



Spring 2020

## A Buck for a Forest: Does Corruption and Development Lead to Environmental Degradation?

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### Recommended Citation

Economou-Garcia, Alexandros, "A Buck for a Forest: Does Corruption and Development Lead to Environmental Degradation?" (2020). *Student Publications*. 826.  
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# A Buck for a Forest: Does Corruption and Development Lead to Environmental Degradation?

## Abstract

With growing awareness of sustainability in both the private and public sectors of the world, new funds - for sustainable development - have been created for developing countries through inter-governmental organizations including the United Nations. With an increase in funding, comes the challenge of ensuring that the funds are used for their correct purposes. This paper analyzes the connection between corruption, human development index (HDI), and environmental degradation. This paper first looks at understanding the connection between corruption and environmental degradation. Secondly, the paper explores research demonstrating the possible impact development has on environment degradation. Finally, the paper looks at studies demonstrating connections between corruption and environmental degradation, and what possible policies could be enforced – at state and international levels – to address environmental corruption. In the end, it was found that there was a negative relationship between corruption and environmental degradation (using carbon footprint as a proxy), while HDI and environmental degradation had a positive relationship.

## Keywords

Corruption, Environmental Degradation, Carbon Footprint, Environmental Corruption

## Disciplines

Environmental Policy | Political Science

## Comments

Written for POL 215: Political Science Research Methods.

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May 9, 2020

## **A Buck for a Forest: Does Corruption and Development Lead to Environmental Degradation?**

The creation of the Paris Agreement in the 2015 Conference of the Parties (COP) brought hope to the global fight against climate change. Not only did it bring new measures regarding lowering carbon emissions for all polluting nations, the agreement also furthered its commitment of aid to developing countries for progressing environmental initiatives through the Copenhagen Green Climate Fund (GCF) (Taraska 2015). Though this would seem like a great step taken by COP, government officials, from developing countries, hold the power to fund initiatives that aren't environmentally friendly. Large amounts of the money will be given to countries with weak government institutions constituting great risk to corruption, which is already widespread in the developing countries (Jacobson and Tropp 2010).

With growing concerns regarding environmental degradation and climate change, nations are tasked to increase their efforts for creating environmental standards and regulations, mitigating their impact on ecosystems, and finding alternatives to the current business-as-usual ways of living. However, this green transition cannot take place due to weak governance, including corruption being the primary factor. In fact, a significant amount of problems regarding environmental degradation arise from nations with weak governmental institutions that

deal with environmental issues, which worsen with corruption. Corruption not only hinders the strength of environmental policies, but it also delays economic development. With increased funding for initiatives that are labeled ‘environmentally friendly’ on paper, many political elites and corporations can take advantage – of funds – for personal gain, especially in developing nations with abundant amounts of natural resources (Leitao 2016; Jacobson and Tropp 2010).

Corruption has already left its mark on environmental degradation in different parts of developing nations’ economies and environment. An example being increased deforestation within forests of developing nations. Many timber companies bribe officials to turn a blind eye to illegal logging activities in protected forest-areas, which has been seen within developing nations like Nigeria, Indonesia, Kenya, and more (Leitao 2016; Fadairo et al. 2017; Jacobson and Tropp 2010). The destruction of forests leads to an increase of floods, landslides, loss of biodiversity, reduction of water supply, wildfires, and more complex issues – environmental and non-environmental. Additionally, corruption hinders economic growth, which can prevent developing countries from implementing new projects preventing harm to the environment (Sekrafi and Sghaier 2018). That is why it is important to look at corruption as a major obstacle in the fight for mitigation and adaptation of climate change and environmental degradation impact.

If developed nations and international organizations want to continue the funding and creation of new sustainable projects through climate finance – like the CGF – then new measures regarding transparency at all levels must be created, and old policies must be changed to fit the new changes (Fadairo et al. 2017).

This paper will first look at understanding the connection between corruption and environmental degradation. Secondly, the paper will explore research demonstrating the possible impact development has on environment degradation. Finally, the paper will look at studies demonstrating connections between corruption and environmental degradation, and what possible policies could be enforced – at state and international levels – to address environmental corruption. These studies will direct the research in understanding the impact corruption has on environmental degradation in developing nations.

Understanding the connection between corruption and the environment in developing nations is important due to developing nations having weaker governance, in comparison to developed nations. Exploring research that looks into the different areas affected by environmental corruption, which can help further the literature surrounding environmental corruption. Using previous studies will allow for the research to congregate different case studies and solutions surrounding corruption's impact on the environment, which is beneficial due to the current lack of literature on the topic.

## **Literature Review**

### ***Level of development and environmental degradation***

How does one research the connection between development and environmental degradation? This is a question asked by many different scholars in the field of environmental economics, and environmental policy. As a result, different mechanisms are used to determine the connection. One of them being the environmental kuznets curve (EKC), which is a U-shaped

graph that demonstrates different factors of environmental degradation – pollution (air and water), deforestation, loss of biodiversity, and other forms of environmental harm – and its connection to income per capita. It hypothesizes that an increase in income per capita will increase environmental degradation, but then slowly fall back as income per capita increases. In other words, the way to combat environmental degradation is through continued economic development, meaning that once environmental degradation reaches its peak, continued increase of income per capita results in a reduction of environmental degradation. The studies that focus more on economic development and corruption use this model rather than creating or using other regression analysis models (Cole 2006; Sekrafi and Sghaier 2017; Akhbari and Nejati 2019).

The usage of the environmental kuznets curve was also used in earlier empirical studies looking at corruption's impact on environmental degradation (Cole 2006). Cole (2006) methodology utilized income per capita as a proxy for economic development and carbon emissions as a proxy for environmental degradation, using similar variables to the environmental kuznets curve, which Sekrafi and Sghaier (2018) continues to use the same methodology as Cole (2006) to create new functional forms for measuring the different variables (GDP per capita, carbon dioxide emissions, control corruption, energy usage per capita, and population respectively).

### ***What is corruption?***

Corruption continues to negatively impact different sectors of life throughout the world. Corruption is defined by Transparency International as an act in which those in control use their power for personal benefit (Sekrafi and Sghaier 2018), and Akhbari and Nejati (2019) add that is

using a professional position – essentially those in power – to gain personal benefit (in both public and private sectors). Corruption is not just a political issue and doesn't always involve money. This definition focuses on abuse. Leitaó (2016) adds that omission, when an official avoids saying or acting-on something for the common good. Fadairo et al. (2017) adds an environmental aspect to the definition, "The abuse of entrusted climate funds or resources for gains other than what is intended." Sekrafi and Sghainer (2018) add that the level of corruption within a country is affected by the costs of being corrupt and the benefits of it.

### ***How does corruption affect environmental degradation?***

Almost all aspects of the environment are negatively affected by corruption. Povitkina (2018) brings up ways corruption affects the environment at different levels including that corruption disrupts coercive power of the state. First, in a corrupt state, laws are rarely followed and policies do not get implemented. These bribes come from individuals and corporations who wish to exploit the environment. This claim is further explained by Sekrafi and Sghaier (2017) by pointing out that "...corruption affects environmental regulations by introducing bias, not only in the adoption process but also in the implementation process and the application of these regulations."

The second impact corruption has is that it impedes voluntary compliance by reducing trust in government institutions (Povitkina 2018). The citizens of the countries lose faith when their government is easily bought out by individuals. This idea is further tested by Fadairo et al. (2018) in Nigeria, when looking at the opinions of REDD+ forest communities. The individuals who were given surveys responded that they felt that they were not being positively impacted by

the actions of the UN and their local governments. As a result, they had a lack of confidence in any climate initiatives since they demonstrated that they weren't even aware of certain aspects of initiatives since political elites within the community were only being updated by government officials and UN staff. Jacobson and Tropp (2010) add on to this idea stating the first group to suffer from corruption in environmental issues are those with the weakest voice – being the marginalized identities who have little-to-no ability to demand accountability. Leita (2016) brings up a case study of the corruption in the oversight of dams, leading to poor monitoring of environmental and public health conditions, leaving marginalized communities with poor water quality and unsafe environments.

The next area that Povitkina (2018) dives into is corruption obstructing extractive capacity of a country, which lower financial resources that can be used at the disposal for nations for taking environmentally-friendly initiatives. This revolves mostly around individuals not paying their taxes, which is a common issue within developing countries. Sekrafi and Sghainer (2017) use the case study of Tunisia to add on to the point made by Povitkina (2018). They bring the topic of the impact of informal sectors within economies, which is a sector that isn't regulated by the government (meaning workers aren't protected by the government, and businesses under informal sectors do not follow policies of states). Giving more power to informal sectors of economies increases pollution levels and leads to environmental degradation. When a country passes strict environmental legislation, corporations move towards informal economies to maximize their profits, or to other developing countries that can be swayed (Galinato and Galinato 2013). Fadairo et al. (2018) also points out that climate financing from developed nations and international organizations can be used to the personal benefit of officials.



When funds from developed countries and international organizations are misused, the likelihood of future investment (or accessibility to funds like GCF) will be reduced.

The fourth impact of corruption is that it hinders policy-making, since polluting business owners can bribe government officials to implement legislation that fits the needs of only a few (Povitkina 2018). Cole (2006) further notes that greater corruptibility reduces the strength of environmental and energy policies. The reason being that the government is moving their focus to accepting bribes from corporations to make policies that help the few members of the elite rather than the welfare of the greater good. Additionally, Leitao (2016) identifies one of the trends pointed out by Transparency International pointing out that weaknesses in governance and policy facilitate corruption in environmental fields. A case study of this would be Mau forest in Kenya, where officials were paid off by political elites in the agricultural sector. As a result of this, there has been a reduction in drinking water coming from Mau forest – which is one of the top five sources of water in Kenya. As a result, politicians blame climate change as the sole reason for the reduction of drinking water (Jacobson and Tropp 2010).

The fifth and final aspect of Povitkina (2018) is that corruption affects carbon dioxide indirectly through its impact on national income. It hurts climate financing because less money is available to invest in green technology. This point is tested by Galinato and Galinato (2013) when looking at the impact corruption has on forest cover specifically due to agricultural and infrastructure (road) encroachment. A decrease of corruption demonstrated lowered forest cover due to better allocation of funds for technology in the agricultural sector. Additionally, the agricultural sector tends to be one of the most corrupt sectors within developing nations due to

the strong reliance on agriculture (Cole 2006). Corruption impedes economic growth, and countries lose money due to corruption (Sekrafi and Sghaier 2017).

### **Causal Explanation and Hypothesis**

Creating and implementing environmental legislation and regulations can help lead a country in the right direction in terms of preventing further environmental degradation, however, what is the point of creating new policies when those who contribute to the problem don't follow? In order for environmental degradation reduction to occur, polluters within the jurisdiction of those policies need to comply, but paying off a local official provides more benefits and less risk to the corporations and political elites rather than following the new policies. When environmental legislation is passed, the host country needs to make sure that it is strict enough for all to comply, and that loopholes aren't taken advantage of. When government institutions are able to enforce these policies, then non-compliant actors – such as the corporations and political elite – will be forced to comply or move their operation somewhere else. This not only provides the opportunity for increased cooperation between governments and individuals, it also allows governments to receive more climate financing – from international organizations and developed nations – to help initiatives.

This is a lot easier to say, especially within developing countries who are rich in natural resources, which is due, in-part, to politicians and corporations looking at the short term gain of illegally exploiting natural resources. Especially when democratic institutions are not put in place to serve as a means for checks and balances. As mentioned before, corporations and

political elites also take advantage of developing nations with weak institutions as a way to increase profit and benefit themselves rather than a wider collective people.

For this study, I wish to study under what conditions corruption has on the environment. Thus, I will be creating two hypotheses.

Hypothesis 1: In a comparison of countries, those that have higher levels of corruption are more likely to have a higher carbon footprint than those with lower levels of corruption.

Hypothesis 2: In a comparison of countries, those with lower HDI ratings are more likely to have higher carbon footprint than those with lower HDI ratings.

For the dependent variable, carbon footprint will serve as a proxy for environmental degradation since it includes the amount of greenhouse gases released from different sectors: food; transportation; energy, and more. This will be similar to the previous studies have done, but it allows for greater representation of environmental degradation since the focus isn't just on the energy sector (as an example). Measuring multiple sectors, rather than one, is important in bridging the gap between the previous studies, and allows for a greater understanding of the research question. The first independent variable will be corruption. Using the corruption perception index as a way to measure corruption within individual countries. Most previous studies used the corruption perception index from Transparency International, and it is the best measure at looking at a wide-range of corruption. Other corruption indexes focus on economic corruption. The second independent variable will be the Human Development Index since it

includes measures of socioeconomic factors of an individual's life, and it works as a proxy for measuring development.

### **Research Design**

In order to test the hypothesis, I examined data from the 2016 World Data set. The data includes ratings and scores surrounding specific issues and the respondents are 169 United Nations Members States. I will only be including data from the 2016 World Dataset.

I selected these data because it is one of the few data indices available to include different ratings and rankings of nations from different organizations and groups. It also includes a wide range of global issues. This made it a lot easier to test the connection between corruption, economic development, and environmental degradation. Additionally, the rating and rankings provided are done by organizations that are commonly used within literature looking at corruption and its impact on policy – including environmental policy. Furthermore, I had selected 2016 because after the passing of the Paris Agreement, climate financing became more clear and provided more funds for developing countries. A constraint of this data is that it doesn't include modern environmental trends, especially with the abrupt change of environmentally policy within the United States due to the change from the Obama to Trump administration. Also, it doesn't include information about all forms of environmental degradation – soil degradation and marine habitat destruction as a few examples.

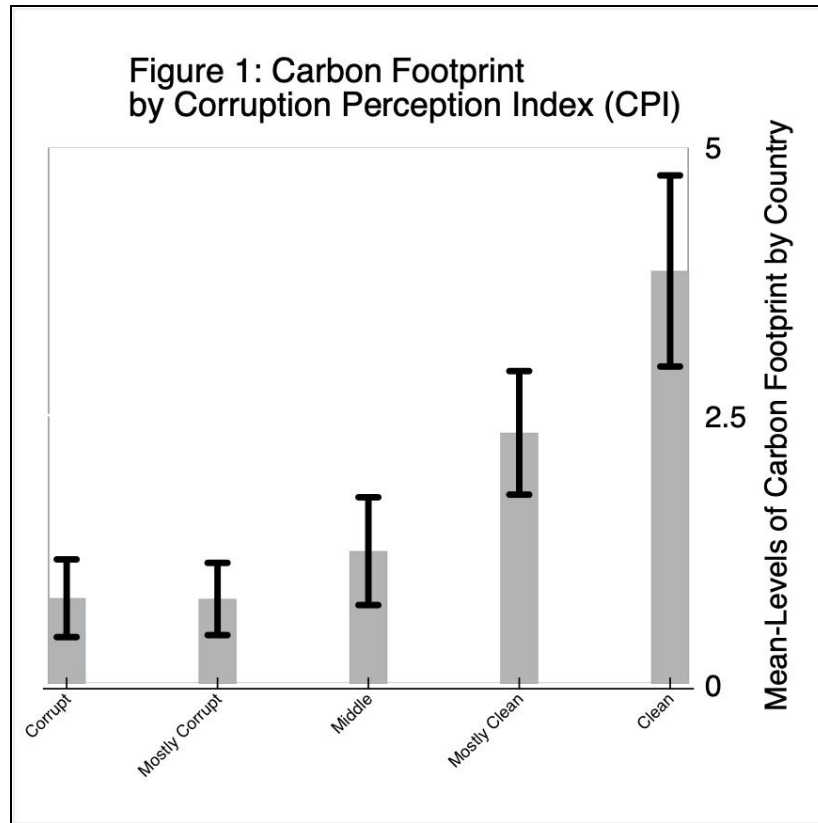
### ***Variable Measurement***

In order to operationalize the amount of environment degradation that occurs in each country, I will use the carbon footprint variable. The variable looked at the carbon footprint of

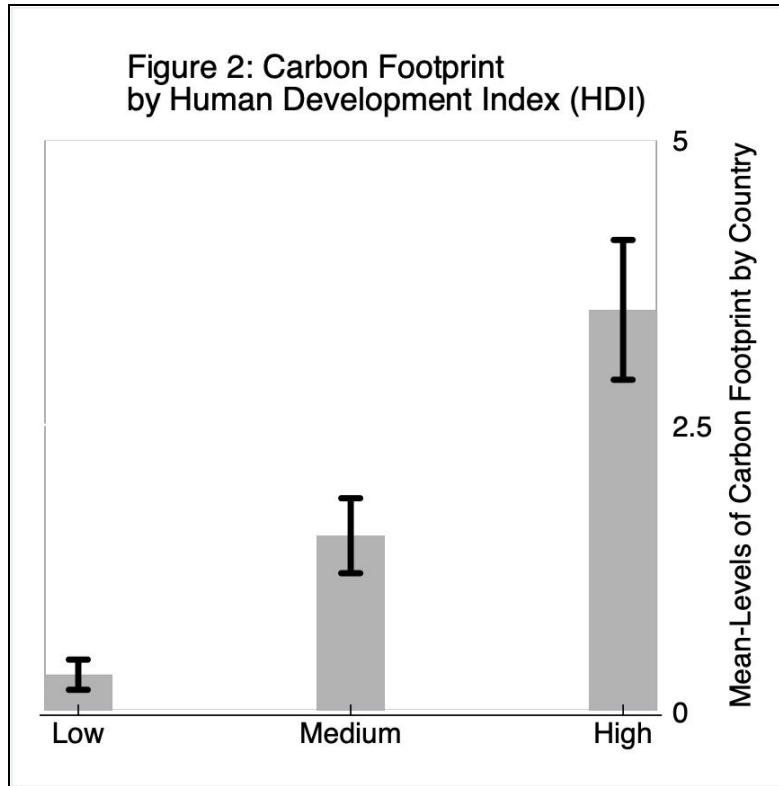
each country provided by the Global Footprint Network, which explains that a carbon footprint “translates tonnes of carbon dioxide released into the demand this places on biological capacity, measured in terms of the total area, in global hectares, required to sequester these carbon emissions” (Global Footprint Network 2020). The countries without any answers or “.” as their responses were removed from the data. The dependent variable, carbon footprint, mostly has countries reported between 1-5, however, there are nine countries with egregious carbon footprints, over 5. The countries with the three most egregious carbon footprints include: Luxembourg (12.65), Qatar (9.57), Kuwait and Trinidad and Tabago (6.89). The other outliers include oil-producing countries and small urbanized countries. It is reported as an interval-level variable. The higher the carbon footprint rating the higher that specific individual - or country in this case - emits carbon. Being an interval-level variable, the mean, median, and mode can be reported. The summary statistics of the carbon footprint variable are as follows: the mean for is 1.757, the mode is 0.07, and the median is 1.08.

The CPI scores are done through Transparency International, an non-governmental organization which combats global corruption through research and reporting (Transparency International 2020). For the Corruption Perception Index (CPI), Transparency International uses scores from businesses and experts, then compiles all the scores into the CPI. The CPI scores were changed from interval-level measurement to ordinal levels, with a new scale of 1-5. The scale was labeled as follows: 1. “Corrupt” 2. “Mostly Corrupt” 3. “Middle” 4. “Mostly Clean” 5. “Clean”. Countries that are given a higher CPI rating are called “cleaner” countries, meaning they are less corrupt than others. Since the CPI variable is now ordinal-level, the summary statistics only include the median and mode which are “Middle” and “Mostly Corrupt”

respectively. Figure 1 demonstrates the relationship between carbon footprint and CPI with confidence intervals.



Countries' HDI are a composite index of different factors including: life expectancy, education, and per capita income. For this study, HDI was split into three quantiles, going from interval-level to ordinal-level like the other independent variable, CPI. The scale of HDI is 1-3 and was labeled as followed: 1. "Low 2. "Medium" 3. "High". The summary statistics for the ordinal-level HDI variable included the median being "Medium", and the mode being "Low". Figure 2 displays the mean carbon footprint of each HDI grouping.



### *Model Estimation*

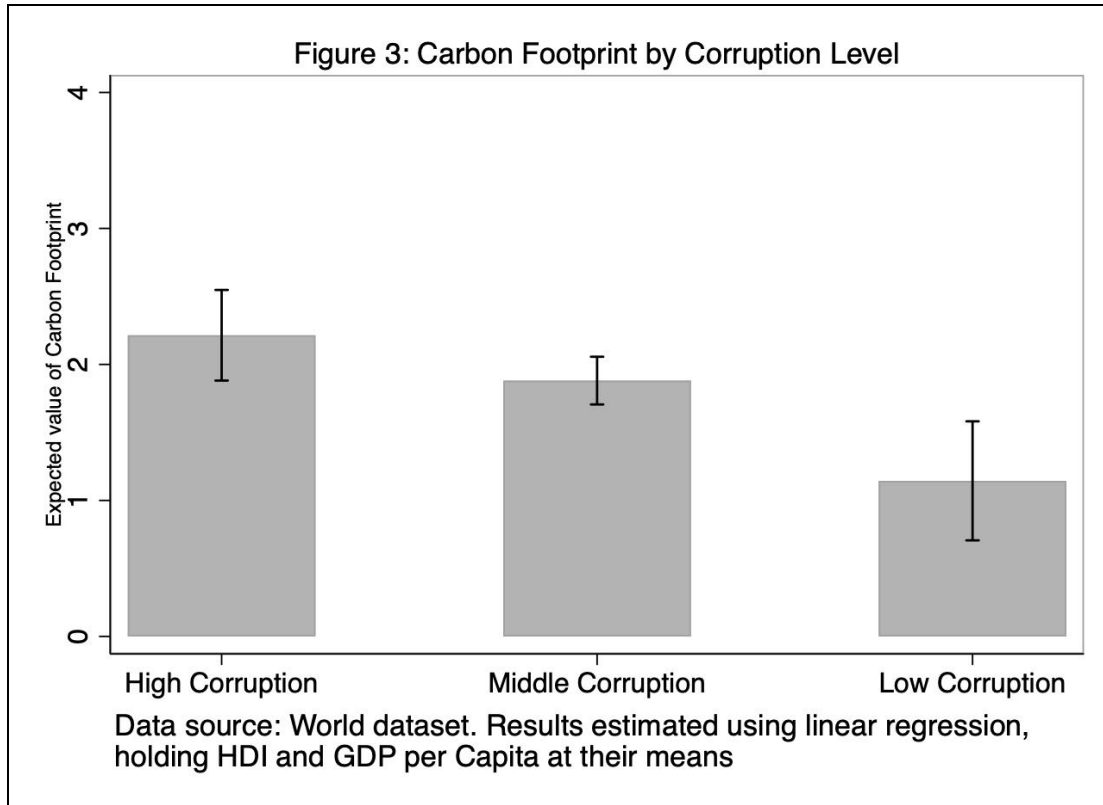
The dependent variable, an individual country's carbon footprint, is an interval-level variable. Due to this, I decided to choose linear regression to analyze the effects the two independent variables - CPI and HDI - have on a country's carbon footprint. I conducted one logistic regression table for my research in order to compare the relationships between my dependent variable and my two different independent variables. Additionally, this would also allow for the isolation of the effect of one independent variable on the dependent variable, while controlling for the effects of the other independent variables. When controlling for the two independent variables, the table displays how changes in each variable accurately impacted the

carbon footprints of each country. For CPI and HDI, I used their interval-level measurements and held for the mean of both independent variables.

### *Results*

Table 1: Linear Regression for Carbon Footprint		
	Dependent variable = Carbon_footprint	
Corruption Perception Index (CPI)	-0.020*** (0.007)	0.023*** (0.009)
Human Development Index (HDI)	1.267* (0.673)	5.344*** (0.873)
Gross Domestic Product (GDP) per capita in USD	0.000*** (0.000)	- -
Constant	-0.288* (0.363)	-2.575*** (0.413)
Countries	138	150
<p>Dependent variable measured in interval level with most countries being between 1-5, and a larger number represents a larger footprint.</p> <p>Standard errors in parenthesis</p> <p>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.1</p>		





The results of my regression table, we see a negative relationship between the two variables - CPI and carbon footprint - which demonstrates that the more corrupt the country, the higher their carbon footprint score. In regards to the p-value, it was less than 0.05, giving the assumption that there is a correlation between the two variables. On average, each increase of CPI level causes the carbon footprint to fall by -0.020. This surprises me a little but since controlling for GDP per capita makes a difference in terms of the type of relationship between the two variables, which proves my hypothesis to be correct, thus I would reject the null hypothesis. When not controlling for GDP per cap, a positive relationship is demonstrated, meaning that the less corrupt a country is the higher their carbon footprint compared to more

corrupt countries. Controlling for GDP per cap is important because it changes the entire relationship between the variables, which would lead to a different result for the paper.

Unlike CPI, we see a positive relationship between the second independent variable, HDI, and carbon footprint, which demonstrates that the cleaner the country, the higher their carbon footprint. In regards to the p-value, it was greater than 0.05, giving the assumption that there's no correlation between the two variables, thus I would have to accept the null hypothesis. On average, each increase of HDI level causes the carbon footprint to rise by 1.267. The results do not surprise me since corrupt countries tend to have less industrial capacity to pollute. Looking back at the environmental kuznet's curve, countries that are continuing to develop economically will encounter an increase then decrease of environmental degradation (following the U-shaped curve). When not controlling for GDP per capita, the hypothesis between development and environmental degradation contains a p-value of less than 0.05, which means that the null hypothesis would be rejected this time. Additionally, the coefficient changes, meaning that the change of HDI level causes the carbon footprint to rise by 5.344. This would be the opposite of my second hypothesis which states that countries that are not as developed will have higher carbon footprints.

### *Discussions and Conclusions*

Overall, the effect of corruption on environmental degradation (using CPI as a proxy for corruption and carbon footprint for environmental degradation) demonstrated that the more corrupt countries have higher amounts of environmental degradation than those that are less corrupt - or cleaner. However, when measuring development, using HDI as a proxy, we find that

the more developed a country is, the greater their carbon footprint compared to those that are less developed. This means that the first hypothesis was proven, since the relationship between corruption and environmental degradation was negative - as seen in Figure 3. Additionally the bars of standard error do not intersect, assuming that there is a correlation between CPI and environmental degradation (Figure 3). However, these findings are still important because it demonstrates that the theory of environmental kuznets curve holds true, especially with development.

Which then brings back previous literature, which brought up that corruption hinders development, in terms of economic, social, and political growth of an individual country. The hindrance of development would result in a slowdown of an individual country's environmental kusnet's curve, meaning an increase of environmental degradation will occur due to corruption's impact on development (Cole 2006; Sefrafi and Sghaier 2017; Povitkina 2018). This is seen within the coefficient value of HDI when GDP per capita is and isn't controlled when analyzing CPI and HDI, which is why there is a positive relationship with HDI and carbon footprint. It is important to still note that countries with egregious carbon footprint values such as Bahrain, Qatar, and Kuwait have poor performance in terms of democracy, human rights, infrastructure, and income inequality - which are taken to consideration when designating whether or not a country is developed or developing (Ncube et al. 2014). This also brings up some of the limitations of the data from the variables used to test the hypotheses.

In regards to measuring corruption's impact on the environment, it is very hard to do since most of it does not get reported. In fact, many politicians in developing countries commit omission when reporting any environmental degradation (Leitao 2016). This would explain why

carbon footprints of countries might not be accurate. It is also important to note that reporting from countries with significant portions of their economies being classified as ‘informal economies’ increases the hindrance for accurate reporting due to the lack of governmental oversight (Sefrafi and Sghaier 2017). Many multinational corporations (MNCs) tend to rely on these informal economies in developing countries due to the lack of regulations, and MNCs will move to countries with less regulations and oversight in hopes of maximizing profit (Galinato and Galinato 2013).

In the future, variables like ‘percentage of economy is informal’, and ‘strength of governmental institutions’ should be taken into account when studying the effects of corruption and development on environmental degradation. Gaining a better understanding of these variables could help bring better understanding of issues such as the reporting of environmental degradations or use of green funds in developing nations.

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