Journal of Indian Studies
Vol. 5, No. 2, July – December, 2019, pp. 231 – 244

Impact of Globalization on Green Growth: A Case of OECD Countries

Mahwish Zafar
The Superior College Lahore, Pakistan.
Shazia Kousar
The Superior College Lahore, Pakistan.
Saeed Ahmad Sabir
University Utara, Malaysia.

ABSTRACT

Green growth is considered as healthy sign for any country in the world. With growing pollution and other health issues now it is considered as burning issue, either to save our natural resources or the cost should be paid in case of over or unrealistic consumption of resources. This study has been carried with real intension to investigate the role of fdi, R &D and trade openness on green economic growth of OECD countries. Developed economies are open for foreign direct investment, more liberal trade policies and ready to adopt technological innovations, all that causes to bring rapid environmental changes in these nations and continuously increasing level of heat in the atmosphere of these economies. No doubt these countries are attaining high speed of growth at high level of CO2 in the atmosphere. Therefore, this study is conducted to identify the factors that can affect green economic growth. Data is extracted from world development indicator from 1991-2018 where results depict that FDI (Foreign Direct Investment) and trade openness has significant and positive relationship with the emission of CO2 in air and has certain association with green economic growth in short run as well as in the long run. Whereas research and development cost has significant but negative relation with green growth of the OECD countries. Policy makers should work on research and development if they are more focused on green growth of the countries.

Key Words: **Foreign direct investment, Research & development, Trade openness, Green growth, OECD countries**

Introduction

A generic concept of globalization to brings a lot of benefits, such as trade openness, exchange of latest technology and ideas. Whereas in the eyes of many economists there are some reservations attached with it. In response of globalization domestic industry of developing countries may get hurts, social and environmental costs etc. Therefore few empirical studies are in the favor of globalization to improve green growth whereas few are against the globalization in prospect of green growth. Developing countries are striving to achieve green growth, although most developing nations` shares very little global greenhouse gas

emission and the emission of greenhouse gas will lead to the same path of economic growth as developed countries.

Globalization cause disparity (Beer & Boswell, 2001) whereas on the other hand globalization added intense contribution in the tax collection on social and environmental cost by government which ultimately increases green growth of the country (Reuveny & Li, 2003). By implementing environmental policies and process, can be achieved through green growth, which will ultimately helping to attain economic growth as by-product as well (Tausz-Posch et al., 2013). Economic growth is considered as healthy sign for any country In the world but with growing pollution and other health issues now it is considered as burning issue, either to save our natural resources or the cost should be paid in case of over or unrealistic utilization of resources (INDICATORS, 2011).

There are two schools of thoughts about production in the eye of management; either they focus on sustainable development with global equity or industrial transformation through technology, energy and trade openness in short we known it as green growth (L. Ø. Blaxekjær, 2012). Green growth is a concept which can be practically implemented in assuring to save natural assets and keep environment safe to support sustainable development (Istance & Kools, 2013).

Nowadays in the modern endogenous growth models depicts direct link between green growth and trade openness, where (Dowrick, 1994) explained in his two model of growth of Adam Smith and Ricardian models which are in favor of trade liberalization and enhance the growth of the economy. Trade openness has quality to smooth economy and environment friendly products and production which is helping to enhance resources and opportunities for public to remove curse like poverty (Zafar, Sabri, Ilyas, & Kousar, 2015). Moreover we could elaborate our discussion in the favor of trade openness for green economy that it's purely depend on policies that how to carry trade in positive manners with rest of the world.

According to experts we cannot detach green economy and trade openness from each other because they are attached each other by default. The reason is as trade openness is increasing in any country ultimately environment will be damaged in response of that constant increase. Trade openness is blamed most to spoil green economy, and consider is focal driver to environmental change.

Foreign direct investment and technology

For more than three decades china not only achieved but maintained their economic growth. This quick growth of economy of china was possible due to many reasons but FDI (foreign direct investment) is considered as the major pillar of it. During 90`s china was in lime light to attract FDI in their country from developed countries. And that attraction is still not stopped and still it is increasing year by year which are now thirty four times bigger than the earlier figure.

As every success needs some cost same like that china has to pay its cost in the form environmental pollution, which ultimately cause of damaging ozone layer of

their environment. So this was the reason Chinese think tank got alerted to change the model of success from high pollution and high emissions to low pollution and low emission models of growth, later it was introduced as green growth. Nowadays it is considered as burning question for the rest of the world is that either we should focus on economic growth or green growth for the long run success of the nation (MahwishZafar & Khan).

Nowadays few countries thinking about economic growth whereas few countries are now on the switching stage of green growth. Whereas most of the developing nations are practically working on saving trees, neat environment, noise barriers, that all helping them to maintain their atmosphere. It is considered that when you take care of environment along with economic growth known as green growth.

Moreover FDI plays crucial role to save environment friendly productions with the help of latest technology which are directly associated with progress of environment and growth as well. Developing countries are getting notable benefits from the technology and other measurements to save the atmosphere not for the current but future generation (Popp, 2012).

Green FDI always remains less highlighted area because of no policies and no practicality of those policies. The main purpose of this paper is to identify steps to implement green FDI. There are so many products which cater both categories of green and non- green products as well. Firms also produce great amount of products but only few of them are green. Green economic activities are not attached with goods and services but most of time it is attached with latest technology which is supportive to save environment. International think tanks are focusing on saving environment and also try to meet the challenges in response cope the situations and retain it for long time. And try to handover clean environment for the upcoming generations.

New technology and research development have been introduced across the world for the betterment of the world economies, which opens new horizons for the markets. Whereas clean environment is considered as the biggest challenge for the third world countries along with economic growth. For the purpose of green growth country has to be relying on trade openness, foreign direct investment and latest technology.

Literature review

Empirically it is been proved that most of the time globalization is source to raise the economic growth of any country by the effect of total factor productivity (Dar & Amirkhalkhali, 2003). On the contrary side few studies indicating that globalization is harmful for the economic growth of the country as it hurts climate condition and effect greenhouse gases as well (Baten & Fraunholz, 2004; Managi, 2004a). It means growth is flourishing in the country without misusing of natural resources and it helps to keep minimize environmental and social costs as well (Dunlap & Jorgenson, 2012).

Green growth described as fastest economic growth and development whereas natural resources have been trying to save for better environment for the betterment of human beings for staying home in long run(INDICATORS, 2011). Green growth helps to maintain economic growth and sustain the environment according to the need of living beings which will help the world to remain balance (Bina, 2013). Hallegatte, Heal, Fay, and Treguer (2012) now environment friendly technologies have been introduced to save the environment for the humankind.

Trade plays very important role for the survival and back bone of the economy of the nation whether it's developing or developed nation in the world. It always help to get recognition and identification when things import or export things with each other. This is one of the causes for globalization that this world has been shrunk in to the global village. And now this is common practice for exchanging goods from one country to another country; therefore trade is considered good source of exchanging environment friendly technology to each other for the survival of human beings in the long run(INDICATORS, 2011).

Nowadays decreasing size of ozone lair and increasing pollution in the environment is a burning issue at worldwide level. The situation is not end here but also carbon dioxide is very alarming situation to live in, so that the scenario is not in control to live healthy life for long run (Borghesi & Vercelli, 2009).Usually this kind of problem arises when all production related issues are handed over to unskilled labors that are less familiar with environmental issues; on the flip side when trade is open then most of the countries rely on the other nations which are expert in the production of those particular goods (Managi, 2004b; Talberth & Bohara, 2006).The mix response is been recorded in the response of inequality of the countries few have less resources and few countries are suffering of unskilled labor who are unable to run modern technology (Baten & Fraunholz, 2004; Ghose, 2004; Maiti & Marjit, 2008; Talberth & Bohara, 2006).

There are two main reasons of promoting idea of green growth in all over the world, one is for poverty alleviation and other is global equality (L. Blaxekjær, 2016). Along with that there is another point of view about the popularity of green growth is welfare of the mankind that they get better environment to live with and enjoy their healthy life in long run (Victor, 2012). Green growth usually described as to change the thinking pattern about the production of goods with natural resources with the aim to save the environment and resources for the upcoming generations (Mysarah & Nasir, 2013).

So the definition of green growth opened new horizons for the rest of the world about saving the resources (L. Blaxekjær, 2016). Green growth policies help in poverty reduction and create new opportunities to save the atmosphere and resources (Kousar, Sabri, Zafar, & Akhtar, 2017).

There is everything possible about successful green growth with the help of trade openness when there is no restriction on transferring goods from one country to another country and one corner to another corner of the world (Jacobs, 2012).In the short run economic revolution will open new opportunities which will indicate that people are capable enough to avail the opportunity in positive manner. So

Green growth is the concept which has to explain and implement at the same time for its positive role.

The impact of green economy through trade openness may vary from region to region or country wise. Impact of trade openness on green economy can be measured through different models and proxies' as well e.g. intellectual property rights, subsides by govt and slandered sets etc.

On the other hand in economic activities if market is open for trade and it is producing products at optimal level then production houses should be keep in mind about society welfare that must keep in mind about the social costs and benefits and their usage as well (Andersen & Bollerslev, 1998; Stern, Common, & Barbier, 1996). But along with private costs it depends on the country`s policies about social costs and market fails then then income disparity prevails among the economy, which will cause to raise the pollution level and damaged environment badly.

Foreign direct investment and technology

Now the question arises whether FDI plays important role in green growth or not. According to existing literature this query is still ambiguous; some report says, it has positive impact on green growth and some report it as negative impact on green growth of the country. FDI plays very important role in the growth of any country e.g. generation of capital, opportunity for new jobs and new technologies which will improve ultimately growth of economy (Porter, 1998).

As for China, (Dean, Lovely, & Wang, 2009) found positive relationship between FDI and green growth of the China by using their 28 provincial secondary data. Whereas on other hand (Frankel & Rose, 2005) says FDI have negative impact on the green growth of the country.

Studies show 72 developed countries and gave confused result of that methodology that there is no relationship exist between FDI and green growth of the economy (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004). (Frankel & Rose, 2005) worked on 28 countries with co integration technique and found no relationship between FDI and green growth of the economy. (Jun, 2015) no relationship exists between economic growth and foreign direct investment in the western union of china from 1986-2010.

The other school of thought depicts positive relationship between foreign direct investment and green growth of the country. And the end result reveals that FDI may plays positive or negative impact on green growth of the nation is still under consideration for the final decision(Arbache, Dickerson, & Green, 2004). And lead to the position where FDI will improve the condition of environment with the help of new techniques and technology of expert nations.

List and co explained in their research that if the matter of clean environment is considered then FDI helps to reduce the emission of pollution. If any country wants positive relationship between green growth and FDI then proper research is involved; that how to utilize technology, energy and power as well. Nowadays

global warming is considered as hot issue, for which purpose all the think tanks are working together and worried about this alarming situation. Not only on above said issue but they also working on green economy of OECD and rest of the world`s regions as well (Gault, 2011). According to OECD the definition of green growth is growing economy of the world along with keeping eye of saving natural resources, environment, slow down the pace of climate changing etc. Especially such technology introduced which should be environmentally supported not only in developed but developing countries as well. This will help to save global warming and pollution to preserve the atmosphere of the country.

The Clean Development Mechanism (CDM) explains that green growth usually gets flourish in developing countries. Equal chance happens in trade liberalization for this reason only green goods leads to success of green growth (Gault, 2011). Liberalization of trade in environmental goods and services (EGS) had been approved with negotiation that green growth has special place and importance in OECD countries OECD. Whereas Foreign Direct Investment considered as important driver of green growth but it has given little lime light in past. It is considered as important variable because FDI involves finance from other countries and considered great source of accumulation of money in many countries. Money transferred from developed to developing nations with certain conditions, Buchner, Brown, (Hallegatte et al., 2011).

FDI have very ambiguous impact on green growth of the economy on domestic and national economy of the country(Wan, 2009). After observing different developing and developed countries there is no robust linking of FDI on green growth of the economy (Herzer & Klasen, 2008). Whereas another investigation of 28 countries on reveals different result as above, study depicts that there is positive impact of FDI on green growth of the country(Yue, Yang, & Hu, 2016). The relationship of foreign direct investment and green growth has been investigated and results depict about it as significant and positive relationship in developed countries like china.

On the other hand another school of thought exists according to different regions and environmental deprivation and inflow of FDI. A lot of literature is available about FDI and economic growth but the relationship between FDI and green growth is still under research area. The green growth is ambiguous area for many countries and regions as their priorities are about economic growth not on green growth. As most of the time Countries who likes to invest in other countries as investment they are more keen about those countries who can work in bulk and give response very heavily without any other obligations. So foreign investors are less concerned about generating pollution and carbon dioxide and other health related issues in country in which they are to invest (Kolstad & Xing, 1998).

As host country, especially from third world countries, need funds and they wants to start new projects and tries to create new opportunities for their people so they welcome all type of investments from the investors around the world. For this empirical relationship have been investigated and results are very shocked in few developing countries like India that with 1% increase in FDI, 0.99% increase in

pollution because of without any check and balance of consequences (Gao, 2016). After investigation of short run and long run relationship in china and India it is come to know that FDI does effect the pollution of the country. But on the other hand there is possibility exist that FDI helps to improve environmental growth in host country, as it introduce and welcome new technology from all around the world (Lizondo, 1990). With the help of FDI host country can purchase new technology which will help to clean the environment and promote green growth respectively.

In most of the host countries pollution and environmental issues are decreases because of welcoming FDI from the investor countries. Another study support importance of FDI for host country by (Tamazian & Rao, 2010) that it helps to reduce pollution and helps for cleaning the atmosphere where human beings are living. As FDI encourage research and development, latest technology and energy efficient resources (Yue et al., 2016). Few investors are very concern about their investment where they are going to invest and about their self-image as well so they themselves emphasis on the importance of latest technology and clean environment.

Whereas south Asia is concerned limited studies have been conducted for the importance of latest technology and innovation on green growth (Popp, 2012).
Here the new dimension is open that how investors will ensure the presence of technological presence in the host country? For this reason there are so many proxies to measure the modern technology which is environment friendly, i.e. research and development (Samad & Manzoor, 2011). In South Asian countries like India, Pakistan, Nepal and Sri Lanka, there green growth is measured with the help of expenditure in research and development, attraction for foreign direct investment and rules for trade openness. The effect of foreign direct investment on green growth directly manipulates the policies. If FDI plays negative role for the development of green growth then developed countries have the power to say 'no' to foreign direct investment. But on the contrary side if it plays positive role then it should promote through different ways to the investors. Overall Literature depicts very ambiguous relationship between globalization and green growth some studies are in the favor of green growth and some are against, for this a study has been conducted to evaluate its true role and impact in the green growth of the country.

Hypothesis

H1: There is relationship between trade openness and green growth
H1: There is relationship between foreign direct investment and green growth
H1: There is relationship between technology and green growth

Methodology

First of all, ECM was introduced by (LeSage, 1990), and later on it become popular when (Engle & Granger, 1987) adopt it and made some modifications. By

definition, ECM is used to combine long run relationship of economic variables with short run dynamics of the model. Similarly Granger Representation Theorem demonstrates that any set of co integrated, long run balance relationship among relevant variables, time series has an error correction representation, which shows short run adjustment mechanism when model deviate from its equilibrium path.

$$\Delta y = \delta + \beta 0 \Delta x_t - \Pi u_{t-1} + b1 x_{t-1} + \in_t$$

β0 = short run impact or impact multiplier
Π = error correction term
b1= long run effect
Specific form:

$$\Delta CO2 = \delta + \beta 1 \Delta \text{FDI} + \beta 2 \Delta \text{RD} + \beta 3 \Delta \text{Trade} - \Pi \mu_{t-1} + \in_t$$

All the data is in log form and covering time span of 1966-2014.
CO2= co2 emissions from manufacturing and construction industries contains the emissions from burning of fuels in industry.
FDI= it is direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital.
RD= Expenditures for research and development to increase knowledge, including knowledge of humanity, culture, and society, and its use for new applications. R&D includes basic research, applied research, and experimental development.
Trade= import +export / GDP
All data of variable is taken in log form for better application of results.

Empirical findings

Before econometric analysis it is necessary to check the stationary of data to find reliable policy implications. Stationary of data implies that mean and the variance of data does not depend on time and remain constant over the time. Therefore, mean, variance does not vary systematically with time. Empirical studies mostly use unit root test to check the stationary of time series data, if unit root is not present it means data stationary and study can draw significant implication on the basis of this stationary time series data. In panel study, most commonly used unit root test is Levin-Lin-Chu and Impesran to check stationary of data. The data was non-stationary at level so it has been differenced at 1stto make series stationary. Results are reported in table 1. Study used panel and group, PP *t*-tests by (Pedroni, 1999) to check co integration among selected variables. Results are stated in table 2 and 3. All test accept H1, there is co integration among said variables.

Table 1: Unit root test

Series	Method	Statistics at 1st difference	Cross section
Co2	Levin, Lin & Chu t	-6.43034*	46
	Im, Pesaran and Shin W-stat	-2.80276*	46
RD	Levin, Lin & Chu t	-17.0376*	46
	Im, Pesaran and Shin W-stat	-14.3736*	46
FDI	Levin, Lin & Chu t	-8.03394*	46
	Im, Pesaran and Shin W-stat	-4.41630*	46

Trade	Levin, Lin & Chu t	-24.5667*	46
	Im, Pesaran and Shin W-stat	-21.1937*	46

Table 2.Descriptive Statistics

Variable	CO2	FDI	RD	TRADE
Mean	17.19470	6.048407	1.139120	1.31E+11
Median	16.52501	3.724236	0.889210	4.53E+10
Maximum	36.98630	142.2570	3.913820	1.50E+12
Minimum	2.863128	-58.97767	0.016110	5.66E+08
Std. Dev.	6.344911	10.34180	0.851174	2.15E+11
Skewness	0.476345	1.612297	1.033740	1.899973
Kurtosis	2.034867	2.84729	1.357976	1.23494
Jarque-Bera	25.29593	103197.4	122.5397	3851.952
Probability	0.000003	0.000000	0.000000	0.000000
Sum	11486.06	4040.336	760.9320	8.73E+13
Sum Sq. Dev.	26852.01	71337.60	483.2397	3.08E+25
Observations	668	668	668	668

Table 2 shows descriptive analysis of the variables used in our model. The results help to understand the behavior of the variables itself, by looking at the distribution of mean, median, maximum, minimum, standard deviation, skewness and kurtosis of each variable. Summary statistics in table 1 include the mean and the standard deviation, minimum and maximum value for Period 1991 to 2018.The mean, median, maximum, minimum and standard deviation are important to develop the understanding of the statistical behavior of variables included in the model. Standard deviation shows dispersion in the series. The data dispersion in the series is quite small if the value of standard deviation is relatively small. The finding of this study shows that all independent variables included in the sample were having smaller dispersion level under our study across time series. The values for asymmetry (skewness) and kurtosis lies between -2 and +2 are considered acceptable in order to prove normal univariate distribution (Cokluk, 2010).

Table 3: Correlation Matrix

variables	CO2	FDI	RD	TRADE
CO2	1	0.0662	0.1071	-0.0113
FDI	0.0662	1	-0.0270	0.0939
RD	0.1071	-0.0270	1	0.4348
TRADE	-0.0113	0.0939	0.4348	1

Table 4: co integration test

Pedroni Residual Co integration Test				
Null Hypothesis: No co integration				
	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-2.197560	0.05783	-2.461460	0.0921
Panel rho-Statistic	2.620615	0.0474	2.801015	0.0788

Panel PP-Statistic	-4.160962	0.0000	-6.362404	0.0000
Panel ADF-Statistic	-2.242505	0.0125	-3.428166	0.0003

The results of pedroni residual co integration test shows that series are co integrated in the long run. In order to check short run relationship study employ ECM. Results of ECM are reported in table 5.

Table 5: Dependent Variable: D (CO2)

Dependent Variable: D(CO2)			
Variable	Coefficient	t-Statistic	Prob.
D(FDI)	0.12795	-2.770605	0.0043
D(RD)	-1.182206	1.322613	0.0265
D(TRADE)	6.69E-12	2.530313	0.0117
C	1.053941	3.605452	0.0003
ECM term	-0.074449	-5.108928	0.0000
FDI(-1)	0.150401	2.107388	0.0159
RD(-1)	-0.128588	1.053580	0.0425
TRADE(-1)	4.50E-13	2.948174	0.0034
R-squared	0.63733		
Adjusted R-squared	0.52433		
F-statistic	5.640157		
Prob(F-statistic)	0.000003		
Durbin-Watson stat	2.241308		

Results & discussion

Results show that FDI has positive and significant relationship with green growth in short run as well as in long run period. During the last decade global warming and climate changes become a serious issue in developing economies. As the process of development grows in developing economies their high CO2 emission considered on serious notes while making international agreement relating to the entrance of FDI for quality of environment. Currently in empirical literature the term green economy or low carbon city become popular and literature focusing factors influencing the behavior ofCO2 emissions seems to be the priority of handling the greenhouse gas emissions. This study indicates that although the elasticity of CO2 emission with reference to FDI is small (β= -0.067950) but still significantly lower the emission of CO2 that cause to develop green economy. The result of this study are consistent with neo-liberal argument, the influx of FDI is good for the environment and reduces pollution by transferring advance and environment friendly technologies and production techniques from developed countries to developing economies (Hervieux & Mahieu, 2014).

Results of this study indicate that trade openness causes to deteriorate green growth because trade openness significantly and positively associated with emission of CO2 in short run as well as in long run (β=6.69E-12 p<0.0117) that causes to deteriorate the quality of environment in developing economies. Moreover, trade openness causes to give birth renowned phenomenon "industrialization" in developing economies that transform their economy from

human and animal power to fossil fuels based economies. Therefore, the carbon level in the atmosphere continuously disrupts in inorganic economies and causes the heat to be preserved in the atmosphere leads towards global warming and climate changes. At present time international trade is extensive in production and consumption of final and intermediate goods with high energy consumption and pollution pattern, causing to worsen sustainability and environment quality (Naranpanawa, 2011). Moreover government trade policies and industrial polices focus to improve import and export volume but sustainability and environmental protection is still missing while formulating and implementing trade polices (Ren, Yuan, Ma, & Chen, 2014).The allocation of resources for research and developmental activities in developing economies has insignificant relationship with green economy. This study indicates that developing countries have a very limited R&D base and a low level of invention and innovative capabilities as compared to developed countries (Manzoor & Ramay, 2013) that cause insignificant relationship with green growth. Developing economies are yet unable to develop an effective innovation system to facilitate the development of environment-friendly technologies and even research and development capabilities (Bajwa, Sayeed, & Nowak, 2009). Moreover, the ECM term is with correct theoretical sign and results shows that model is convergent to equilibrium although the speed of convergence is slow (β=-0.074449 $p<0.0000$). If any shock causes to diverge the model from equilibrium path, 7.4% adjustment toward equilibrium will take place in each period.

Conclusion

This study has been carried with real intension to investigate the role of FDI, R &D and trade openness on green economic growth of developing economies. Developing economies are open for foreign direct investment, have more liberal trade policies and ready to adopt technological innovations, all that causes to bring rapid environmental changes in developing nations and continuously increasing level of heat in the atmosphere of these economies. No doubt these countries are attaining high speed of growth at the cost of high level of CO2 in the atmosphere. Therefore, this study is conducted to identify the factors that can affect green economic growth. FDI and trade openness significantly affect the emission of CO2 in air and has certain association with green economic growth in short run as well as in the long run. FDI positively increase sustainability of the economy by lowering the emission of CO2 while trade openness negatively affects green economic growth by increasing the emission of CO2. Moreover, research and development expenditure have insignificant association with green economic growth.

References

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of international economics*, *64*(1), 89-112.

Andersen, T. G., & Bollerslev, T. (1998). Answering the skeptics: Yes, standard volatility models do provide accurate forecasts. *International economic review*, 885-905.

Arbache, J. S., Dickerson, A., & Green, F. (2004). Trade liberalisation and wages in developing countries. *The economic journal*, *114*(493), F73-F96.

Bajwa, W. U., Sayeed, A., & Nowak, R. (2009). *Sparse multipath channels: Modeling and estimation.* Paper presented at the Digital Signal Processing Workshop and 5th IEEE Signal Processing Education Workshop, 2009. DSP/SPE 2009. IEEE 13th.

Baten, J., & Fraunholz, U. (2004). Did partial globalization increase inequality? The case of the Latin American periphery, 1950–2000. *CESifo Economic Studies*, *50*(1), 45-84.

Beer, L., & Boswell, T. (2001). The effects of globalization on inequality: a cross-national analysis. *Halle Institut Occasional Paper*.

Bina, O. (2013). The green economy and sustainable development: an uneasy balance? *Environment and Planning C: Government and Policy*, *31*(6), 1023-1047.

Blaxekjær, L. (2016). Korea as green middle power: green growth strategic action in the field of global environmental governance. *International Relations of the Asia-Pacific*, *16*(3), 443-476.

Blaxekjær, L. Ø. (2012). *The Emergence and Spreading of the Green Growth Policy Concept.* Paper presented at the Lund Conference on Earth System Governance 18-20 April 2012.

Borghesi, S., & Vercelli, A. (2009). Greenhouse gas emissions and the energy system: Are current trends sustainable? *International journal of global energy issues*, *32*(1-2), 160-174.

Cokluk, O. (2010). Logistic Regression: Concept and Application. *Educational Sciences: Theory and Practice*, *10*(3), 1397-1407.

Dar, A., & Amirkhalkhali, S. (2003). On the impact of trade openness on growth: further evidence from OECD countries. *Applied Economics*, *35*(16), 1761-1766.

Dean, J. M., Lovely, M. E., & Wang, H. (2009). Are foreign investors attracted to weak environmental regulations? Evaluating the evidence from China. *Journal of Development Economics*, *90*(1), 1-13.

Dowrick, S. (1994). Openness and growth. *International Integration of the Australian Economy, Reserve Bank of Australia, Sydney*, *8*(21), 9-41.

Dunlap, R. E., & Jorgenson, A. K. (2012). Environmental problems. *The Wiley-Blackwell Encyclopedia of Globalization*.

Dutz, M. A., & Sharma, S. (2012). Green growth, technology and innovation.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Frankel, J. A., & Rose, A. K. (2005). Is trade good or bad for the environment? Sorting out the causality. *Review of economics and statistics*, *87*(1), 85-91.

Gao, J. (2016). Heterogeneous Human Capital and Environment Influence Mechanism of FDI: An Empirical Research Based on the Panel Data Derived from Provinces of China. *Modern Economy*, *7*(03), 290.

Gault, F. (2011). Social impacts of the development of science, technology and innovation indicators.

Ghose, A. K. (2004). Global inequality and international trade. *Cambridge Journal of economics*, *28*(2), 229-252.

Hallegatte, S., Heal, G., Fay, M., & Treguer, D. (2012). From growth to green growth-a framework: National Bureau of Economic Research.

Hallegatte, S., Ranger, N., Mestre, O., Dumas, P., Corfee-Morlot, J., Herweijer, C., & Wood, R. M. (2011). Assessing climate change impacts, sea level rise and storm surge risk in port cities: a case study on Copenhagen. *Climatic change*, *104*(1), 113-137.

Hervieux, M.-S., & Mahieu, P.-A. (2014). A detailed systematic review of the recent literature on environmental Kuznets curve dealing with CO2.

Herzer, D., & Klasen, S. (2008). In search of FDI-led growth in developing countries: The way forward. *Economic Modelling*, *25*(5), 793-810.

INDICATORS, O. (2011). Towards green growth: monitoring progress.

Istance, D., & Kools, M. (2013). OECD Work on Technology and Education: innovative learning environments as an integrating framework. *European Journal of Education*, *48*(1), 43-57.

Jacobs, B. (2012). A dragon and a dove? A comparative overview of Chinese and European trade relations with Sub-Saharan Africa. *Journal of Current Chinese Affairs*, *40*(4), 17-60.

Jun, S. (2015). The Nexus between FDI and Growth in the SAARC Member Countries.

Kolstad, C. D., & Xing, Y. (1998). Do Lax Environmental Regulations Attract Foreign Investment? *Department of Economics, UCSB*.

Kousar, S., Sabri, P. S. U., Zafar, M., & Akhtar, A. (2017). Technological factors and adoption of green innovation: Moderating role of government intervention: a case of SMEs in Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *11*(3), 833-861.

LeSage, J. P. (1990). A Comparison of the Forecasting Ability of ECM and VAR Models. *The review of Economics and Statistics*, 664-671.

Lizondo, J. S. (1990). Foreign direct investment.

MahwishZafar, P. S. U., & Khan, Z. U. FDI, TRADE OPENNESS AND ECONOMIC GROWTH NEW DYNAMICS IN CASE OF PAKISTAN.

Maiti, D., & Marjit, S. (2008). Trade liberalization, production organization and informal sector of the developing countries. *Journal of International Trade and Economic Development*, *17*(3), 453-461.

Managi, S. (2004a). Competitiveness and environmental policies for agriculture: testing the Porter hypothesis. *International journal of agricultural resources, governance and ecology*, *3*(3-4), 310-324.

Managi, S. (2004b). Trade liberalization and the environment: carbon dioxide for 1960-1999. *Economics Bulletin*, *17*(1), 1-5.

Manzoor, R., & Ramay, S. A. (2013). *Green Growth and Technological Innovation: A case for South Asian countries*.

Mysarah, N., & Nasir, M. (2013). The Consumer's Personal Environmental Awareness Towards Sustainable Marketing Program At TESCO, Melaka.

Naranpanawa, A. (2011). Does trade openness promote carbon emissions? Empirical evidence from Sri Lanka. *The Empirical Economics Letters*, *10*(10), 973-986.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics, 61*(S1), 653-670.

Popp, D. (2012). The role of technological change in green growth: National Bureau of Economic Research.

Porter, M. E. (1998). The Adam Smith address: Location, clusters, and the" new" microeconomics of competition. *Business Economics, 33*(1), 7.

Ren, S., Yuan, B., Ma, X., & Chen, X. (2014). International trade, FDI (foreign direct investment) and embodied CO 2 emissions: a case study of Chinas industrial sectors. *China economic review, 28*, 123-134.

Reuveny, R., & Li, Q. (2003). Economic openness, democracy, and income inequality: an empirical analysis. *Comparative Political Studies, 36*(5), 575-601.

Samad, G., & Manzoor, R. (2011). Green growth: an environmental technology approach. *The Pakistan Development Review*, 471-490.

Stern, D. I., Common, M. S., & Barbier, E. B. (1996). Economic growth and environmental degradation: the environmental Kuznets curve and sustainable development. *World Development, 24*(7), 1151-1160.

Talberth, J., & Bohara, A. K. (2006). Economic openness and green GDP. *Ecological Economics, 58*(4), 743-758.

Tamazian, A., & Rao, B. B. (2010). Do economic, financial and institutional developments matter for environmental degradation? Evidence from transitional economies. *Energy Economics, 32*(1), 137-145.

Tausz-Posch, S., Borowiak, K., Dempsey, R. W., Norton, R. M., Seneweera, S., Fitzgerald, G. J., & Tausz, M. (2013). The effect of elevated CO 2 on photochemistry and antioxidative defence capacity in wheat depends on environmental growing conditions–A FACE study. *Environmental and Experimental Botany, 88*, 81-92.

Victor, P. A. (2012). Growth, degrowth and climate change: A scenario analysis. *Ecological Economics, 84*, 206-212.

Wan, X. (2009). A literature review on the relationship between foreign direct investment and economic growth. *International Business Research, 3*(1), 52.

Yue, S., Yang, Y., & Hu, Y. (2016). Does Foreign Direct Investment Affect Green Growth? Evidence from China's Experience. *Sustainability, 8*(2), 158.

Zafar, M., Sabri, P. S. U., Ilyas, M., & Kousar, S. (2015). The impact of trade openness and external debt on economic growth: new evidence from south asia, east asia and middle east. *Science International, 27*(1).

Biographical Note

Mahwish Zafar is an Assistant Professor at The Superior College Lahore, Pakistan.

Dr. Shazia Kousar is an Assistant Professor at The Superior College, Lahore, Pakistan.

Saeed Ahmad Sabir is Ph.D. Scholar at School of Economics Banking and Finance, University Utara, Malaysia.