

Economic Impact of Institutional Quality on Environmental Performance in Post-Soviet Countries

Shukrillo Abduqayumov* • Noman Arshed** • Samra Bukhari***

Abstract Maintaining the balance between economic growth and environmental performance is a new trend of challenges for developing countries. The economic impact of institutional quality on environmental performance is analyzed from 2001 to 2017 using multinational panel data for 15 Post Soviet-Countries. The indicators of institutional quality are government effectiveness and regulatory quality and this research is first of its kind utilizing a comprehensive Environmental Performance Index as an empirical paper for post-Soviet-Countries. This study has utilized an instrumental variable method in Generalized Method of Moments, in order to introduce dynamics and then check for endogeneity. Other controlling factors include GDP per capita, industrial manufacturing, energy efficiency, urbanization, and secondary education. The results indicate that institutional quality have a significant positive impact on environmental performance. It is suggested that the post-Soviet-Countries must ensure better institutions in order to sustain an environment for future generations.

Keywords: Panel GMM, Industrialization, Urbanization.

JEL Classification: H1, O1, Q5.

1. Introduction

It is vitally important for human well-being and economic growth that there is a sustainable management of the environment and natural resources. Sustainable preservation of environment is crucial for economic growth, poverty reduction, and food security. Historically, natural resources are the main source of income and food, and for a government the vital source of revenue. The future prospects of humans,

Shukrillo Abduqayumov*, Noman Arshed** (✉), Samra Bukhari***

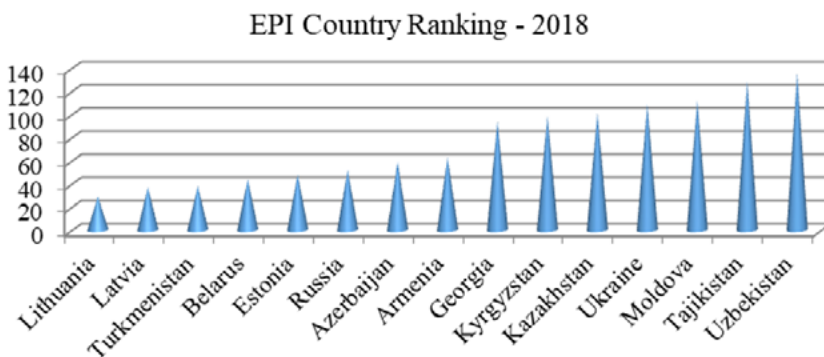
* MA Economic Governance and Development, OSCE Academy in Bishkek, Kyrgyzstan
e-mail: s.abduqayumov@osce-academy.net

** Lecturer, Department of Economics, University of Management and Technology, Lahore, Pakistan.
e-mail: noman.arshed@umt.edu.pk

*** MS Economics, Department of Economics, University of Management and Technology, Lahore, Pakistan.
e-mail: sambukhari56@gmail.com

other species and crops depend on an ecosystem. The quality of air, water and soil are the first one in line to be effected by the climate change and extreme weather conditions. Thus, a sustainable ecosystem is necessary for the long run development of every economy. The functionality of these precious natural resources rapidly compromised, and around 60 to 70 % of the global ecosystem is degrading quicker than they actually can recover. However, when our environment and resources are not properly managed can lead to an economic crisis: for example, due to the mismanagement of fisheries from oceans annually, around 80 billion US dollars are wasted. Air pollution is another severe detrimental factor that makes human well beings vulnerable, causes an increased number of untimely deaths, resulting 1 out of 10 deaths globally, and considered a massive loss for welfare and income of the societies (World Bank, 2018). The Energy Policy Institute of the University of Chicago (2015) stated that poor environmental quality for developing countries are not escapable, and poor air quality leads to health issues and decreases lifespans. The health effects of pollution lead to low productivity and increase health costs. Although pollution costs are high, investment in improvements to environmental quality is very low for developing countries. Weak policy design and regulation increase the costs of environmental improvements, for example, when policymakers fail to collect environment tax efficiently, then this process of revenue collection leads to higher costs of environmental quality. NASA (2018) reports that since 1880 the global temperature rose to 1.8 Fahrenheit, Arctic ice minimum decreased to 12.8 percent per decade, sea level rose to 3.2 millimetres per year, and 409 parts per million are the highest carbon dioxide level on air observed for last 650,000 years. Considering the importance of environmental performance and crucial role of government in addressing environmental issues, differences in environmental performance amongst the countries permit a careful study. Thus, there is a need to explore the differences that is why some nations are succeeding as compared to others and why some other nations become failures at regulating water contamination and air pollution, at protecting the environment more effectively. Moreover, for efficient water and energy utilization, we would be in the position to identify the linked elements with the prosperity of the environment as well as its failure. During 1970 the US was a leader in addressing water and air pollution, but afterwards, the US environmental performance declined as suggested by (Esty, 2008; Emerson et al., 2010; Holzinger et al., 2011; Scruggs, 2003).

Figure 1. Comparison of EPI country ranking



After introduction, section 2 will discuss the empirical literature relevant to institutes and environment, after this section 3 and 4 will provide the methodological framework and estimation findings. Lastly, section 5 will explore conclusion and policy implications.

2. Literature review

There is an increased number of literature covering the relationship of institutional quality and environmental performance. This paper is going to investigate the strength of government effectiveness and regulatory quality as an indicator of institutional quality on environmental performance. One of the earliest empirical paper by King and Borchardt (1994) had found a modest negative association between left wing government and per capita level of air pollution covering 17 OECD countries. Neumayer (2003, 2004) stated that the relationship of left wing government with the pollution level is smaller, hence promotes environmental protection causes. Wen et al. (2016) left-wing governments prefer environmental quality to economic performance, while right-wing governments care more about economic growth than environmental issues.

However, when under pressure for a better economic performance, both left- and right-wing governments tend to forgo environmental goals for higher economic growth. Apergis and Ozturk (2015) stated that higher income increased environmental degradation, and this is in the first stage of development. After first stage, when the certain threshold is reached, the higher income starts to motivate environment friendly procedures. They also found a negative relationship between government effectiveness and regulatory quality with CO₂ emissions. Shahbaz et al. (2014) investigated the relationship between economic growth, electricity consumption, and environmental degradation for the case of United Arab Emirates, they found a negative relationship between economic growth and CO₂ emissions, and positive relationship with urbanization.

Stiglitz (2002) claimed that climate change triggered by the industrialized countries also distresses those living in under developing countries as they are also the major contributor to the global pollution. The variations of the temperature and the emissions level can have severe adverse impacts on the wellbeing of the population as the environmental degradation results in the long term drought. The impacts of CO₂ emissions on developing countries are vitally important because most of it is caused by the industries set by the developed countries.

Over the time period of the past two decades, quite a lot of studies of the associations between economic progress and environmental protection have focused on the sustainability. Centering principally on detailed measures of air and water contamination, these empirical studies found that initially growth intensifies pollution but higher growth brings maturity. This it follows U shaped curve known as EKC (Dasgupta et al., 2001). For this argument variety of literature have emerged. Pinpointing the situation post of materialism Inglehart (1995), an argument arose that as the societies reach a certain level of development and beyond certain point citizens prefer a good quality on the environment and better quality of life. Dasgupta et al. (2006) states that growing capital

expands the society's capability to respond to environmental problems. Developed countries have higher capacity to spend on control of pollution, a tougher legal and governmental infrastructure, and more widespread technical and scientific resources than poor ones. Dasgupta et al. (2005) stated that to take a full response regarding environmental issues of the globalization, one would need serious concentration to the long run governmental sector growth and decision making capacity as well monetary visions. Esty and Porter (2005) showed that there is no evidence of pursuing greener systems slows the economic progress.

Victor (2008) was of the opinion that at the start of modern movements on environmental performance, there was an assumption that the economic growth was the cause for all types of environmental degradation. This stated that growth and technology advancement lead to intensified use of the ecosystem.

Solesbury (1976) studied both left and right parties and stated that when they involuntarily align themselves in environmental or economic growth terms, they have assumed pro-growth visions, somewhat from a strong belief in technology but other from acceptance that economic growth is compulsory to protect social and economic objectives. Bernauer and Koubi (2013) in their paper have found a significant negative relationship between the quality of government and environmental quality. Using government spending as an indicator of governance have led to increase in air pollution.

King and Borhardt (1994) disclosed a modest but sustainable negative relationship between left party strength and per capita levels of air pollution. Konisky et al. (2008) stated that geographic location of the economy matters while enjoying the natural endowments and right wing politicians are known for exploiting such situation leading to depreciation of environment. Bättig and Bernauer (2009) democracies put more effort in the provisioning of global public goods. The study demonstrated that there is a positive effect of voting based system on the environment quality. Neumayer (2003) discovered that parliamentary green left party strength is connected with the lower environment contamination levels. In most regressions, a higher share of fossil fuels is associated with higher per capita contamination levels, whereas more energy efficiency leads to lower contamination levels. The share of manufacturing is constantly assessed with a positive coefficient but is typically statistically insignificant.

Grossman and Krueger (1995) rather they found that while increments in GDP might be related with worsening ecological conditions in exceptionally poor nations, air and water quality seem to profit by economic development once some basic level of wage has been reached. A panel data study by Anwar, Sarwar, Amin and Arshed (2019) compared estimates determinants of environment quality of difference country groups, for all cases it was confirmed that increase in GDP showed significant environment deteriorating effect.

3. Methodological framework

This study includes 15 Post-soviet countries namely, Azerbaijan, Armenia, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russian

Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. These countries have similarity environmental conditions as all of them had inherited USSR's industries and infrastructures which are deteriorated enough to contribute to environmental degradation. Further low custom duties between Russia and former USSR states led to increase in the trading of outdated automobiles and machineries, which is a major factor causing pollution in this region.

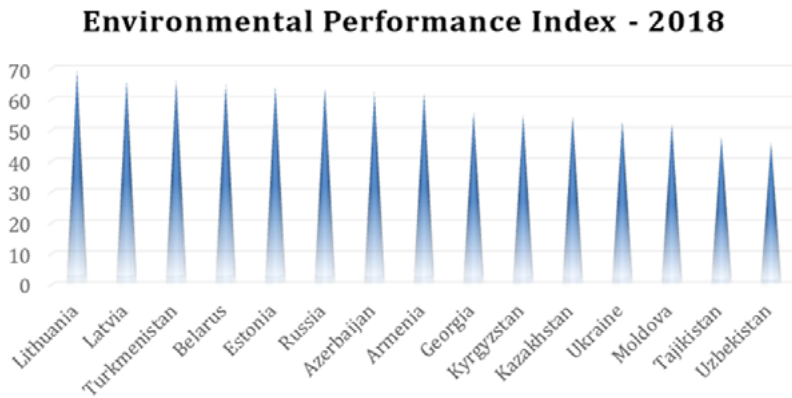
Moreover, developed countries have streamlined environmental legislation which causes the industries to move their production to developing countries with weaker environmental standards, also higher corruption ratios in the region enables the industries to avoid environmental laws using monetary means. Comparing to most of the available literature done on Post-soviet countries that are the main focus of this study is that the institutional quality is comparatively weak, and this is one of the main factors can be considered responsible for environmental degradation. The data time period considered is from 2001 to 2017 and taken from World Development Indicators, Worldwide Governance Indicators and Environmental Performance Index developed by Yale and Columbia University. Total sample constitute to 255 country years.

This study is going to estimate the indicators of institutional quality on environmental performance. The study intends to utilize panel data which is a combination of times series and cross-sections. Studies like (Neumayer, 2003; Garmann, 2014) has used dynamic panel data models (Arellano & Bond, 1991) while studying institutional quality and environmental quality. This approach is better merited than cross-sectional technique as this approach includes a higher number of observations. Accordingly, this approach controls the problem of endogeneity lagged dependent variable in the model, omitted variable biases, unobserved panel heterogeneity, and measurement errors. This technique is more efficient for over identified models as it gives more efficient results.

3.2. Dependent variable

Environmental Performance (EP) – represented by EPI a sophisticated environmental quality indicator evaluation in the region, ranks countries from zero being lowest to 100 being the highest rank. EPI included 180 economies, covering 99% of the global population, 98% of the land, and 97% of global GDP. Ranks how well countries perform on high-priority environmental issues in two broad policy areas: protection of human health from environmental harm and the protection of ecosystems. Within these two policy objectives, scores the country's performance in nine issue areas comprised of 20 indicators. The indicators measure how close countries are to meeting internationally established targets or, in the absence of agreed-upon targets, how they compare to the range of observed countries (EPI, 2018).

In figure 2, the result of Environmental Performance Index for 2018 is displayed for 15 former Soviet countries. The EPI is the combination of Environmental Health and Ecosystem Vitality Indices, and higher ranking shows better performance.

Figure 2. Country wise Environmental Performance index

3.3. Independent variables

Government effectiveness (GE) – According to World Bank’s WGI (2018) “Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies. The estimate gives the country’s score on the aggregate indicator, in units of standard normal distribution, i.e. ranging from approximately -2.5 to 2.5, and the higher score the better”.

As we have mentioned earlier that ‘GE’ is our primary determinant of institutional quality, available literature suggests that for the case of developing countries government effectiveness have mixed effect. Apergis and Ozturk (2015) states that the government effectiveness in Asian countries leads to reduction in CO₂ emissions. But over restrictive regulations might also lead to increase in CO₂ emissions.

Regulatory quality (RQ) – is another main explanatory variable in this study and one of the six indicators of Worldwide Governance Indicators. “Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The measurement ranges from -2.5 to 2.5 and the higher the result the better” (World Bank, 2018). Apergis and Ozturk (2015) found that for the case of Asia countries regulatory quality leads to a reduction of CO₂ emissions.

Choosing government effectiveness and regulatory quality out of six indicators of WGI are essential for determining environmental performance and comparing to other four indicators these two indicators are more suitable in investigating determinants of environmental performance. Government effectiveness measures the commitments of government in policy implementations, the quality of the public and civil services. On the other hand, regulatory quality measures the commitment of the government in implementing effective policies in order to promote the development of private sectors.

GDP Per Capita (LGDP) - is the natural log of GDP per capita, and the reason we include this variable is due to the close relationship of economic growth and

environmental performance. This variable indicates the stability of financial resources of the country. Also, the Environmental Kuznets Curve (EKC) explains this relationship, and according to EKC hypothesis countries when experiencing economic growth will face environmental degradation at the first stage of their economic growth. When they shift from the green agrarian economy into industrialization the environmental quality decreases. According to Bacot and Dawes (1997) countries with financial resources can better afford to spend on environmental protections.

Industrial manufacturing (LInd) – the natural log of the share of manufacturing production in GDP. In any country the structures and operations of industries have direct link with environmental quality, as they cause pollution in the country. Cole et al. (2005) industrial productivity has negative associations with environmental pollution. The hypothesis of environmental Kuznets curve suggests that as country's technological advancement is in the rise it leads to higher income and this leads to environmental degradations. Neumayer (2003) have found positive but insignificant relationship between industrial manufacturing and environmental quality.

Energy Efficiency (LEff) – natural log of energy intensity level of primary energy, measured as a ratio between energy supply and GDP at PPP. Energy efficiency indicates better use of energy but its impact can be two-sided. It may encourage more energy consumptions leading to environmental degradation and may lead to efficient and effective use of energy which decreases environmental degradation (Hanley et al. 2006).

Urbanization (LUrb) – natural log of urban population, measured in terms of share of urban population into total population. The literatures suggest that urban population effects environmental quality both negatively and positively thus, it has a mixed effect on environmental quality. Dasgupta et al. (2005) suggest that urbanization leads to better environmental quality.

Secondary education (LSecEdu) – is the natural log of secondary enrollment school. This is important because number of educated people will contribute to environmental and effective good governance. That is why more educated people will take care of the environmental quality and will cause the government to react to environmental protections (Liu et al., 2014)

3.4. Estimation model

This study is going to estimate following two models, whereby first model will use government effectiveness and second model will use regulatory quality.

$$EPI_{it} = \alpha_0 + \alpha_1 GE_{it} + \alpha_2 LGDP_{it} + \alpha_3 LInd_{it} + \alpha_4 LEff_{it} + \alpha_5 LUrb_{it} + \alpha_6 LSecEdu_{it} + \mu_{it}$$

$$EPI_{it} = \beta_0 + \beta_1 RQ_{it} + \beta_2 LGDP_{it} + \beta_3 LInd_{it} + \beta_4 LEff_{it} + \beta_5 LUrb_{it} + \beta_6 LSecEdu_{it} + \epsilon_{it}$$

Where i is the number of years between 2001 and 2017, t is the number of 15 Post-soviet countries, μ_{it} and ϵ_{it} is the error term.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Source
EPI	249	0.59	0.12	0.31	0.88	EPI (2017)
GE	255	-0.34	0.72	-1.64	1.19	WGI (2017)
RQ	255	-0.27	0.96	-2.13	1.70	WGI (2017)
LGDP	255	8.24	0.98	6.10	9.85	WDI (2017)
LInd	252	3.36	0.31	2.81	4.20	WDI (2017)
LEff	225	2.15	0.50	1.21	3.52	WDI (2017)
LUrb	255	15.26	1.28	13.71	18.49	WDI (2017)
LSecEdu	186	13.53	1.33	11.26	16.49	WDI (2017)

Table 1 shows the results of descriptive statistics of EP, LGDP, LInd, LEff, LUrb, and LSecEdu which have a mean values greater than their standard deviation values which show all these explanatory variables are under-dispersed. These variables are closely scattered around their mean value. While the results of GE and RQ show mean values of negative and smaller than their standard deviations. Thus, government effectiveness, and regulatory quality are below average and over-dispersed. This over-dispersion indicates that series are heterogeneous across countries. Further table 2 reports the VIF statistics of the independent variables in the model. It can be seen here that none of the independent variables have VIF value > 10 indicating that there is no hint of multicollinearity (Gujarati, 2004)

Table 2. VIF statistics

	GE	RQ	LGDPpC	LIndustry	LEfficiency	LUrban
RQE	7.579					
LGDPpC	1.547	1.354				
LIndustry	1.000	1.014	1.066			
LEfficiency	1.226	1.292	1.226	1.006		
LUrban	1.074	1.155	1.008	1.158	1.368	
LSecEdu	1.265	1.428	1.048	1.136	1.649	7.043

4. Estimations and results

Following section provides the estimation results based on the equations and estimation approach discussed earlier.

Table 3. Estimation Results

VARIABLES	GMM	GMM
GE	0.04*** (0.01)	

RQ		0.04*** (0.01)
LGDPpC	-0.02* (0.01)	-0.02* (0.01)
LIndustry	0.03 (0.04)	0.04 (0.04)
LEfficiency	-0.11*** (0.03)	-0.10*** (0.03)
LUrban	0.07*** (0.02)	0.06** (0.02)
LSecEdu	-0.05* (0.03)	-0.04 (0.03)
Observations	170	170
R-squared	0.25	0.27
Number of Country	14	14

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Worked out from Stata software package

Table 3 provides the 2 step GMM estimates of the model. We can see that GE is significant at 1%, and if GE increases by 1% will increase EP by 0.04% which is supported by previous studies for example King and Borchardt (1994), and Wen et al. (2016). LGDPpC is significant at 10% and if it increases by 1% will decrease EP by 0.02%. This is supported by the statement of EKC that at the initial stages of development, economic growth leads to environmental degradation, Dasgupta et al. (2002), Victor (2008), Shahbaz et al. (2014) and Anwar et al., (2019) conclude the same results.

The coefficient of LIndustry is insignificant, this result is supported by other empirical papers, for example, Neumayer (2003). LEfficiency is significant and 1% increase in LEfficiency will decrease EP by 0.11%, this result follow the Hanley et al. (2006). This happens when industries are efficient in their productivity as they produce more and consume higher energy which leads to increase of environmental degradation this is possible because of the fact that the industries are using old technology purchased from Russia. LUrban is significant and 1% increase in LUrban will increase EP by 0.07% supported by Dasgupta et al. (2005). And also LSecEdu found to be significant at 1%, and if there is an increase in LSecEdu will decrease EP by 0.05%, this study conclude the opposite of Liu et al., (2014), this is in the case when educated people start working on industries while shifting from agrarian economy to industrial economy this process transforms the agricultural lands towards commercial or industrial zones, which leads to an increase of environmental degradation.

In the RQ model, we can see that the results for RQ is significant at 1%, and if RQ increases by 1% will increase EP by 0.04% which supports the study hypothesis about institutional quality and also supported by previous studies for example Varoudakis et

al. (2007), and *Apergis and Ozturk* (2015). LGDPpC is significant and if it increases by 1% will decrease EP by 0.02%, Grossman and Krueger (1995) and Anwar et al. (2019) study support the same result. This is supported by the statement of EKC that at the initial stage of development, economic growth with immature institutes, leads to environmental degradation. The coefficient of LIndustry is insignificant. LEfficiency is significant and 1% increase in LEfficiency will decrease EP by 0.10%, same conclude the Hanley et al. (2006). This happens when industries are at their maximum productivity and consuming energy at maximum level, and this leads to increase of environmental degradation. LUrban is significant and 1% increase in LUrban will increase EP by 6% supported by Shahbaz et al., (2014). And LSecEdu found to be insignificant which fails to reach study hypothesis about secondary education impact on EP.

5. Conclusion

This research paper has investigated the relationship between institutional quality and environmental performance by using multinational panel data for 15 Post-Soviet countries. The paper's investigation was for the time period between 2001 to 2017, and defined institutional quality with government effectiveness and regulatory quality, the indicators of WGI. The environmental performance is represented with Environmental Performance Index the broad environmental comprehensive indicator was used for the first time as an empirical paper in this region. We used instrumental variable in Generalized Method of Moments in order to introduce dynamics in the model and then capture the problem of endogeneity. We have incorporated other controlling variables like industrial manufacturing, energy efficiency, urbanization, and secondary education for 15 post-soviet countries.

Overall, we found that the indicators of institutional quality have strong relationship with environmental quality. When there is an increase in government effectiveness and regulatory quality the environmental performance rises by 0.04 percent for both cases. Further increase in GDP per capita, energy efficiency, and education leads to depreciation of environment and urbanization increases the environmental performance.

5.1. Policy implication

During this study from our estimation results we have confirmed that our main explanatory variables have strong relationship with environmental performance. The government effectiveness and regulatory quality have vital role for environmental better performance. As we have reviewed in paper that comparing to developed countries post-soviet countries ranked lower for institutional quality, as they are developing and industrialization taking place and economic growth is happening, and for this reason there is need to improve government effectiveness and regulator quality.

Our findings show that economic growth (LGDPpC) is inversely related to environmental performance, and it is logical because when countries start developing their main focus will be economic prosperity and then environmental performance. This economic prosperity degrades environment during initial stage as suggested by

EKC then eventually start positive contribution in environmental quality. Hence further investigation is required for these countries in order to identify the growth threshold for the sustainable environment.

According to paper we reviewed the results of energy efficiency is supported by our hypothesis. The energy efficiency decreases environmental performance as industrial productivity rises more energy is consumed, and environmental degradation increased. Hence policy makers must ensure the fact that the new and existing industries must expand their utilization of renewable energy.

Reference

- Anwar, A., Sarwar, S., Amin, W., & Arshed, N. (2019). Agricultural practices and quality of environment: evidence for global perspective. *Environmental Science and Pollution Research*, 26(15), 15617-15630.
- Apergis, N., & Ozturk, I. (2015). Testing environmental Kuznets curve hypothesis in Asian countries. *Ecological Indicators*, 52, 16-22.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58(2), 277-297.
- Bacot, A. H., & Dawes, R. A. (1997). State expenditures and policy outcomes in environmental program management. *Policy Studies Journal*, 25(3), 355-370.
- Bättig, M. B., & Bernauer, T. (2009). National institutions and global public goods: are democracies more cooperative in climate change policy? *International organization*, 63(2), 281-308.
- Bernauer, T., & Koubi, V. (2013). Are bigger governments better providers of public goods? Evidence from air pollution. *Public Choice*, 156(3-4), 593-609.
- Cole, M. A., Elliott, R. J., & Shimamoto, K. (2005). Industrial characteristics, environmental regulations and air pollution: an analysis of the UK manufacturing sector. *Journal of environmental economics and management*, 50(1), 121-143.
- Dasgupta, S., Mody, A., Roy, S., & Wheeler, D. (2001) Environmental Regulation and Development: A Cross-country Empirical Analysis. *Oxford Development Studies*, 29, no. 2, 173-87. Accessed November 16, 2018.
- Dasgupta, S., Laplante, B., Wang, H., & Wheeler, D. (2002). Confronting the environmental Kuznets curve. *Journal of economic perspectives*, 16(1), 147-168.
- Dasgupta, S., Deichmann, U., Meisner, C., & Wheeler, D. (2005). Where is the poverty–Environment nexus? Evidence from Cambodia, Lao PDR, and Vietnam. *World Development*, 33(4), 617-638.
- Dasgupta, S., Hamilton, K., Pandey, K. D., & Wheeler, D. (2006). Environment during growth: accounting for governance and vulnerability. *World development*, 34(9), 1597-1611.
- Emerson, J., Esty, D. C., Levy, M. A., Kim, C. H., Mara, V., de Sherbinin, A., & Srebotnjak, T. (2010). Environmental performance index. *New Haven: Yale Center for Environmental Law and Policy*, 87.
- Environmental Performance Index (EPI). (2018) “Environmental Performance Index”. Accessed May 05, 2018. <https://epi.envirocenter.yale.edu/>.
- Esty, D. C., & Porter, M. E. (2005). National environmental performance: an empirical analysis of policy results and determinants. *Environment and development economics*, 10(4), 391-434.
- Esty, D. C. (2008). Rethinking global environmental governance to deal with climate change:

- The multiple logics of global collective action. *American Economic Review*, 98(2), 116-21.
- Garmann, S. (2014). Do government ideology and fragmentation matter for reducing CO₂-emissions? Empirical evidence from OECD countries. *Ecological Economics*, 105, 1-10.
- Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. *The quarterly journal of economics*, 110(2), 353-377.
- Gujarati, D. (2004). *Basic econometrics*. The Mc-Graw Hill.
- Hanley, N. D., McGregor, P. G., Swales, J. K., & Turner, K. (2006). The impact of a stimulus to energy efficiency on the economy and the environment: A regional computable general equilibrium analysis. *Renewable Energy*, 31(2), 161-171.
- Holzinger, K., Knill, C., & Sommerer, T. (2011). Is there convergence of national environmental policies? An analysis of policy outputs in 24 OECD countries. *Environmental politics*, 20(1), 20-41.
- Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science & Politics*, 28(1), 57-72.
- King, R. F., & Borchardt, A. (1994). Red and green: air pollution levels and left party power in OECD countries. *Environment and Planning C: Government and Policy*, 12(2), 225-241.
- Konisky, D. M., Milyo, J., & Richardson, L. E. (2008). Environmental policy attitudes: Issues, geographical scale, and political trust. *Social Science Quarterly*, 89(5), 1066-1085.
- Liu, X., Vedlitz, A., & Shi, L. (2014). Examining the determinants of public environmental concern: Evidence from national public surveys. *Environmental Science & Policy*, 39, 77-94.
- NASA. (2018). Climate Change: Vital Signs of the Planet. NASA. Accessed November 20, 2018. <https://climate.nasa.gov/>.
- Neumayer, E. (2003). Are left-wing party strength and corporatism good for the environment? Evidence from panel analysis of air pollution in OECD countries. *Ecological economics*, 45(2), 203-220.
- Neumayer, E. (2004). The environment, left-wing political orientation and ecological economics. *Ecological economics*, 51(3-4), 167-175.
- Scruggs, L. (2003). *Sustaining abundance: Environmental performance in industrial democracies*. Cambridge University Press.
- Shahbaz, M., Sbia, R., Hamdi, H., & Ozturk, I. (2014). Economic growth, electricity consumption, urbanization and environmental degradation relationship in United Arab Emirates. *Ecological Indicators*, 45, 622-631.
- Solesbury, W. (1976). Issues and innovations in environmental policy in Britain, West Germany, and California. *Policy Analysis*, 2(1), 1.
- Stiglitz, J. (2002). *Globalization and its discontents*. Penguin Books. New York, Page 223. Accessed May 6, 2018
- Victor, P. A. (2008). *Managing without growth: slower by design, not disaster*. Edward Elgar Publishing.
- Wen, J., Hao, Y., Feng, G. F., & Chang, C. P. (2016). Does government ideology influence environmental performance? Evidence based on a new dataset. *Economic Systems*, 40(2), 232-246. Accessed May 5, 2018. doi:10.1016/j.ecosys.2016.04.001. <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-9299.1976.tb00256.x>
- World Bank. (2018). "Environment". Accessed November 22, 2018. <https://www.worldbank.org/en/topic/environment>.
- University of Chicago. (2015). Why Environmental Quality is Poor in Developing Countries: A Primer. (2015, May 26). Retrieved from <https://epic.uchicago.edu/news-events/news/why-environmental-quality-poor-developing-countries-primer>