Globalization and Environmental Degradation: Sustainable Growth in Pakistan

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Abstract
The purpose of the research is to identify the impact of environmental degradation and globalization on sustainable growth in the Pakistani context. After succinct review of literature gross domestic product has been taken as a predictor of increase in sustainable economic growth. Environmental degradation has been measured by two indicators 1-CO2 emissions from residential buildings and commercial and public services and 2-CO2 emissions from transport have been used as environmental degradation proxies. For globalization proxy trade openness (import and export divided by GNI) has been used in present study.
Error correction representation of ARDL model and ARDL approach to cointegration has been used in present study using annual time series data from 1980 to 2010. Findings suggest that TO is the most significant determinant of sustainable economic growth of Pakistan in both short run and long run. On the other side environmental degradation does not affect economic growth of Pakistan both in short and long run. Results suggests that the government of Pakistan should device such policies to promote the level of TO in Pakistan. This decision will support the country to grow its economy by increasing trade with other countries and increase opportunities by introducing incentives for business communities.

Key Words: Sustainable Growth, Gross domestic products, environmental degradation, trade openness, CO2 emissions, globalization

Introduction
The concept of sustainable growth seems greatly debatable phenomena in the present literature. Sustainable growth is associated with aspects; for instance globalization and environmental degradation in a country. The development process of south Asian region's agriculture experienced radical transformation to a capital intensive structure from labour intensive and to large scale agriculture from subsistence. Likewise, the composition of industrial sector has also modified from import substitution industrialization (ISI) to promotional export through latest dynamism systems in the wake of regionalization and globalization. The major impact of globalization is a country's e-commerce, trade policy, and particularly on environment (Somaratne , 2002).
In the current context, the sectoral structure of the Pakistani economy is evolving to a more service intensive industry compared to manufacturing industry, including trade services from agriculture specifically by consistent trade agreements, such as FTA (a free trade agreement between Pakistan and China) (David , Jason , & Martin , 2005). Furthermore, the association of SAARC (South Asian Association for Regional Cooperation) countries in south Asian region is also an attempt towards expanding trade opportunities amongst associated countries. The result of these agreements would ultimately promote investment, trade, and technology exchange within the south Asian region (Manfred , 2010).
Meanwhile, international environmental policies have also changed in the globalization scenario, as cross border barriers are blurred through integration of international market and promoting foreign direct investment (FDI) in the country. Through the advent of such policies;

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agriculture, environment, service sector and industries would be integrated quickly in Pakistan and other countries of south Asian region. The result of these changes will create environmental degradation problems; where quick deforestation, land degradation, excessive soil erosion, watershed degradation, water contamination, and damage of biological diversity are some problem of environmental degradation, which may ultimately disturb the country growth (Michael S. , David , & Edward , 2000).

However, rapid rise of industrialization, urbanization and modernization has created serious concerns of environmental degradation in Pakistan and other developing countries. Though, regionalization and globalization enhanced opportunities in Pakistan and other south Asian countries, the utmost concern in this region about how to control and minimize environmental degradation and due to globalization. The sustainable economic growth is also interlinked with these problems which are created through globalization in the region. The higher rate of depleted natural resources has observed over the past few years as a result of rapid transformation of social and economic conditions in the globalization scenario (Mohan , 1999).

The concept of economic growth of a country has repercussions as environmental degradation. Economic development is improvement of literacy rates, quality of life, per capita income, welfare of human being and particularly quality of environment (James , 1994). However, economic development is more related with sustainability, in other words fulfilling the present requirements without compromising upcoming requirements and needs. Sustainable Growth of a country may be explained as continuous enhancement of the living standards of a country's population in socio-economic, normally achieved through increasing international trade in the country and improving its environment in the process of globalization (Mäler, 1990).

In an economy to ensure sustainable growth, countries need to reduce environmental degradation with the passage of time or at least keep it constant. If the environmental degradation will increase in the country the sustainable growth will be disturbed and number of economic issues will arise and if it will be controlled or minimized then Sustainable Growth of economy will be increased and strong (Michael S. , David , & Edward , 2000).

The most important issue of today's research is; relationship between economic activities and environmental degradation. The current study is trying to unearth the connection between sustainable economic growth and environmental degradation and also considering the economic activities (like import and export) responsible for environmental degradation and sustainable economic development (James , 1994). Additionally the study estimates relationships of environmental degradation with sustainable economic growth including explained socio-economic factors in the country of Pakistan. This endeavor of analytical research is important for construction of effective policies and strategy structure of macroeconomic for sustainable economic growth and decreasing environmental degradation in developing countries generally and in Pakistan specifically.

Theories of economy advocate that trade amongst developing countries on international levels could be the cause of heavy pollution. In developing countries the environmental laws and regulations are less stringent as compared to developed countries (Sjak , 2005). Therefore free trade agreements amongst developing countries might enhance industrialization in the context of globalization but also responsible for environmental degradation and pollution (Baumol & Oates, 2005). Cole (2004) claimed that in developing countries pollution may be controlled or reduces through trade, as heavy access to advanced greener manufacturing technology or heavy competitive burden. For this motive, the globalization variable includes in present study to examine its impact on environmental degradation and sustainable economic development in developing countries.

Literature Review

The world commission on environment and development (WCED) has explained sustainable economic growth as fulfilling the present needs without disturbing the capability of future generation to fulfill their own needs. The main objective of sustainable economic development is to satisfy the public needs. In developing countries the majority of people are struggling for jobs, shelter, food and clothing. In sustainable growth a country requires fulfilling the basic needs of its population and increased their living standard through providing equal opportunities (WCED, 2000).

Sjak (2005) investigates that Economic growth of any country increases as real output of the country increases over the time. Gross domestic product (GDP) is a variable used to measure the exact actual output of a country. The idea of sustainable growth refers to a growth rate that can be maintained by neglecting consistent economic problems, specifically for upcoming audience. Michael, Edward and David (2000) worked on environmental Kuznets curve (EKC); they investigated inverse U-Shape relationship between per capita income and environmental degradation and finally suggested that growth decreases the environmental degradation. Sjak (2005) used two determinants, sustainable economic growth and environmental policies to check the relationships between them. He noted that the policies related to environment affects economic growth through affecting consumers saving behavior and investment productivity both in short and long term. Thus, effective policies enhance environmental quality that ultimately boosts productivity and growth.

Engelbert, Klaus, Bernhar & Harald (1997) claimed that only GDP is not the perfect measure of growth, they used the index of sustainable economic welfare (ISEW) in order to measure the GDP with other influential aspects such as income distribution, unpaid household labor, environmental damage and social cost in Austria. The results regarding economic growth and GDP tested by the ISEW significantly differed over the time. In the period of 1970s the economic growth over estimated by the GDP, during 1980s where GDP increasing but economic growth stagnating. The main reason behind this was inequality in increasing income, using of GDP only a determinant and overlooked other influential determinants like income

distribution, unpaid household labor, environmental damage and social cost.

Wilfred (1992) argued that the growth of developing countries is depends upon cleanness urban air by pollution, better sanitation system and sufficient access to pure drinking water. Considering the importance of indicator gross domestic product by the top researchers to measures the economic growth of a country I have used variable GDP per capita (US$) to measure the economic growth of Pakistan.

Environmental degradation is an outcome of technological, institutional and socio-economical activities. The situation of degradation on earth happens at the time when natural resources are depleted. The most affected natural resources include water, air and soil. The impact of degradation also harms for animals, wildlife, plants and micro-organisms of a country observing this problem. Environmental degradation problem occurs due to changes in environment of a country by urbanization, economic & population growth, increase in transportation and energy usage and intensification of agriculture (William , 2012). James (1994) developed two hypotheses related to environmental degradation using economic activities and found that higher inequality of wealth and power leads to greater environmental degradation.

Maler (1990) argued that failure in policies and market both are the causes of environmental degradation. He explained that the major issue of environmental degradation is uncertainty in policies instead of limited effects of failure polices of exchange rate, incentives, prices and taxes. Thus handling of uncertainty in a correct way also remains a key problem. Moreover the study also investigates international problems related to environment, like CO2 buildup or acid rain and suggested that by execution of game theory and by revelation mechanism developed for consumer goods can benefits to improve environment.

Thomas and Jeffery (2007) conduct a research on environmental degradation and explained that the theory of entrepreneurship can resolve degradation problems. They mentioned that the previous studies identifies; the failure of markets are the reasons of environmental degradation, but they argued that failure of markets provides the opportunities to earn maximum profits by entrepreneurship and reduced the environmental degradation by changing of economic behaviors. D. Pimentel, et al., (2007) used the data of many international organisation reports including world health organization (WHO) in their study and pointed that human diseases are increasing rapidly by the last decades. They identified number of issues causes for human diseases in the whole world including growth rate of population and the pollution of soil, air and water. They estimated that about 40% deaths in the world are due to environmental degradation problem.

Mohan (1999) have worked on economic reforms that often positively contribute to social and economic gains. However, he also addressed the negative effects of these reforms on other polices by using EKC approach. Finally he recommended win-win policies for mutual gain of environmental and economic and fine-tuning reform policies to escape from environmental destruction. Scott, Jikun , & Linxiu (1997) has studied the association among environmental factors, poverty and population, and their effect on pastures, forests, water and land of China. They examine how the Chinese leadership has designed the series of institutions and legal framework to develop policies related to environment and gives empirical findings regarding success of these polices in decline of some environmental disease. In the study they included five resources related with rural areas such as salinization, damage of grasslands, soil erosion, deforestation and water pollution. The paper produced results, that Chinese government failed to effectively manage rural resource deprivation because of untrained personnel and lack of fiscal resources and country is maintaining its development through control population and integrate markets policies.

Globalization can be defined as the process in which companies, people and government of different countries are integrated and interact, this process run by investment and worldwide trade and supported by information technology (IT) (Manfred , 2010). Globalization has effects on economic growth, human prosperity & physical well-being, environment, political system, and culture in societies throughout the world (Eric F. & Patrick , 2011). Globalization is not a new phenomenon, many people and later companies from different places and huge distance were involved in buying and selling activities by each other. The best example is Silk Road build during the middle-ages that crosses Central Asia connecting Europe and China. Similarly, for centuries, organizations and people invested their funds in other countries enterprises (Robert E. & J. , 2004).

Karen L & Robin M (2000) has introduced new concept of double exposure where they investigates joint effects of globalization and climate change. They found that certain social groups, ecosystems, sectors and regions strongly effected by both globalization and climate changes. By considering simultaneous impacts of double exposure they emerge winners and losers in new sets. Quan Li & Drew (2004) tested impact of economic globalization on different international terrorist activities within states, for this they used time series data of 112 countries. They produced results that portfolio investment, trade and foreign direct investment have no positive direct impact on economic growth of countries and transnational extremist activities but its supreme trading partners minimize the terrorist activities within the country. Moreover foreign direct investment and trade promote economic growth but have negative indirect impact on terrorism.

Quan & Rafael (2003) investigates the relationship between national democratic governance and globalization. Varity of researchers views have been examined in the study, and they gathered time series data of 127 countries on democracy and globalization from 1970 to 1996. They examined the impact of globalization on democracy through four national elements: spread of democratic ideas, trade openness, inflow of portfolio investment and inflow of FDI. Results indicate that inflow of portfolio investment and trade openness negatively affect democracy but over the time the effect of trade openness remains constant. Moreover, inflows of FDI impact positively to democracy, but over the years the said effect weakens. Furthermore they found that transmission of democratic ideas support democracy for long time period.

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David , Jason , & Martin (2005) examined the relationship between globalization and its impact on welfare states. For this they gathered time series data from 1975 to 2001 to analyze whether globalization positively impact on states causing expansion or negatively triggering reduction and crisis or insignificant. They used different models to investigate the relationship between them and overall findings suggest that globalization effect on states welfare.

Scores of researchers have noted gross domestic product a predictor of increase in sustainable economic growth. Sjak (2005), Michael, Edward and David (2000) and Engelbert, Klaus, Bernhar & Harald (1997) are few studies supporting this concept. For this reason GDP per capita has been taken for present study. As supported and cited by numerous studies environmental degradation increases due to ineffective policies that eventually leads to reduced economic growth in the country. Maler (1990), Scott, Jikun, & Linxiu (1997) and Mohan (1999) have contributed significant literature in this domain and found that there is a significant role of gas emissions on environmental degradation and ultimately reduction in growth. In present study two indicators 1-CO2 emissions from residential buildings and commercial and public services and 2-CO2 emissions from transport have been used as environmental degradation proxies. Finally researcher found positive impact of globalization on welfare of state that ultimately increases economic growth. Quan & Rafael (2003) and David , Jason, & Martin (2005) are advocates of this argument. For globalization proxy trade openness (import and export divided by GNI) has been used in present study.

By considering aformetioned literature a study is required to investigate the impact of environmental degradation and globalization collectively on economic growth of Pakistan to accomplished the require needs.

Data Sources and Methodology

Data Sources and Variables

The present study has used three variables data sustainable growth (SG), globalization (GZ), and environmental degradation (ED) with time series data on annual basis for the period 1980-2010 related to Pakistan. Data series on all variables including proxies have been obtained from official websites of World Bank http://data.worldbank.org/country/pakistan. The present study is intended to evaluate the effects of two Independent Variables GZ, and ED on dependent variable sustainable growth (SG) in Pakistan. Trade openness (Exports & Import of goods and services, current US$) is the proxy of Globalization (GZ) variable. Furthermore two proxy variables have been used for Environmental Degradation (ED) includes 1- CO2 emissions from residential buildings and commercial and public services (% of total fuel combustion) and 2- CO2 emissions from transport (% of total fuel combustion). For the sustainable growth (SG) proxy indicator Gross Domestic Product (GDP) per capita (Currency US$) has been used in present study.

Econometric Model

The following equation is specifically used to investigate the effect of globalization (GZ) and environmental degradation (ED) on sustainable growth (SG) of Pakistan:

$$In\ (SG_t) = \beta_O + \beta_1\ In\ (GZ_t) + \beta_2\ In\ (ED_t) + e_t \qquad \textbf{(3.1)}$$

Where *SG*, *GZ* and *ED* indicate Sustainable growth, Globalization and environmental degradation respectively, 't' indicates number of years and '*e*' indicates error term. Whereas 'In' is directs basic logarithmic form of sequence. β_1, β_2 and β_3 are the parameters of long-run elasticity of SG with respect to GZ and ED respectively. The three most vital test methods include Johansen-Juselius (1990), Maximum Likelihood-Based Johansen (1988,1991) and Engle & Granger (1987) which are mostly used by researchers to investigate variables cointegration (long-run equilibrium relationship). The I(1) (Stationary at first difference) is the mandatory condition of these three tests that is imposed on all variables used in a model. In case of small sample size these methods do not perform well, thus it is also a limitation of these methods. However, Autoregressive Distributed Lag (ARDL) approach to cointegration removes these limitations. ARDL approach was developed by Shin, Smith and Pesaran (1996) whilst Pesaran et al. (2001) further developed it. This approach has gained great acceptance due to its multiple econometric benefits over other techniques of cointegration. ARDL is different from other approaches, do not imposed the condition of I(1) all variables must be integrated in the same sequence. Pesaran and Pesaran (1997) the ARDL approach is good for both situation, when all the variables in a model are fractionally integrated or I(1) or I(0). Shin & Pesaran (1999) claimed that this approach produced great results in case of small samples and good estimates of long-run coefficients.

The following model has been developed after considering the advantages of aforementioned autoregressive distributed lag approach to cointegration:

$$\boldsymbol{In\ (SG_t)} = \beta_0 \sum_{i=1}^{q} \beta_{1i}\ \Delta\ In(SG_{t-i}) + \sum_{i=0}^{q} \beta_{2i}\ \Delta\ In(GZ_{t-i}) + \sum_{i=0}^{q} \beta_{3i}\ \Delta\ In(ED_{t-i}) + \beta_4\ In(SG_{t-1}) + \beta_5\ In(GZ_{t-1}) + \beta_6\ In(ED_{t-1}) + U_t \qquad \textbf{(3.2)}$$

Whereas q in the above equation represents optimal lag distance, the first difference operator denoted by Δ, β_1, β_2, β_3 and β_4 indicates of the model short-run dynamics and on the other hand β_5, β_6, β_7 and β_8 are represents long-run elasticities. This is important to test the integration level of all variables before applying ARDL model because ARDL is not applicable if a single variable is equal to or greater than I(2). For this the present study has used Phillip-Perron (PP) and Augmented Dickey-Fuller (ADF) tests. Moreover by using F-statistics including two bounds, like upper bound and lower bound this study has computed bounds test of equation (3.2) in order to investigate the long-run relationship as described in equation (3.1). The null hypothesis perceives that there is no cointegration among all variables. If the F-Statistic value is less than the value of lower bound then we accept null hypothesis but if greater

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than upper bound value then we reject null hypothesis and the test will be inconclusive if the value falls between upper and lower bound.

In order to identify the variables optimal lag length Schwarz Bayesian Criterion (SBC) is used before moving with checking cointegration. The equation (3.2) is presented below in error correction form:

$$\boldsymbol{In}\,(\boldsymbol{SG_t}) = \beta_0 \sum_{i=1}^{q1} \beta_{1i}\ \Delta\, In(SG_{t-i}) + \sum_{i=0}^{q2} \beta_{2i}\ \Delta\, In(GZ_{t-i}) + \sum_{i=0}^{q3} \beta_{3i}\ \Delta\, In(ED_{t-i}) + \lambda EC_{t-i} + e_t \quad \textbf{(3.3)}$$

In the above equation the length of optimal lag has expressed by q_1, q_2 *and* q_3, *the parameter that is used for the adjustment of speed is* λ, the term for the error correction is indicated by EC which is derived by the abovementioned equation 3.2 showing long run relationships amongst variables.

Empirical Findings

This is important to test unit roots of all series before proceeding with Autoregressive Distributed Lag (ARDL) approach to cointegration. In the below table 4.1 results are indicating that PP and ADF at first difference and at level. According to the results of Augmented Dickey Fuller test SG, ED and TO are stationary at first difference type at 1% significance level. Thus, in explained situation we can proceeds with ARDL approach to cointegration.

Table 4.1
Unit Root Test Results

Variables	Augmented Dickey Fuller Test Statistic (At Level)	Augmented Dickey Fuller Test Statistic (At 1st Difference)
SG	0.9995	0.0081
ED	0.1723	0.0002
TO	0.9863	0.0000

Findings of long-run relationship are sensitive to lag length taken in the model (Bahmani-Oskooee & M. Bohl). The calculated value of F-Statistic presented in table 4.2 in order to take the optimal lag-length in the model. According to Pesaran, Y. Shin , & R. J. Smith (2001), by order 1 lag the values of upper and lower bound at 95% significance levels are 5.73 and 4.94 respectively. The value of F-statistic calculated in table 4.2 is (5.77) which is higher than the value of upper bound directing us to reject the H_0, there is no long run relashionship among variables. Hence, findings concluded that a long-run reslashionship exists amont variables.

Table 4.2
F-Statistic for Testing the Existence of Long-Run Relationship

Order of Lag	F-Statistic
1	5.77

For F-Statistic value of lower and upper bound (4.94 & 5.73 at 95%) selected from case (III) Table CI(iii) no trend provided and unrestricted intercept in Pesaran et al. (2001).

In the present study in order to take the optimal lag-length of variables, SBC (Schwarz Bbayesian Criterion) has been included in the ARDL model. The folowing table 4.3 indicates the outcomes of long-run relationship of ARDL model (1, 1, 0, 0) SBC.

Table 4.3
Long-Run Coefficients of ARDL (2, 3, 2) Model Dependent Variable ln (SG)

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
ED	7.354	6.450	1.140
TO	0.149	.105	14.307*
C	-323.1010	276.060	-1.170

* showing significance level at 1 percent

Results of table 4.3 present that Trade Openness (TO) is the most significant factor of sustainable economic growth (SG) in Pakistan. The effect of TO on SG is significant at one percent level of significant. The coefficient (0.149) shows that one percent increase in TO will lead to positive change by 0.149 percent in SG in long run. However, ED (environmental degradation) does not effect to SG in long run. The results of this study signify the importance of TO in sustainable growth of Pakistan. These results suggested that concerned authorities must devise and execute such policies for sustainable growth which increase the level of TO. Current work supported the findings of Quan Li & Drew (2004), David, Jason, & Martin (2005) and Quan & Rafael (2003).

Table 4.4
Error correction representation of the selected ardl (2, 3, 2) model dependent variable dSG

Regressor	Coefficient	Standard Error	t-Ratio
dED	-6.391	4.759	-1.3430
dTO	.793	.152	5.201*
ECM(-1)	-.52948	.109	-4.818*

R^2 = .65570, Adj. R^2 = .60061, F (3, 26) = 15.8705, Prob (F-stat) = .000, DW= 1.7380

* one represent significance of the coefficient at 1 percent level.

The table 4.4 presents outcomes of error correction representation of the stated ARDL model. Variables coefficients with d present the short-run elasticity. Results indicates that in short-run the factor TO is again significant and having higher value of t-Ratio to Sustainable Growth. Hence, TO is affecting the SG at one percent significance level. The coefficient value (.793) of dTO reveals that ten percent increase in TO will bring 7.93 percent addition in Sustainable Growth in short run. Whereas ED does not significantly affecting the sustainable growth of Pakistan even in short run. The coefficient of ECT (-.52948) is significant at one percent level. The greater significant inverse sign of ECT strengthen that the long-run relationship is exist between variables. Therefore, the speed

of previous year's adjustment disequilibrium in sustainable growth to current year's equilibrium is 52.9 percent.

Conclusion

The present study aimed to investigate the factors of sustainable growth in Pakistan for the period of 1980 to 2010. Therefore, two variables have been selected (environmental degradation and trade openness proxy of globalization) as determinants of sustainable growth. Further error correction representation of ARDL model and ARDL approach to cointegration has been used in present study due to certain advantages explained in chapter IV. Findings suggest that TO is the most significant determinant of sustainable economic growth of Pakistan in both short run and long run. On the other side environmental degradation does not affect economic growth of Pakistan both in short and long run. The speed of process where adjustment by previous years disequilibrium in sustainable growth to present years equilibrium is sufficient i.e. 52.9 percent. Through overall findings, results suggests that the government of Pakistan should device such policies to promote the level of TO in Pakistan. This decision will support the country to grow its economy by increasing trade with other countries and increase opportunities by introducing incentives for business communities.

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