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Potentially Terminal Conditions: Economic Globalization and Ecological Footprint

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Keywords

Globalization, Environment, Economic globalization, ecological footprint

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This paper studies the relationship between economic globalization and environmental footprint. It hypothesizes that economic globalization will increase the negative environmental impact. The study covers theories for and against this argument, focusing especially on the validity of an environmental Kuznets curve, market-based solutions, and other suggested policies. It then gathers data and tests the relationship using a regression analysis. The results show a statistically significant positive relationship between economic globalization and ecological impact. The study concludes by discussing these results and proposing future steps.

Environmental change is the most substantial threat to existence on Earth in the modern era. From controlled fires to hunting for food, humans, like any other organism, have shaped the world around them in different ways. However, the human species differs in how far it has stretched these entitlements. Environmental degradation is occurring at a rapid rate across all biomes. It has exponentially increased in the past few decades, despite policies implemented to suppress its growth. Climate change and environmental issues already have wrought, and will continue to wreak, massive destruction across the planet. Local and international bodies have attempted to implement countermeasures but projections indicate that, without major compliance, this will not be enough.

Escalation in natural devastation occurs somewhat parallel to the timeline of globalization's rise. Globalization has spread and deepened since the end of World War II. The 1970s and 1980s began a period of hyperglobalization (Rodrik 2011). In addition to deepening the global integration of already internationally present nations, hyperglobalization has invited, and at times forced, many other states to change in order to be present on the global stage. This enormous phase of economic globalization may be a contributing factor to the rise of climate change. This paper seeks to discover how an increase in a nation's economic globalization affects its environmental footprint. It focuses on individual impacts on the environmental footprint and separates from prior studies by explicitly rejecting gradual market solutions.

The paper analyzes this relationship by first reviewing previous scholarship on the ties between globalization and the environment. This includes the actions of entities to salvage or harm the environment, proposed relationships, and suggested solutions. Next, I will expound on the perspective via which I view the relationship and the causal effects believed to be present between economic globalization and environmental footprint. I will then detail the regression

analysis to be run and the results of that test. At the end of this paper, suggestions for further steps of analysis and real-world implications for this connection will be given.

Creation of International 'Natural Capital'

Almost all academic literature agrees that economic globalization has a relationship to a country's environmental footprint: the level of impact that it has exerted on the natural world both within and outside of its borders. The exact nature of this relationship is something that is not settled. Many articles say that there is a direct correlation between a country's level of globalization and the extent of its footprint, with globalization being an exacerbating force on environmental degradation (Adelson et al. 2008; Spencer 2015). Specifically, these studies focus on economic globalization, viewing the two phenomena as inextricably linked. The dawn of hyperglobalization and widespread neoliberal economics brought with it the perspective of everything as a potential component for assimilation into and advancement of globalization. The natural world has been one such element. The creation of the term 'natural capital' promotes a perception of nature as just another tool to be used, instead of a vital factor in humanity's continued existence (Kütting 2004; Roy 2016). These perspectives have set a dangerous precedent for how environmental issues are dealt with on the global scale.

International policy on environmental matters has been shown to have a great many flaws, chief among them the minimal enforcement for broad policies. This is due to the fact that many countries would not join if they felt their sovereignty was threatened in any way. Ultimately, while a state can nominally pledge themselves towards a certain goal, compliance with the guidelines of a policy happens on their terms. These terms often shift over the course of implementation, rendering the policy less effective (Kütting 2004). International intergovernmental organizations are usually the actors to set the policy. The solutions that they

present typically focus on doing the 'best' for the situation while still remaining within previously set economic levels. Although international organizations like the World Bank have put environmental policy high on the priority list, it is policy that operates "in a sustainable development framework which assumes unlimited growth and denies the basic reality of environmental equity and resource access" (Kütting 2004: 32). These organizations are operating under the assumption that the world economy can continue on in the same manner of growth as in previous years while still making progress on the environment. This does not fit in with the perspective of those scholars and activists who see the economic growth as the causal factor of environmental degradation. They see the current policy reactions as myopically centered on "what is politically feasible" while not addressing "what is environmentally necessary" (Kütting 2004: 34).

An Environmental Kuznets Curve

Those that study environmental policy and globalization speak of the effect of economic globalization on a state's sovereignty and environmental policy. A major division can be drawn between authors that support the idea of an environmental Kuznets curve and those that reject such a hypothesis. The Kuznets curve hypothesis began as an economics concept in the 1950s. It speculates that income inequality will initially rise as economic development occurs but, as the development continues, inequality will proceed to drop. In the 1990s, during the era of massive hyperglobalization, this theory was applied to environmental issues (Stern 2004). At the outset, it was said that as a country starts becoming more economically globalized its level of environmental degradation will correspondingly grow. However, after the annual income per capita hits a certain level, it was hypothesized that there would be improvements to the environmental situation in the state. Numerically, it is not clear where the bar of income per

capita before improvements is set, with Adelson et al. (2008) placing it solidly at $8000 (equivalent to $9671.21 in 2020[1]), but others leaving it a vague figure to be later determined (Copeland 2009).

It should be noted that even among those that support the environmental Kuznets curve, the actions of international organizations are still ruled as falling short of acknowledging the global truths of environmental problems and crafting the requisite policies (Adelson et al. 2008). At the same time, those supporters instill a large degree of belief in the capacity of newly economically globalized nations. The starting surge in environmental devastation will often provide a temporary boost to a state's gross domestic product (GDP) as it takes advantage of its natural resources. Then, as GDP per capita rises, presumably as the regular Kuznets curve simultaneously also holds true and income inequality decreases, the nation's government and economy strengthens and stabilizes. This allows the state to reach a position where it is able to implement regulations to offset the impacts, protecting the environment while still successfully participating in the international trade economy (Stern 2004). The idea of the environmental Kuznets curve combined with a dispirited outlook on international policy leads some to suggest it may be more advantageous environmentally to shift policy responsibility principally to within the domestic sphere, while still attempting to produce international resolutions (Adelson et al. 2008). This proposed solution is shared by a selection of those that reject the Kuznets curve, who believe that it is impossible for global policy to broadly regulate the wide variety of situations presented by different nations (Ehrenfeld 2005).

Rejection of an environmental Kuznets curve comes most strongly from literature that believes in operating outside of market-based solutions. Supporting the environmental Kuznets

[1] This figure was calculated using an online inflation converter (https://www.in2013dollars.com/us/inflation/2008?amount=8000).

curve allows the perpetuation of the idea that global economic growth and business can continue without interruption, as the situation will be resolved domestically. Presumably, a cohesive international policy can then be extrapolated from the domestic policies of these globalized nations. An environmental Kuznets curve envisions a path where globalization can continue relatively unchecked. In the 1990s especially, when this theory was first advanced and when hyperglobalization was unilaterally appealing, the Kuznets curve was an incredibly attractive future to support (Stern 2004). However, the applicability of the theory falls apart when placed under scrutiny. In already wealthy nations, the growth curve is slower, and the Kuznets curve may potentially hold true, as they are able to conceive and implement effective policy at a rate capable of offsetting the scale of their domestic pollution production (Stern 2004). Developing and 'middle income nations', however, rarely conform to the relationship. Developing nations have at times created environmental policy from the start of their economic globalization (Stern 2004). Less wealthy countries are often unable to accommodate the rapid pace of change and the generation of environmental reforms is not swift enough to keep up with the destruction. The Kuznets curve has not held true with "many nations who have instituted economic reforms focused on industrial and manufacturing based economic growth over the past two-three decades," (Roy 2016: 87). The rate of shifting globalization means that these nations are forced into the global economy before they are ready, expected to compete on the same level with globalization powerhouses despite having far less time to adapt and thrive on the international stage. This can compromise the integrity of a state, making it fragile and porous to outside influence. Foreign pressures can affect a state's decisions in the creation and implementation of environmental policy (Adelson et al. 2008; Copeland 2009; Roy 2016). These can come from governments, international organizations, and- most prominently- multinational corporations.

Global Influences

Natural resources are often an initial boon in accruing internationally competitive interest and capital. Foreign governments of already prolifically globalized nations are attracted to these products. With many nations having already used up significant reserves of their own natural resources, they must turn to importing these goods (Ehrenfeld 2005). Though these states may have banned ecologically harmful practices within their own borders, this does not mean they do not carry them out within less regulated spaces (Adelson et al. 2008; Kütting 2004). Wealthier nations outsource their devastation. They move their toxic waste abroad to dumping grounds that will not affect their citizens and thus do not warrant regulatory attention (Kütting 2004). This takes advantage of and exacerbates existing environmental inequities. The exploitative relationship that modern globalization can bring upon developing countries has led some, called postcolonialists, to deem globalization an extension of colonialism (Spencer 2015).

Most of the literature pays specific attention to the effects of multinational companies. Multinational companies are seen to be one of the more immediate threats in the sphere of foreign pressures. One cited source of effect is the introduction of 'cap and trade' arrangements. These present a system through which overall emissions are limited, but where the restrictions for companies vary and can be traded. This sort of market-based solution is condemned by authors such as Roy (2016), who also rejects the existence of an environmental Kuznets curve. Roy states that cap and trade agreements are ineffective; they redistribute pollution instead of reducing it (2016). Copeland (2009) also researched pollution redistribution, producing and rejecting what he called the 'Pollution Haven Hypothesis'. This was specifically defined as "the idea that trade could cause [the] polluting industry to shift to countries with relatively weak environmental policy" (Copeland 2009: 579). The hypothesis is not a direct equivalent to cap

and trade agreements, but it contains these agreements within its purview, along with other waste outsourcings by companies and governments. Moving pollution from one location to another, it theorizes, is not an inherently malicious action. It is a strategic one, shifting the pollutants or damaging industry to a location where the environment is better equipped to handle the situation. However, this movement based on policy differences is only positive if an area's environmental policy differs in a manner representative of its environment's sensitivity. The fact that policy does not reflect this leaves a country open to potential exploitation and pressures (Adelson et al. 2008; Spencer 2015).

Copeland (2009) posits that governments may be slow to tighten their regulations due to concerns about economic growth. Tighter regulations may lead some multinational companies to move their investments elsewhere to locations with fewer restrictions (Zugravu-Soilita 2017). This in turn stunts a country's ability to compete on the global scale. International trade agreements have also been alleged to be a hindrance to country-by-country implementation (Copeland 2009).

Copeland says that the pollution haven hypothesis is true for very few pollutants, instead linking trade to the growth of pollutants within wealthier nations (2009). This conflicts with a number of other papers on the same subject. Some of these, such as Roy (2016) and Spencer (2015), were published more recently. As such, the perspectives and predictions in these papers regarding the interactions between economic globalization and environmental footprints may be more accurate. Copeland supports the existence of an environmental Kuznets curve, though includes a caveat that states it is not universally applicable and that it does not apply to carbon emissions, one of the biggest environmental threats of the modern era (2009). In the paper the only highlighted evidence comes from research into the correlations between per capita income

and sulfur dioxide emissions. Other studies have also found that trade openness, which encourages economic globalization, has been positively linked to pollution growth; mostly through indirect effects produced by GDP per capita (Zugravu-Soilita 2017). There are some circumstances within the literature in regards to specific trade emissions that do support the Kuznets curve and which authors have extrapolated to indicate wider support. When analyzed against the large breadth of opposing writings that discount the existence of a Kuznets curve, however, the varying nature of the relationships found, such as in Copeland's study, seem comparatively frail.

Proposed Solutions

As it stands, the research is divided on how to attain better environmental regulations. This is not strictly along lines of support for or against the environmental Kuznets curve hypothesis. However, ascribing to the theory innately affects what views are held regarding environmental issues. Those that favor the Kuznets curve are often more likely to push for market solutions. They believe that only further economic globalization, with the assumed subsequent rise in GDP per capita, has the capacity to salvage the environment. The world operates within a market economy. It responds to what is most cost effective and economically beneficial. As a result, solutions must be based in this system of capital. This includes cap and trade agreements and monetary incentives.

Others denounce the idea of market-based solutions. These people often, but not always, reject the Kuznets curve hypothesis, stating that a more globalized economy does not always bode well for environmental regulation. Market solutions commodify the issue, playing into the same systems of capital accumulation that initially exacerbated the destruction. "Market mechanisms [such as cap and trade agreements] do very little to redistribute overall emissions.

This is a classic case of markets attempting to solve complex ecological issues without addressing the root causes. It is a telling commentary on mainstream economic thought- that, somehow, setting the right price for pollution will make pollution itself vanish," (Roy 2016: 84).

This oppositional group rallies behind solutions that have their basis in the community. The focus for these types of solutions ranges from forging local communities to banding together on the worldwide scale. The ideal community-based solution operates on both of these levels (Kütting 2004). The individual acknowledges their own consumerism and works to build a more sustainable community. At the same time, structural issues are addressed in policy. Globally, disparities in environmental equity are recognized while policy still works to curb pollution and emissions. To shift to this type of solution departs from the existing neoliberal system. The switch from neoliberalism is assumed to eventually lessen the impacts that the market would otherwise inflict by changing the attitude that societies hold towards the environment (Malone 2002). This would contribute to worthwhile and functional policies being formed on climate change.

There is an inherent conflict present between these two proposed tactics. Each presents its own pros and cons. Non-market based initiatives are more difficult to implement; the international organizations that instate them do not at this time have enforcement mechanisms strong enough to overcome the neoliberal economic self-interest of the state. Non-market solutions have been dismissed as overly optimistic or idealistic (Copeland 2009). The flaws in market solutions are produced by the same self-interest that constrains non-market suggestions. Market solutions do not go as far as they need to in order to prevent massive climate devastation (Kütting 2004; Roy 2016). The motivations behind both groups of solutions stem from separate spheres of belief about the environmental repercussions of globalization.

The Contents of This Paper

This study diverges from and contributes to the existing literature by focusing specifically on economic globalization and its environmental consequences. Previous studies have examined this relationship with globalization as a whole (cultural, political, and economic) or a smaller component of economic globalization, such as trade. There has been little prior quantitative study on the relationship between economic globalization and environmental impacts under an assumption that it will diverge from the path of an environmental Kuznets curve. The majority of the literature found rejecting market solutions and/or an environmental Kuznets curve has been composed on a qualitative theory level. I aim to bring a more structured basis to these arguments through quantitative analysis. This paper also differs in that it aims to analyze the results of economic globalization as an independent variable separate from economic growth and industrialization. Though these are relevant factors with influences that will be noted, this study will focus solely on measurements of economic globalization when constructing its main hypothesis. Further research on this topic could help make a more convincing argument on how to shape the treatment of climate issues. It would help solidify a view on the effectiveness of market solutions versus other initiatives.

Theory

Economic globalization is a major facet of globalization. It is often given the most focus in research and policy. It concerns the global market economy and the trade that occurs between different nations. Economic globalization has undergone major changes in its operation throughout the years post-World War II. The 1970s saw the rise of neoliberalism, a theory (and/or ideology) which continues to dominate among approaches to globalization. Neoliberalism urges greater globalization for its own sake, as opposed to strategically sized

globalization in order to attain specific benefits. Thus began the prioritization of trade and economics over all other policy goals. Neoliberal pursuits formed the hyperglobalized era of the 1980s and 1990s. Globalization during this period began to happen much faster and at a greater scale. Thus, a deeply integrated international market has been formed, with some participants in advantageous positions. Economic trade is regulated somewhat efficiently on the global scale. Organizations such as the World Trade Organization (WTO) have been given enforcement powers capable of regulating a nation's domestic trade policy. The WTO is able to actually make a country change these policies, and has even successfully regulated the United States of America to do so, powers rarely- if ever- seen before in an international organization (Rodrik 2011). While this has, naturally, produced a degree of controversy towards the WTO, the organization's abilities have remained. This is a clear indication of the importance placed on economic globalization within the international sphere. Economic globalization differs from economic growth and industrialization, though the two are certainly influential elements in the process. Globalization can lead to economic growth or further industrialization and vice versa. However, economic globalization primarily concerns the global interplay of different domestic entities, and the collaborative market weaved by these interactions.

A country's environmental impact concerns the harmful effects that it has caused: emissions, deforestation, pollution, etc. It can also take into account the positive steps taken by a nation, such as a shift from fossil fuels towards renewable energy sources or reductions in waste production (i.e., national cutdowns on plastic products, cleaner chemical usage). Currently, the majority of countries in the world are in an ecological deficit, with their ecological footprint having grown past their biocapacity. Biocapacity is the amount of area a given state has available for use as resources and waste storage. It in theory constrains a nation's resource consumption,

but this has not always held true, especially as globalization has progressed. Even states that have not exceeded their biocapacity, and that are in an ecological reserve, can have a massive environmental footprint (Global Footprint Network 2019).

The policies that regulate interactions with the environment naturally also play a role in a country's environmental footprint. The regulations that concern the natural world are often less stringent than those that deal with economics, both at a domestic and an international level. International organizations have found themselves only capable of instating environmental agreements that require self-regulation. They have little ability to enforce the agreements themselves. As such, it is left up to the states to curb their behavior. Many states are either loath to do this at the expense of their economic freedom or do so much too slowly. Their prioritization of sovereignty over real commitment to these accords has let many harmful practices carry on unchecked.

Economic globalization has an indubitable relationship to a country's environmental footprint; the only dispute is what kind. Analyzing the impacts of globalization may give some illumination as to how one shapes the other. Rapid initial globalization in a country can also expose it to foreign influence, as companies and governments take notice. The attention may include pressures for it to keep environmental regulations loose and natural resource usage high, thus allowing for a nation to better compete in the international market system. Tightening up this policy can result in foreign investors going elsewhere and economic losses taken. Nations in this position then must continue to compete, often against states that have been able to globalize more slowly and thus diversify themselves economically. The newly globalized are not afforded this same luxury and their swift economic ascension can as such be tenuous: an encouragement to refrain from the radical environmental restraints that are required to prevent global

devastation. Delaying policy can lead to an accelerated usage of biocapacity. Recently globalized nations also assert that economic powerhouses that have been polluting for longer should cut back instead; this is an argument that has not yet received a satisfactory response.

Those nations that have undergone a slower globalization without premature pressures often have greater economic stability. However, this does not mean that their environmental footprint is smaller. Industrialization and economic growth are often both a cause and a result of economic globalization. Both of these elements are linked to an increased usage of resources within the borders of a country. It can be extrapolated that to some degree economic globalization can result in greater domestic resource usage, but this is not the main consequence of such a timeline. When a country reaches the limit of some of its naturally occurring resources, its maximum biocapacity, it can begin to look outward. Importing resources will allow this nation to proceed at the same level of functioning in its industry and economy. A more economically globalized country will be able to import resources and export waste more easily due to the preexisting ties it holds to the international economy. Expansion of its biocapacity grants certain states a disproportionate impact on the environment and increase in global environmental footprint.

Both rapidly and slowly globalizing countries have ramped up their impacts on their environments over time. There is a definitive path between the escalation of economic globalization and ecological fallout.

Hypothesis 1. The environmental footprint of a country is likely to increase as a country becomes more economically globalized.

This is the primary relationship that this study aims to analyze. In the next section, I will test and analyze the possible correlations.

Research Design

The tests for this study will examine data on economic globalization and environmental footprint between 1996 and 2014. The data reaches across 182 countries of varying globalization levels. The unit of analysis for this study is country-year and each variable used was taken from, though not originally operationalized in, the 2019 QOG cross-national time-series dataset.

The dependent variable for this study is the environmental footprint of a given nation. *Ecological impact* is a country's usage and effect on the natural world's 'resources'. This variable was originally calculated by the Global Footprint Network. It was operationalized as the Ecological Footprint of Consumption: the sum of the Ecological Footprint of Production and the Net Ecological Footprint of Trade. The Ecological Footprint of Production is an area's domestic consumption of biocapacity as a result of production processes. The net ecological footprint of trade is the nation's ecological footprint of exports subtracted from its ecological footprint of imports. This calculates the use of biocapacity within global trade interactions. *Ecological impact* is a continuous ratio value measured in global hectares (GHA) per person.

The central explanatory variable in this relationship is a nation's level of economic globalization. This variable, called *economic globalization,* is an ordinal variable measured on a scale of 1 to 100. The higher the number returned, the more economically globalized a nation is, with 100 being the most globalized. *Economic globalization* was calculated by the KOF Globalization Index by aggregating data concerning international trade and financial flows. The index includes de facto and de jure information for both.

The first control variable used in this study was a measure of government effectiveness. *Government effectiveness* is an ordinal value that ranges from -2.5 to 2.5, -2.5 being the least effective and 2.5 being the most. The variable was operationalized by the World Bank as part of

the Worldwide Governance Indicators (WGI) Project. *Government effectiveness* is based on data about perceptions on the quality of various infrastructures, bureaucratic elements, and civil servants. Also included in the figures is quality of policy formulation, implementation, and the degree to which a government actually commits to its policies. A government's capability and effectiveness can have a significant impact on what policies it makes to address environmental issues. Less effective globalized states, whether as a consequence of competition or foreign pressures, may be expected to implement environmental regulations that are weaker than more effective states (Roy 2016; Zugravu-Soilita 2017). However, more effective states are able to outsource for further resources and create dumping grounds abroad (Adelson et al. 2008; Kütting 2004). More effective states are also able to globalize their economies at a higher rate while keeping pace with competition (Stern 2004). Though both sides make considerable points, the expectation of this study is that a higher level of *government effectiveness* will result in a higher *ecological impact*.

Another control variable is gross domestic product (GDP) per capita. The ratio variable *GDP per capita* was created by the World Bank as part of its World Development Indicators collection. GDP per capita has a number of proposed effects on environmental footprint, many proposing the Kuznets curve theory that as GDP per capita reaches a certain level ecological impacts will be diminished. However, this paper is explicitly breaking from this theory and siding with the other side of the data: that both GDP per capita and environmental issues jointly rise without caveats (Roy 2016; Stern 2004). As such, the expected relationship between the two variables is that as *GDP per capita* increases *ecological impact* will also rise.

The next control variable is a measure of democracy. This is an interval variable that measures the level of electoral democracy attained in a nation from 0 to 1; 0 being the lowest

amount of democracy and 1 being the highest. *Level of democracy* was compiled by Varieties of Democracy. Higher levels of democracy have been linked to greater economic globalization, and vice versa (Eichengreen and Leblang 2008). Therefore, it is expected that a higher value for *level of democracy* will produce a greater *ecological impact*.

A final control variable is the presence of the right to strike within a country's constitution. This is an interval variable that is coded with the responses as Yes (1), Yes but with limitations (2), No (3), and Other (96). *Right to strike* was compiled by the Comparative Constitution Project. Opposition to trade unions and striking is a notable component of neoliberalism, which focuses on the production of capital. It is also somewhat indicative of a state that is responsive to workers and potentially willing to impose policy that protects the rights of these individuals. Climate strikes are more likely to occur in states that outline an explicit right to strike and more stringent regulatory practices can be produced from these strikes (Subasinghe and Vogt 2019). It is expected that if *right to strike* returns a value of 1 or 2, there will be a lesser corresponding *ecological impact*.

Methodology

The dependent variable for this study was a continuous variable capable of returning measurements ranging from 0 GHA per person to billions of GHA per person. This type of essentially infinite variable is most conducive to being analyzed in a regression analysis. One was run in Stata to determine the nature of the relationship between variables. The standards for rejecting the null hypothesis for this study were a returned p-value of $\leq .05$. For this study's hypothesis to be confirmed, it must return a positive coefficient for the central explanatory variable's relationship in a regression test and a p-value of $\leq .05$.

Table 1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Ecological Impact	1,830	3.266316	2.694854	.428228	17.02194
Economic globalization	1,830	54.69015	16.38732	16.71884	93.58852
Government effectiveness	1,830	-.0858077	.9749779	-1.884888	2.436975
GDP per capita	1,830	11540.48	17716.43	122.8561	111968.3
Level of democracy	1,830	.5421535	.2536046	.020954	.9327943
Right to strike	1,830	2.036066	3.932149	1	96

Analysis

Table 2: Effects of Economic globalization on Ecological Impact, 1996-2014

Variable		
Economic globalization	0.021**	(0.003)
Government effectiveness	0.494**	(0.062)
GDP per capita	0.000**	(0.000)
Level of democracy	-1.164**	(0.163)
Right to strike	-0.019*	(0.008)
N	1830	
R^2	0.7504	

Standard errors appear in parentheses. Statistical significance levels: * p ≤ 0.05, ** p ≤ 0.00

The results of the regression test appear in Table Two. I tested the effect of *economic globalization* on *ecological impact* with the expectation that the two will have a positive relationship. This hypothesis was supported by my analysis. The coefficient returned for *economic globalization* in the regression analysis was positive, showing a positive relationship where the increase of one will result in increase for the other. It should be noted that *economic globalization's* coefficient, at .0214038, indicated a relatively weak positive relationship between it and the dependent variable. The relationship was deemed to be statistically significant with a p-value of .0159386, a value under .05.

The control variables *government effectiveness* and *GDP per capita* were both expected to have positive relationships with the dependent variable *ecological impact*. The regression test supports these suppositions. They both had p-values of .00 making them statistically significant. *Level of democracy* was expected to have a positive relationship with *ecological impact*. Instead, the regression test's coefficient was a negative variable. This communicates that as the *level of democracy* increases, the *ecological impact* will decrease. The inverse correlation presented was found to be statistically significant with a p-value of .000. *Right to strike* was expected to have an inverse relationship, with the right to strike procuring a lower *ecological impact*. Regression analysis found this to be true, as *right to strike* had a negative coefficient. This relationship was proved to be statistically significant as its p-value was .022. Based solely on coefficients, most of these control variables had quantitative relationships to *ecological impact* that were at times somewhat weak, but undeniably present. The coefficient relationship between *ecological impact* and *GDP per capita* was astonishingly slight, having the smallest reported coefficient: .0001035. The two strongest coefficient-based effects were produced by *government effectiveness* and *level of democracy*. *Government effectiveness* had the strongest positive coefficient ties with a value of

.4937603. *Level of democracy* had the strongest impact of any variable on this scale with its coefficient of -1.164198.

Discussion and Conclusions

In this study, a positive relationship between *ecological impact* and *economic globalization* was theorized. It was supported by the analysis and found to be statistically significant. Three of the four control variables followed the expected connections and all of the relationships presented by them, whether predicted or not, were statistically significant. While the hypothesis was supported, the quantitative relationship was not an exceptionally strong one. In order to strengthen the relationship, it is possible that a wider pool of data needed to be accessed in order to find more pertinent control variables. However, this study was limited to the QOG cross-national time-series dataset. Another possible weakness is that the number of years this study covered was fairly limited. For a more accurate depiction of the relationships, it would perhaps be beneficial to observe a longer time frame for the variable, specifically *government effectiveness*, which was significantly constraining. Another weakness of the test was the variability present within the p-value of the dependent variable when different control variables were applied. When tried with a relatively similar *GDP per capita* value from the same source, the central explanatory variable's p-value was rendered not statistically significant. This suggests that it may be necessary to find a more expansive control variable for *GDP per capita*.

A final point about variables is that for the purposes of this study, it would be prudent to find a dependent variable that is less individually based. At its operalization source, *ecological impact*'s value is said to be most capable of being changed at the individual level by changes in personal consumption patterns (Global Footprint Network 2019). For a more holistically effective overview of the association between globalization and environmental footprint, it

would be ideal to focus on environmental footprints at the structural level. Governments and multinational corporations, not individuals, have been seen to have the heaviest hand in climate change. An institutionally-based ecological variable would also allow countries to be examined not just by their citizens, but by taking a closer look at their actions abroad, such as waste outsourcing.

Also present in the results for the regression test was a positive relationship between *GDP per capita* and *ecological impact*. Though its positive coefficient value was fairly weak, it is nevertheless positive. When *GDP per capita's* coefficient relationship is analyzed in a broader context alongside the earlier examined ties between *ecological impact* and *economic globalization*, a firmer nascent conceptualization begins to take form. Economic globalization is often linked to increased GDP per capita (Adelson et al. 2008). Considering the results of *GDP per capita* and *economic globalization* within the form of the existing literature, their potential environmental impacts can be more accurately gauged. In these circumstances it is possible to visualize realistically damaging repercussions that may emanate from the forces of globalization and are not quelled by a rising GDP per capita. While this study alone is by no means a solid refutation of an environmental Kuznets curve hypothesis, it does add to the existing research against the theory. It also hints at what could possibly be found in future quantitative studies that cover a wider time period and use a dependent variable on the environment that is contrastingly operationalized to *ecological impact*.

The relationship produced by the regression test between *ecological impact* and *level of democracy* is contrary to the usual feedback on the two matters. While more democratization has traditionally been linked to more globalization and- according to the other variables in this study, a greater environmental footprint- the regression analysis showed a strong inverse relationship

between the two. This indicates that as the *level of democracy* increased, *ecological impact* would then decrease. The relationship present cannot be dismissed on the basis of chance, as it is exceptionally strong, with over one point of change in *ecological impact* for every point shifted in *level of democracy*. These results can neither be discounted nor conclusively explained, only theorized upon. It is possible that the presence of many newly globalizing, less democratic, nations affected the results. *Level of democracy's* interaction with *ecological impact* may also be colored by more democratic nations that are also some of the few not in an ecological deficit: Finland, Brazil (ranking fairly high in *level of democracy* until recently), Norway, etc. (Global Footprint Network 2019). There may be other reasons not touched on that are capable of explaining these circumstances.

The presence of supportive and significant findings even at the more individually focused level for *ecological impact* does suggest that there is a correlation between environmental footprint and economic globalization that is worth further analysis. This paper advances the notion that the consequences of economic globalization do worsen environmental issues. Most effectively, it brings attention to the repercussions of individual interactions with the natural world. This study is one of the few that has focused solely on individual behavior instead of a nebulous conglomeration of forces at every level. Though it produced the drawbacks outlined above, this is not to discount the value of inspection at this level. While a bulk of climate change events can be attributed to larger structures, trade emissions and military industrial energy costs, there is no doubt that individuals are capable of making a change. Emissions from the average combustion engine and the meat industry are just a few of the markets that could be shaped by the consumer. The idea of massive change at the individual level -of letting the 'invisible hand of the market' guide trends- single-handedly being enough to shift climate patterns is naive. It is

discounting the harsh wave of capitalism that inundates the average human with pleas and pestering, shoving them towards greater consumption. Important as well is the preexisting energy deficit in which most countries find themselves. This cannot be undone by individual action alone but instead requires corresponding structural changes.

This study's results do provide a strike against market-based solutions. Market solutions that encourage further trade and globalization will only exacerbate the issue. For every point increase in economic globalization, there is a slim increase in the consumption of every individual. This can build up quite fast. The implications of the regression test run do not account for the level of globalization present prior to 1996. The 1990s and 1980s were a time of very rapid globalization and as such the level of globalization held may already be an unsustainable one. Gradual international market solutions are not the ideal way to confront a threat at this magnitude. The increased economic globalization that they provide will only serve to solidify and intensify the relationship shown within this study.

At the same time, this study's results cannot conclusively advocate for the community-based variety of solution. It has been noted that individual actions are not sufficient without structural change. Whether structural change can be procured by collectivism remains to be seen, as the nature of this study cannot determine with confidence an outcome. The inverse relationship present between *ecological impact* and *right to strike* is the only solid evidence produced in favor of collectivist solutions. This in conjunction with the literature that favors this type of solution suggests a future within which collectivist solutions are not the ultimate answer but are one step of many.

The undisputed policy implications of this study are reiterations of a statement that runs through much of the writings that have preceded it: environmental impacts are increasing and the

current efforts to curb them are insufficient. Effective governments need to shift the force of their focus from profit to sustainability. In place of the importation of natural resources in order to maintain the current level of economic prosperity there should be an effort towards creating domestic reserves of renewable resources. Local policy moments can come in coexistence with the narrowing of inequality within the nation-state, something often present in more neoliberally globalized countries. This can include the expansion of workers' rights such as the inclusion of a right to strike in the constitution, as well as moving away from the neoliberal model of globalization and increasing levels of democracy through social equality measures. This is not to imply that the state should simply cease all attention towards economics. In order to produce high levels of equality and democracy, a certain level of economic equality within a country must be met. But the implications of this study are that there must be a de-escalation of economic globalization. The main challenge will be ensuring the creation and maintenance of high levels of democracy while still implementing effectual policy. This study does not give any concrete signal for the level that this policy should be conceived: domestic or international. The current rate of environmental footprint escalation and the standing level of ecological destruction greatly suggests the necessity of international initiatives to successfully avert massive, long-reaching, ruination.

Further studies on this matter should find variables that intentionally advance past the limitations of those present in this paper. A chief focus should be to find variables that cover a larger time period, in order to view the effects presented in this study over a greater span. Ideally, this would be able to cover the entire era of hyperglobalization and the decade(s) before, from the 1960s or 1970s through the present day. Additionally, it would provide a more well-rounded picture of the situation for further studies to use a more structurally operationalized dependent

variable. While further studies into individual effects are also useful, the rapid nature of climate change requires an expeditiously crafted broad viewpoint. Dependent variables that look at how governments and multinational companies interact with the natural world will generate results capable of completing said task. Analysis on the ties between democracy and ecological impact is needed, as those found within this study were thoroughly unexpected. Looking into this relationship will help illuminate the ways that equality can be increased while continuing to keep ecological impacts on the decline. Subsequent studies should also continue looking into the effects of GDP per capita on environmental footprints. The weak ties presented by this paper are insufficient for complete rejection of an environmental Kuznets hypothesis. They present a correlation that refutes the theory, however mildly, and it is likely that further inspection will provide a more substantive pushback.

Expansions of the results produced by this paper must continue to extrapolate suggestions for solutions based in both the quantitative and prior literature on the topic. There must be policy formulated in order to slow ecological impacts that includes a theoretical aspect. Numerical analysis will help to prove correlations and provide justifications, but the solutions presented must go beyond this to be useful. Theoretical analysis will give a path to change that exists outside of the strict boundaries pushed by market solutions, whether this appears as collectivism or something beyond remains to be seen. The advancement of economic resolutions, the analysis of cold probability, while certainly useful, fails to highlight the very essence of combating climate crises as a task which must operate optimistically. Cautious realism in this sphere will hinder palpably needed action. The requisite level of innovation for climate policy must be conceived by experts, anything less will leave too much to chance. The policy created has to be flexible and powerful, a contradictory space to embody, but one that must be filled.

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Stata Outputs:

```
sum ef_ef dr_eg    wbgi_gee    wdi_gdpcapcon2010 vdem_polyarchy ccp_strike if    e(sample)

Variable    Obs    Mean        Std. Dev.       Min      Max

ef_ef    1,830    3.266316      2.694854       .428228   17.02194

dr_eg    1,830    54.69015     16.38732   16.71884   93.58852

wbgi_gee    1,830    -.0858077        .9749779  -1.884888   2.436975

wdi_gdp~2010    1,830    11540.48   17716.43   122.8561   111968.3

vdem_polya~y    1,830    .5421535   .2536046       .020954   .9327943

ccp_strike    1,830    2.036066        3.932149       1        96


 reg ef_ef dr_eg wbgi_gee wdi_gdpcapcon2010 vdem_polyarchy ccp_strike

        Source |       SS               df       MS      Number of obs   =    1,830
-------------+----------------------------------   F(5, 1824)    =   1096.70
        Model |  9967.19998             5        1993.44   Prob > F        =     0.0000
        Residual |  3315.42962        1,824  1.81766975   R-squared       =        0.7504
-------------+----------------------------------                          Adj R-squared   =        0.7497
        Total |  13282.6296    1,829  7.26223597   Root MSE        =        1.3482
------------------------------------------------------------------------------
        ef_ef |       Coef.   Std. Err.        t        P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
        dr_eg |   .0214038   .0027866          7.68   0.000    .0159386       .026869
        wbgi_gee |   .4937603   .0623408     7.92   0.000    .3714935       .616027
wdi_gdp~2010 |   .0001035   2.88e-06         35.98   0.000   .0000978       .0001091
vdem_polya~y |  -1.164198    .16319 -7.13   0.000   -1.484256   -.8441388
 ccp_strike |   -.018509   .0080932   -2.29   0.022   -.034382        -.002636
        _cons |   1.612921   .1735103          9.30   0.000    1.272622       1.953221
```