lnexport	(5) Lnexport	(6) VIF
L.lnexport					0.94750*** (0.03492)	
lnco2	0.62861*** (0.01828)	0.80496*** (0.19450)	0.62735*** (0.03993)	0.62832*** (0.01746)	0.07790** (0.05958)	1.31
lnenergy	0.11206 (0.08578)	1.91023** (0.65805)	0.11206 (0.27669)	0.11206 (0.10723)	0.00846** (0.22412)	1.92
lnfdi	0.22523*** (0.02338)	0.07429*** (0.01608)	0.22523*** (0.03502)	0.22523*** (0.02536)	0.00083** (0.00785)	1.64
lnreserve	0.14750*** (0.05102)	0.16901** (0.09433)	0.14750** (0.14883)	0.14750*** (0.04730)	0.03133* (0.01747)	1.42
lncredit	0.37527*** (0.11853)	0.26696** (0.09339)	0.37527 (0.25350)	0.37527*** (0.09972)	0.01729* (0.04039)	1.87
Inflation	-0.00144 (0.00920)	-0.00316** (0.00408)	-0.00144 (0.00826)	-0.00144 (0.00834)	-0.00258** (0.00185)	1.16
Gdp growth	-0.00655 (0.01494)	0.01557 (0.00988)	-0.00655 (0.02488)	0.00655 (0.01625)	0.01365 (0.00413)	1.14
Constant	15.34689*** (0.51913)	3.60139** (2.21762)	15.34689** (1.07202)	15.34689** (0.58034)	0.27717 (0.51095)	
Observations	167	167	167	167	149	
R-squared	0.83151	0.93592	0.84533	0.89513	0.86315	
Number of countries		5	5	5	5	

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$





Table 3 explained coefficients with logarithm natural of exports as dependent variable with panel 1 pooled OLS regression, panel 2 as Panel fixed effect, panel 3 with random effect model, panel 4 reported results obtained through panel GLS regression model and panel 5 reported results obtained by dynamic panel regression model. Panel 6 of table 3 reported Variance Inflationary factor (VIF). All values of VIF less than 10 shows that there is no Multicollinearity among predictors. Results of table 3 showed that co2 emission has positive and significant impact on exports in all techniques which indicated that by increasing pollution in SAARC the exports are boosted. While coefficient result of energy usage has positive and significant impact in fixed effect model, panel GLS and dynamic

panel models and other models have shown no significant relationship of energy usage with exports. Table 3 showed that FDI inflows has positive and significant impact on exports in all techniques which indicated that exports are boosted due to FDI inflows in SAARC countries. Dynamic panel model explained that first lag of exports has a positive significant impact on exports and co2 emission, energy used, FDI inflows, reserves and credit availability has positive and significant impact while inflation has negative significant impact on exports. GDP growth has found no significant impact on exports of SAARC countries. These signs of results are in accordance with panel fixed effect model and GLS as well.

**Table 4 OLS Regression results for each country over 1980-2018.**

VARIABLES	(PAK) lnexport	(BGD) lnexport	(IND) lnexport	(LKA) lnexport	(NPL) lnexport
Inco2	1.352*** (0.296)	1.397*** (0.373)	1.028*** (0.236)	0.942* (0.548)	0.503*** (0.115)
lnenergy	-0.557 (1.111)	1.115* (0.602)	1.654*** (0.582)	1.540 (1.424)	-0.472 (0.648)
lnfdi	0.0907* (0.0489)	0.0312 (0.0256)	-0.0149 (0.0264)	-0.0979 (0.107)	0.0100 (0.0206)
lnreserve	0.0309 (0.0419)	0.0541 (0.0681)	0.267*** (0.0391)	0.152 (0.171)	-0.138* (0.0703)
lncredit	-0.837*** (0.212)	-0.427 (0.309)	0.724*** (0.168)	-0.237 (0.154)	0.584*** (0.125)
Inflation	0.00336 (0.00398)	-0.000824 (0.00698)	0.0329*** (0.00740)	-0.00723 (0.00817)	-0.0153** (0.00652)
Gdp growth	0.0192 (0.0117)	0.0281 (0.0208)	0.00825 (0.00876)	0.00760 (0.0280)	-0.00688 (0.0118)
Constant	13.44*** (3.519)	3.697 (2.457)	-2.985** (1.306)	5.019 (4.051)	18.31*** (3.230)
Observations	35	33	35	35	29
R-squared	0.982	0.990	0.996	0.933	0.989

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4 reported results of OLS regression for each country separately. Panel 1 of table 4 reported results for Pakistan, panel 2 of table 4 reported results for Bangladesh, panel 3 of table 4 reported results for India, panel 4 of table 4 reported results for Sri Lanka and panel 5 of table 4 reported results for Nepal with logarithm natural of export as dependent variable for all countries. Result of table 4 showed co2 emission has

positive and significant impact on exports in all five countries. While energy has also positive impact on exports except Pakistan and Nepal where results showed negative relationship which is due to using more energy which is not translated in their exports. The FDI has no significant impact on exports of SAARC countries except Pakistan, which has positive significant at 10% level relationship. Inflation has



negative impact on exports except Pakistan and India in SAARC countries. Table 4 showed that GDP growth has no significant impact on exports of SAARC countries. Availability of credit has positive and significant impact in case of India and Nepal, while Pakistan has negative, impact on exports.

## CONCLUSION

This study mainly focused on the environment, energy, FDI inflows and inflation impact on the exports of SAARC region, the findings indicate that the exports of the country are boosted by the industrialization and omitting more CO<sub>2</sub> emissions. In Pakistan and Nepal the energy usage indicate negative effect on the export showing nonproductive usage of energy. While the findings for the other countries, show the energy usage as significant booster of the exports in SAARC region. The persistent rising in the prices has negative impact on exports, so it is suggested to control inflation to boost the exports for SAARC region. FDI is another important factor to enhance exports as it leads to more production in SAARC. In future the results can be replicated for all other regions and for major exporting countries.

## REFERENCES

1. Ahmed Siddiqui, A. D., Hasnain Ahmad, M., & Asim, M. (2013). *The causal relationship between Foreign Direct Investment and Current Account: an empirical investigation for Pakistan economy. Theoretical & Applied Economics*, 20(8).
2. Akhmat, G., & Zaman, K. (2013). *Nuclear energy consumption, commercial energy consumption and economic growth in South Asia: bootstrap panel causality test. Renewable and Sustainable Energy Reviews*, 25, 552-559.
3. Akhmat, G., Zaman, K., Shukui, T., Irfan, D., & Khan, M. M. (2014). *Does energy consumption contribute to environmental pollutants? Evidence from SAARC countries. Environmental Science and Pollution Research*, 21(9), 5940-5951.
4. Alam, A., Malik, I. A., Abdullah, A. B., Hassan, A., Awan, U., Ali, G., & Naseem, I. (2015). *Does financial development contribute to SAARC' S energy demand? From energy crisis to energy reforms. Renewable and Sustainable Energy Reviews*, 41, 818-829.
5. Nguyen, M., Skully, M., & Perera, S. (2012). *Market power, revenue diversification and bank stability: Evidence from selected South Asian countries. Journal of International Financial Markets, Institutions and Money*, 22(4), 897-912.
6. Perera, A., & Wickramanayake, J. (2012). *Financial integration in selected South Asian countries. South Asian Journal of Global Business Research*.
7. Pradhan, R. P. (2011). *Government spending and economic growth in SAARC: evidence from panel cointegration. International Journal of Economic Policy in Emerging Economies*, 4(1), 78-94.
8. Sami, J., & Kreishan, F. (2012). *FDI and export-led growth in Jordan: evidence from cointegration and causality test. Economics Bulletin*, 32(2), 1-18.
9. Shahbaz, M., Khan, S., & Tahir, M. I. (2013). *The dynamic links between energy consumption, economic growth, financial development and trade in China: fresh evidence from multivariate framework analysis. Energy economics*, 40, 8-21.
10. Sharma, K. (2000). *Export Growth in India: Has FDI played a role? (No. 1858-2016-152730)*.
11. Sudershan, K., Muppani, V. R., Khan, M., & Ali, A. (2012). *Foreign direct investment and export performance of pharmaceutical firms in India: An empirical approach. International Journal of Economics and Finance*, 4(5).
12. Tabassum, U., Nazeer, M., & Siddiqui, A. A. (2012). *Impact of FDI on import demand and export supply functions of Pakistan: An econometric approach. Journal of Basic & Applied Sciences*, 8(1), 151-159.
13. Tan, K. C., Lim, H. S., & Mat Jafri, M. Z. (2013). *Relationship between ozone and the air pollutants in Peninsular Malaysia for 2003 retrieved from SCIAMACHY. In AIP Conference Proceedings (Vol. 1528, No. 1, pp. 151-156). American Institute of Physics*.
14. Tang, C. F., & Tan, B. W. (2015). *The impact of energy consumption, income and foreign direct investment on carbon dioxide emissions in Vietnam. Energy*, 79, 447-454.
15. Yousaf, M. M., Hussain, Z., & Ahmad, N. (2008). *Economic evaluation of foreign direct investment in Pakistan. Pakistan economic and social review*, 37-56.
16. Zhang K.H. (2005). *How does FDI affect a host country's export performance? The case of China, Paper presented in International conference of WTO China and the East Asian Economies III Xian China : pp25-26*
17. Zhang, X., Wu, L., Zhang, R., Deng, S., Zhang, Y., Wu, J., & Wang, L. (2013). *Evaluating the relationships among economic growth, energy consumption, air emissions and air environmental protection investment in China. Renewable and Sustainable Energy Reviews*, 18, 259-270.