

It's Not Easy Being Green: The Effectiveness of Environmental Provisions in Preferential Trade Agreements

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It's Not Easy Being Green: The Effectiveness of Environmental Provisions in Preferential Trade Agreements

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I. ABSTRACT

Do environmental provisions actually have an effect on the environmental quality of a state? Trade and the environment have a complicated relationship, as states don't have a concrete way to resolve environmental issues that are associated with gains from trade—increased avenues for pollution, threatened conservation efforts, and the lack of incentives to improve environmental quality threaten a state's abilities to address environmental threats. However, the inclusion of environmental provisions in preferential trade agreements provides both an economic and legal incentive to improve environmental quality. In this paper, I argue that environmental provisions have a positive quantitative effect on the environmental quality of the state. Numerous qualitative studies lend support to the hypothesis, but a large-N quantitative study has never been attempted to establish a general link. This was tested using a multivariate regression on a lead variable. The results showed that environmental provisions actually had a negative effect on the environmental quality of the state, due to what was theorized as a weak commitment to environmental improvements and the negative effects of trade on the environment. The lead on the variables was also tested, and showed that as the lead increased, the coefficients increase and the effect of environmental provisions have a larger positive effect on the environmental quality as time increases between measurement and the agreement coming into force.

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II. RESEARCH PUZZLE AND INTRODUCTION

Do environmental provisions in preferential trade agreements actually have an effect on the environmental quality of a state? Especially in recent years, states have been negotiating preferential trade agreements. These agreements give preferential access to markets of goods and services to the signing countries, which can increase trade overall and provides another institutional framework for trade liberalization. Several of these trade agreements have additional provisions that deepen the scope of the agreement—countries can include additional dispute settlement mechanisms, human rights provisions, labor standards, and, most importantly for the scope of this paper, environmental provisions. While these provisions are potentially a good solution to the issues surrounding trade and the environment, it is questionable whether or not the provisions actually have an effect.

If these provisions do indeed have an effect, they have important implications for many of the questions that have plagued the relationship between trade and the environment. While the WTO has a Committee on Trade and the Environment and has stated its commitment to sustainable development (World Trade Organization 2015), many environmental groups argue that increased gains from trade and a lack of a clear institutional policy on the environment make it easy for polluters to continue destructive activities and threaten conservation efforts (“Trans-Pacific Partnership,” *The Sierra Club*). Governments cannot solve this problem by taking direct action against environmentally harmful actors.

This is excellently illustrated in the infamous Dolphin-Tuna Case, brought to the General Agreement on Tariffs and Trade (GATT) in 1994. The United States adopted an embargo on Mexican tuna. Oftentimes in the Pacific Ocean, schools of dolphins swim above schools of yellowfin tuna. When fishermen harvest tuna, dolphins are sometimes caught in the nets and die

if they are not released. The US Marine Mammal Protection Act explicitly forbids the “taking” of marine mammals in excess of US standards, and when dolphins are caught in the nets of the tuna fishermen and subsequently killed, it is in violation of the Marine Mammal Protection Act. Therefore, the US imposed an embargo on Mexican tuna because of excess dolphin murders (*Mexico etc. versus US: “Tuna-Dolphin”*). The GATT dispute settlement body ruled that the US’s embargo of Mexican tuna violated GATT rules, as the US could not take action on the *process* of tuna harvesting, only on the *finished tuna product*; the body also stated that the US could not impose its own laws on another state, even when plant, animal, or human health is in harm’s way.

Environmental provisions in preferential trade agreements seek to circumvent this conundrum. By placing safeguards for the environment specifically within the text of a preferential trade agreement, a state can adapt to the rules that exclude process and production methods. They can potentially exact real environmental change by using economic incentives to create measures for environmental improvement. I argue that environmental provisions in preferential trade agreements have a positive effect on the environmental quality of a state.

III. LITERATURE REVIEW

1. Trade and the Environment

It is first helpful to examine the relationship between trade and the environment in the literature so as to gain a clearer picture of why environmental provisions matter. One such finding of interest involves what has been referred to as the “Environmental Kuznet’s Curve.” This plots the relationship between income and environmental degradation, resulting in an inverse-U shape. In low-income countries, environmental degradation is low, because these

countries don't have industries that pollute, or industry in general. In high-income countries, environmental degradation is also low, because they have the capacity and the will to rectify environmental damages. It is in industrializing, middle-income countries that environmental damages are highest, because they are trying to gain a competitive edge in the global market. The effects of the Environmental Kuznet's Curve only increase when trade is involved, because countries seek to increase income and productivity when they are involved in the global exchange of goods and services (Frankel and Rose 2004).

Incomes generally rise with trade and therefore, according to the Environmental Kuznet's curve, environmental degradation should decrease. This is the case in middle-income countries that are growing more prosperous; however, for low-income industrializing states that are trading far more rapidly than most other states (Andrade 2009) this is not usually the case. Because of the lack of infrastructure frameworks or human capital to ensure that pollution remains low, low-income countries can easily turn into polluters because they want growth and the benefits of higher incomes at a faster rate than environmental quality. While this results in negative externalities (poorer environmental quality), the microeconomic effects from trade, industrialization, and specialization (cheaper prices, better products, better jobs, increased human capital, etc.) far outweigh the consequences (Harris 2004). There is, therefore, no domestic incentive to improve environmental quality while liberalizing trade and increasing income during industrialization.

Environmental provisions in preferential trade agreements can potentially create an incentive when there is not one inherent in rational behavior. If a state wants to further liberalize its markets, there is an incentive to sign onto PTAs, which give it preferential access to large and powerful trade partner's markets. Therefore, a more powerful state has the leverage to extract

certain concessions from the industrializing state in a trade agreement, which can take the form of provisions. Provisions in preferential trade agreements, then, provide an incentive for an industrializing state to improve its environmental quality, even when it runs parallel to its industrializing goals—a state doesn't want to lose out on preferential access to a trading partner's market, so it will comply with environmental provisions in an agreement.

2. Rational Design in Trade Agreements

It is also helpful to examine the design of preferential trade agreements, because states can shape these agreements according to their priorities. Environmental provisions in trade agreements are a manifestation of these priorities, especially for Western industrialized states, and the rational design of their trade agreements.

Recent research into the design of preferential trade agreements utilizes rational design literature as a pillar for their analysis. Rational design theorists posit that trade and institutions are based on states constructing them in order to suit their own interests and serve their own ends. Rational design theorists also posit that institutions seek to reduce uncertainty about contracting in an anarchic world.

Koremenos, Lipson, and Snidal (2001) are often cited with regard to rational design literature. Their paper argues that states can make agreements more desirable in prospect and more robust in practice by varying negotiation and duration provisions—provisions that may include environmental provisions. Environmental provisions make the agreement desirable for developed states and their domestic publics because they ensure cooperation on environmental affairs—a state can deny access to its market if the environmental quality of its contracting partner is less than desirable. Developing states agree to these provisions because additional negotiation provisions deepen the integration to an attractive, large market (Chaffour and Maur

2004). A state is free to refuse the provisions or not follow them, but the cost of noncooperation is larger for a developing state than it is for a developed state.

In this vein, cheating on these agreements' environmental provisions is theorized to be less likely, due to the adverse economic effects due to noncompliance. States have to care about future payoffs and expect that future interactions are likely enough to deter cheating. Institutions and agreements extend these future payoffs, proved through a game theory approach (i.e. increased iterations make states more cooperative). Cooperation, then, is reached because states expect future interactions with a powerful trading partner (Fearon 1998). States can then make the rational choice to include an environmental provision in the bargaining phase (based on their original preference), and the threat of trade sanctions, stoppage of trade flows, or a costly dispute settlement phase will deter the incentive to cheat on these provisions in the long run.

Lastly, it is questionable whether or not provisions in trade agreements have a tangible effect on the domestic activities of the states at all—the central question of this paper. Luckily, rational design theorists have studied this as well. The NAFTA dispute settlement mechanism was used as an example of how nations seek to extend their own interests when entering international agreements and international institutions (Goldstein 1996). There was a question as to why a powerful state would sign onto an agreement that favors a less powerful state, and it was concluded that domestic interactions at the institutional and bureaucratic level start to shape the treaties that states sign onto. This provides a reason for an industrialized state to sign onto an agreement containing an environmental provision with a developing state. The industrialized state sees an opportunity to extend its own interests—improving environmental quality. It is also noted that domestic changes as a result of NAFTA are important to consider—the United States significantly altered its behavior towards Canadian petitions for protection directly as a result of

an international trade agreement (Goldstein 1996). It therefore stands that an environmental provision in an international trade agreement could cause similar changes in domestic behavior.

IV. THEORY

Trade and the environment's complicated relationship make it difficult for gains to be made simultaneously in both spheres. Trade liberalization does present the problem of the "race to the bottom" with respect to environmental affairs—countries trying to gain a competitive edge on the global market can end up making irresponsible environmental choices. If a profit is to be made, environmental standards will be relaxed. Likewise, multilateral environmental agreements lack the enforcement or clout to make concrete environmental progress.

Therefore, states need an appropriate way to improve the environment while simultaneously liberalizing trade. In recent years, many industrialized nations, including the United States, the European Union trading bloc, Australia, and Japan, have sought to address this question in the negotiations of their preferential trade agreements. Occasionally, states seek to enhance the scope of these agreements by including certain provisions within the text of the agreement. Many of provisions in the negotiations deal with the environment—stopping trade when it interferes with human, animal, or plant health, placing regulations on how nonrenewable resources are handled and processed, creating institutions domestically to deal with environmental practices, developing sustainable fishing practices, and the conservation of forests, coral reefs, and other ecosystems during the production phase.

Because there is a direct and tangible economic cost of noncompliance to these agreements (denial of market access, lengthy dispute settlement negotiations, stoppage of trade flows, etc), countries will be more likely to follow these environmental provisions, improving the

environmental quality of the state. This also creates an incentive for developing states to improve their environment where there was no inherent incentive—by removing the temptation of the “race to the bottom,” countries can manage their environment more responsibly while simultaneously liberalizing trade and gaining access to important markets.

The distinction between hard law and soft law is key to this argument—an agreement is considered “hard law” if the agreement provides regulations and a basis for interpreting the laws. Most trade agreements, especially those signed in recent years, fall under this interpretation (Abbott and Snidal 2000), while most multilateral environmental agreements fall under soft law (as they lack the clout to enforce the agreements). It follows that there is both an economic and legal incentive to follow environmental provisions in preferential trade agreements.

These incentives have been tested at the domestic level. Most of the literature deals with the North American Free Trade Agreement (NAFTA), signed in 1994 by the Canada, Mexico, and the United States. This agreement has a separate chapter on the environment, establishing the North American Commission on Environmental Cooperation (NACEC), which monitors the environment of each country and encourages cooperation between the states.

Prior to 1994, Mexico in particular came under fire for their abuse of the environment, with rampant air and water pollution in its cities and irresponsible plant enforcement of existing regulations. After NAFTA’s implementation, however, the environment began to improve marginally—plants enforced regulatory standards, air pollution began to clear, and water quality began to improve. While the causality is somewhat disputed between consumers wanting products that were environmentally friendly (Gallagher 2004) and NACEC’s supervision (Hufbauer et al 2005), the case of Mexico is proof that economic and environmental gains can be made under trade simultaneously.

Several more case studies on environmental provisions have been made over the years. The Southern Common Market (MERCOSUR), for example, placed an environmental provision in its trade agreement. Although the governments failed to make a legal structure to support the enforcement of the provision, each of the participating state governments (i.e. Argentina, Brazil, Paraguay, and Uruguay) made the environment a national directive and have seen marginal gains (Hochstetler 2003). While the provision itself was not entirely effective, the norms it created within the MERCOSUR community were observed to percolate to the domestic level. This may undermine support for the hypothesis's direct relationship, but it does show that environmental gains are possible with environmental provisions (albeit in a roundabout way).

Meanwhile, Japanese environmental provisions in trade agreements are not exceedingly deep in their scope, but they still need to be agreed to in order to gain preferential access to Japan's large, protectionist market (Yanai 2014). This further lends credence to the theory that market access will motivate states to improve their environmental quality. EU and US initiated provisions, on the other hand, are far more legalistic and contain references to other multilateral environmental agreements (Jinnah and Morgera 2013). This strengthens existing environmental agreements and provides the hard law basis for environmental quality improvements.

Overall, most of the analysis of environmental provisions in trade agreements seems to support to the theory that economic and integrative incentives for compliance make environmental provisions more likely to improve environmental quality (Hochstetler 2003, Hufbauer et al 2005). Likewise, many qualitative studies of environmental provisions in trade agreements also support the theory that provisions lead to improved environmental quality (Colyer 2004, Colyer 2012, Bourgeois et al 2007). However, not a single large-N quantitative study has been performed on the effects of these provisions. It should follow that if small-scale

qualitative studies hold up to scrutiny, a large-scale quantitative study should yield the same results on a macroscopic scale. Therefore, I hypothesize that environmental provisions in preferential trade agreements should have a measurable quantitative effect on the environmental quality of the state.

V. RESEARCH DESIGN AND METHODOLOGY

1. Hypotheses

Two hypotheses are being tested for this paper, and read as follows:

H1: Preferential trade agreements containing an environmental provision are associated with improved environmental quality.

H2: Preferential trade agreements containing both an environmental provision and a dispute settlement mechanism are associated with larger improved environmental quality than only having an environmental provision.

2. Variables

The dependent variable for each hypothesis is environmental quality. The independent variable for *H1* is the existence of a preferential trade agreement with an environmental provision, and the independent variable for *H2* is an interaction effect with the existence of a PTA with an environmental provision *and* a dispute settlement mechanism. The unit of analysis is country-year (*it*).

Environmental quality is measured using Yale and Columbia's Environmental Performance Index, which creates an index of overall environmental performance using a combination of air quality, conservation efforts, water quality, and pollution. The data is taken from the 2014 EPI Report, which took data from the 2012 dataset and projected data back to

2002 for 178 states. The data ranges from 0 (worst environmental quality) to 100 (best environmental quality), and changes only slightly with an upward trend as an aggregate whole as time goes on. It is one of the best indices of environmental quality that is also broken down into the appropriate units of analysis, which was critical to testing a quantitative study.

The main independent variable, environmental provisions, measures how many environmental provisions have been signed onto and the scope of said provisions. This is by far the most difficult variable to measure, as no one has done a comprehensive study on these provisions. No dataset exists that codes for them. To obtain data, agreements in Kucik's 2012 dataset on the design of trade agreements (as well as agreements that entered into force between 2009 and 2012, which were not covered in the dataset) were read and coded if there was an environmental provision first. The agreements containing an environmental provision were then further analyzed for the scope of the provision. 0 indicated no environmental provision. 1 indicated that the provision only occurred in the preamble of the agreement. 2 indicated that the provision occurred in the main body of the text but were only included as a general exception for the stoppage of trade. 3 indicated the provision occurred in a specific article in the text, which oftentimes covered the most scope. 4 indicated the provision had its own specific chapter in the agreement. After coding, the scopes of the provisions were then summed for each year for all the countries in the Environmental Performance Index. A country with a large environmental provisions score therefore not only signed onto more agreements, but also had a greater scope of the provisions.

Because a country needs to first sign onto a preferential trade agreement to have an environmental provision, the number of preferential trade agreements was also coded. Data for this also came from the Kucik dataset. The total number of PTAs per year for each country in the

Environmental Performance Index was summed and added to the dataset. This number of PTAs also took into account agreements that were signed before 2002 but are still in force, agreements that have become defunct since 2002, and states that signed onto an agreement after it went into force (the latter mostly applies to countries in the EU, which has enlarged since 2002). It did not code for agreements that were defunct before 2002.

Another independent variable, indicated in the second hypothesis, is the dispute settlement mechanism. Kucik 2012's dataset contained a variable for a dispute settlement mechanism, and coded either 0 for no dispute settlement mechanism or 1 if the agreement contained a dispute settlement mechanism. The number of dispute settlement mechanisms per year for each country in the Environmental Performance Index was summed and added to the dataset. In theory, one could also code for the scope of the DSMs, but they vary a great deal less than the environmental provisions.

A number of control variables were also selected for this project. GDP per capita was taken from data obtained by the World Bank, measured in US Dollars as of the 2014 value. This was chosen as a control because of the effects of the environmental Kuznet's curve as discussed in the literature review. Polity was taken from the Polity IV Project by the Center for Systemic Peace, which controls for the political development of a country (as democracies are more likely to have a higher environmental quality). This ranges from -10 as the most autocratic regime (i.e. North Korea, China), and 10 as the most democratic (i.e. the United States, the United Kingdom). The measures between the two extremes are states with some mix of autocratic and democratic institutions (i.e. Russia, Venezuela, Malaysia). Surface Area was taken from data obtained by the World Bank, measured in square kilometers. This was chosen as a control because environmental benefits are more disperse if the country is larger (especially with regard

to air quality). Urbanization was also taken from data obtained by the World Bank, and measures the percentage of people living in cities. This was chosen as a control because more urbanized states are more likely to have poorer environmental quality overall (due to the effects of more motor vehicles and concentrated populations in a smaller space). Trade is a measure of a country's sum of manufacturing imports and exports as a share of the real GDP with 2014 as the base year, and represents an indicator of both market size and the economic strength of the country. Manufacturing was chosen because manufacturing imports and exports are more likely to have a direct impact on the environmental quality of a state (due to the production methods being more likely to pollute based on low in-state controls on emissions and pollution). Data for this control came from the World Trade Organization's 2012 annual report. Multilateral environmental agreements codes for the number of MEAs a country has in force during in a given year. This is a measure of a prior, soft-law commitment to the environment. Data is pulled from the University of Oregon's International Environmental Agreement Database Project.

3. Model Specifications

A linear regression model will be used to analyze the results of these variable interactions. My regression is based on Emile Hafner-Burton's 2005 paper "Trading Human Rights: How Preferential Trade Agreements Influence Government Repression," which measured the repression of human rights by governments with the independent variable as the inclusion of human rights provisions within free trade agreements. Based on her model (also using country-year as the unit of analysis), the regression will read as follows for *H1*:

$$EQ_{it+3} = \beta_0 + \beta_1 EQ_{it} + \beta_2 PTA_{it} + \beta_3 PTAEP_{it} + \beta_4 PTADSM_{it} + \beta_5 DEM_{it} + \beta_6 pcGDP_{it} + \beta_7 AREA_{it} + \beta_8 URBAN + \beta_9 TRADE_{it} + \beta_{10} MEA_{it}$$

EQ is environmental quality, and is led by three years to see if the quality of the environment changes over time as a result of the environmental provision. Three years is a somewhat arbitrary value, because any provisions will take time to have an effect; however, three years has a larger sample size (because with a lead, the number of observations in a timeseries dataset drop out). *PTA* is the number of PTAs that have been signed, which should have a zero effect; *PTAEP* is the scope of environmental provisions that have been signed which should be positive and significant; and *PTADSM* is the number of dispute settlement mechanisms that have been signed onto, which (in this model) should also have a zero effect. The controls should theoretically have a zero effect. *DEM* is the polity score, *pcGDP* is the GDP per capita, *AREA* is the surface area, *URBAN* is the urbanization level, *TRADE* is the trade flows, and *MEA* is the number of multilateral environmental agreements signed onto. Fixed effects are also added to this model to account for country-specific variables that are not controlled for in the model (i.e. environmental advocacy groups, activist culture, etc).

The second model for *H2* is the same as the first, but instead adds an interaction effect for environmental provisions and dispute settlement mechanisms:

$$EQ_{it+3} = \beta_0 + \beta_1 EQ_{it} + \beta_2 PTA_{it} + \beta_3 PTAEP_{it} + \beta_4 PTADSM_{it} + \beta_5 DEM_{it} + \beta_6 pcGDP_{it} + \beta_7 AREA_{it} + \beta_8 URBAN_{it} + \beta_9 TRADE_{it} + \beta_{10} MEA_{it} + \beta_{11} (PTAEP * PTADSM)_{it}$$

The eleventh beta coefficient is the interaction effect, which is expected to be positive. Because of the interaction effect, *PTAEP* and *PTADSM* should have a statistically insignificant effect and remain positive. However, the addition of β_{11} and β_3 should be positive, larger than the β_3 value in *H1*, and significant. All other coefficients have the same predictions. This model likewise uses country-specific fixed effects.

VI. RESULTS AND DISCUSSION

1. Preliminary Notes on the Dataset

The dataset, while only covering ten years of data, contains 1958 independent observations with a fair amount of variance. 325 observations have no environmental provisions in place, while 1633 observations have one or more environmental provisions signed onto. The max number of provisions signed in preferential trade agreements is 22; Switzerland, Norway, and Iceland all have this number. Most EU countries, Singapore, Japan, the United States, EFTA states, and Chile have all signed onto ten or more agreements containing environmental provisions. The mean scope of the provisions is 9.882 with a minimum of zero and a maximum of 53. The mean of the environmental performance index is 49.548 with a minimum of 14.51 and a maximum of 88.79. The standard deviation of the EPI is 16.50. Both the minimum and the maximum of the EPI fall within 3 standard deviations of the dataset, which doesn't indicate a large spread of the data or any outliers.

2. Multivariate Regression Results

Both Model 1 (*H1*) and Model 2 (*H2*) were regressed on a three-year lead. The results are illustrated below.

Table of Results:

Variable	Model 1 Results	Model 2 Results
Environmental Quality	0.270 (0.083)*	0.268 (0.083)*
PTA	-0.029 (0.075)	-0.031 (0.075)
Environmental Provisions	-0.032	-0.021

	(0.021)	(0.022)
Dispute Settlement Mechanism	0.098 (0.078)	0.139 (0.080)
Polity	-0.010 (0.035)	-0.011 (0.035)
GDP per capita	0.000012 (.0000181)	0.0000105 (0.0000181)
Surface Area	1.20E-06 (6.73E-07)	1.03E-06 (6.91E-07)
Urbanization	0.096 (0.043)*	0.082 (0.046)
Trade	19734.73 (86743.14)	20528.82 (83907.44)
Multilateral Environmental Agreements	0.008 (0.002)*	0.008 (0.003)*
Interaction Effect (DSM*EP)	N/A	-0.00133 (0.0006)*

Table of Results: N=1277 observations, model clusters by state with fixed effects. Cells contain coefficients with standard errors in parentheses, with * indicating statistical significance at $p \leq 0.05$.

3. Inter-Model Comparisons

The results of this statistical analysis provided some surprising results. For both models, multilateral environmental agreements was the only variable that remained statistically significant including the interaction effect. This is wholly surprising and undermines some of the

assumptions made in the hypothesis—it was assumed that MEAs would not have the legal clout to have a measurable effect on the environment and were instead largely symbolic gestures for environmental protection. However, these models and this data suggest otherwise. While it is a small measurable positive effect (0.008 out of 100 is less than 1% improvement in environmental quality), it is indeed a measurable and statistically significant positive effect. It could be due to the sheer number of MEAs that were coded for and consequently signed onto (states sign onto an average of 105 MEAs); however, it suggests that perhaps MEAs deserve to be taken more seriously on their ability to enact positive environmental change.

The other variable that retained statistical significance across both models was the non-lead EPI variable. Given that the dependent variable was regressed on this variable, it is unsurprising that it retained statistical significance and does not warrant further explanation.

4. Model 1 Results

The first model directly contradicts the hypothesis that was postulated in the theory—environmental provisions actually have a negative effect on the environmental quality of the state. The negative result, however disconcerting it may be, is not statistically significant and is also quite small—0.032 is a small negative effect on a dataset spreading from 0 to 100. Even between 14.51 and 88.79, this is still less than a one percent decrease in environmental quality. This may be due to several factors.

One possibility is that the failure to confirm the hypothesis is a purely data-based failure. It may be that the timeseries isn't long enough to see an observed positive effect on the environmental quality and that the environment getting worse is just a factor of the dataset in this particular time period. Another possibility is that the dataset doesn't account for domestic policies that were enacted, as seen in the case of MERCOSUR. The domestic policies and laws

concerning environmental improvement are not accounted for in a performance-based metric like the EPI; this may also be due to the fact that domestic laws created under the influence of a preferential trade agreement take longer to come into force, which may not be encompassed by the lead. While this paper did attempt to examine exactly a performance-based assessment, it may be possible that these provisions have other effects than simply performance-based successes. This gives some hope for the hypothesis to be true in some capacity that is not captured by the data in use.

Another possibility is that trade itself makes the environment worse, as mentioned in the literature review. Preferential trade agreements mean that markets are opened further for certain countries, and naturally trade should increase between the states privy to the agreement. However, the trade coefficient, counted as a control, has a *very* large positive effect on the environmental performance—in fact, this non-statistically significant coefficient is the largest effect of all. While this does lend support that rising incomes with trade lead to improved environmental quality (as predicted by the Environmental Kuznet's Curve), it more likely lends credence to the idea that this is a data-based failure. By coding trade as manufacturing imports and exports as a share of real GDP, the mean value of the trade statistic is 6.97E-07, which is incredibly small. It is therefore unsurprising that a one-unit increase in trade would yield an exponentially large increase in environmental quality.

However, the other trade variable that was coded for is the number of PTAs that have come into force between 1969 and 2012. This coefficient is also seen to be negative and not statistically significant, but supports assertions made in the literature review in that trade makes the environment worse. As previously stated, preferential trade agreements increase the amount of trade flowing between states that are allowed preferential market access, so it is plausible that

trade makes the environment worse due to rapid increased production of polluting industries, or increased production from industry for the first time. Environmental provisions do almost nothing to combat this problem using this explanation—their inclusion may be too optimistic or purely symbolic.

By coding for the number of PTAs signed onto, however, it is possible that the effect of the environmental provisions is masked. This is because having an environmental provision is conditional to being a member of a PTA—the independent variable is not fully independent, which is one of the problems inherent in the model itself. More statistical tests could in theory be run; however, this is outside the extent of my statistical training and could not be performed in this thesis.

It is also possible that the provisions are indeed simply boilerplate language built into the trade agreements in order to appease domestic constituents that find fault with trade for making environmental quality worse (Putnam 1988). The inclusion of these provisions do occur mostly in states that have active environmental lobbies—most EU countries and the United States in particular have groups that actively oppose trade deals for being too lenient on environmental standards (Tobey 1990). These provisions may be a way to silence the active lobbies and get the treaties ratified.

These provisions also tend to occur within treaties between industrialized states and states with already poor environmental quality, which provides a reverse-causality story—industrial states are more likely to include an environmental provision in an agreement with a state that already has a poor environmental quality in order to enact positive change. It does not completely seem to be working because the poor environmental quality of some states may be tipping the scales in the negative direction. Likewise, regional agreements like SADC and

Mercosur, modeled on regional agreements between initially high-income and environmentally friendly states like the European Union treaty, seem to be the only places where environmental provisions occur between middle- and low-income states with mediocre environmental quality. This may be an example of scripting, in which certain institutional forms propagate through the world without a clear commitment to actually enforcing them (Meyer et al 1997). The provisions are therefore there in form, but lack a concrete functional outcome that is rigorously followed.

5. *Model 2*

Model 2 also fails to confirm the hypothesis postulated—trade agreements with both a dispute settlement mechanism and an environmental provision have a statistically significant negative effect on the environmental quality of the state at the 95% confidence level. The negative effect is likewise incredibly small (less than a 1% decrease in quality) but it retains statistical significance. When added to the environmental provisions coefficient, this result is, however, larger (i.e. less negative) than the *H1*'s coefficient, so that part of the hypothesis does hold up.

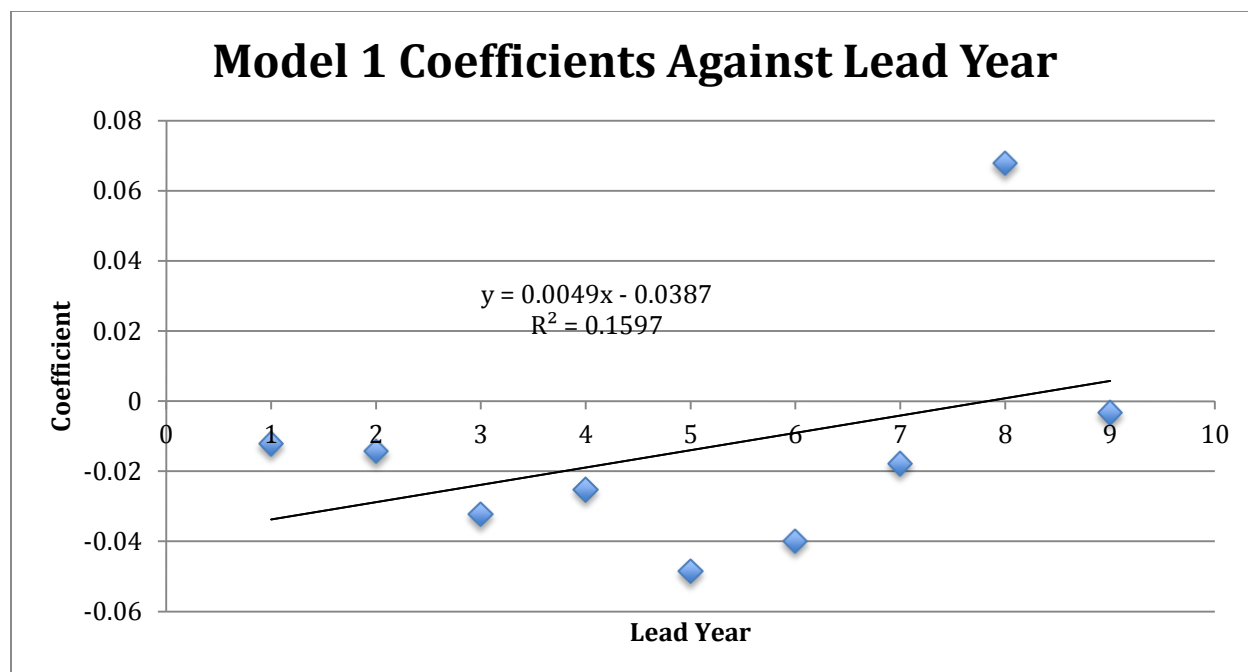
The World Trade Organization has one of the most complex dispute settlement mechanisms in the realm of international organizations, but less than five disputes have been filed at the panel about issues of environmental protection or safety, and less than ten disputes have been filed under both the WTO and its predecessor GATT dispute settlement mechanism (World Trade Organization 2016). This suggests that countries often do not actually file disputes about environmental violations. The same logic may be applied to dispute settlement mechanisms in trade agreements—it's likely that very few cases are actually filed about environmental violations, although the data on this is incredibly hard to find. States simply may not choose to punish other states on the basis of harming the environment.

This phenomenon is likely due to the effect of the tragedy of the commons—because the environment is a public good, no state government wants to bear the costs of regulating and policing other states. This is especially tricky due to the fact that there are numerous benefits to continue exploiting the public good—cheaper products, more jobs, and increased development all come at the cost of poor environmental quality. No states want to take the lead and police because they also have gains from environmental degradation. Because there is virtually no enforcement mechanism, environmental quality keeps worsening.

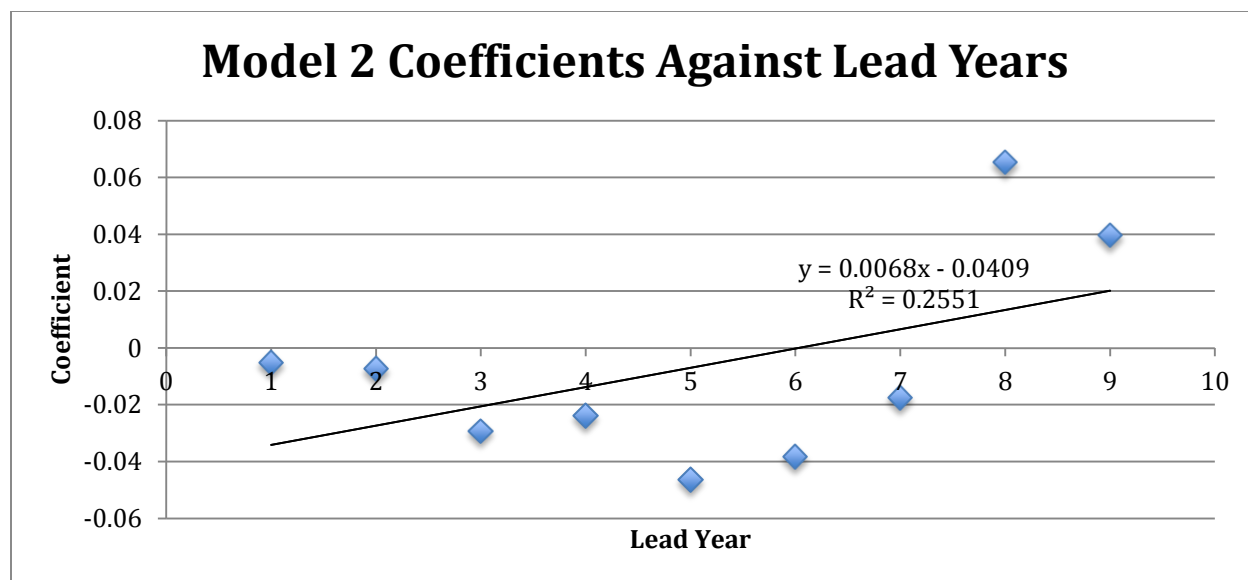
The inclusion of environmental provisions in trade agreements is, as suggested in the theory, an attempt to make incentives (preferential market access) to improve the environmental quality of the state. However, the lack of action makes it difficult to confirm environmental provisions as anything other than boilerplate language. Even in the face of a dispute settlement mechanism, environmental quality gets worse, indicating that there is an overwhelming incentive towards noncompliance.

6. Testing the Lead

One of the potential reasons for the failure to confirm each hypothesis was that the timescale for the provisions to take effect was not long enough. It was therefore a useful exercise to test the lead on each of the variables. Both *H1* and *H2* were regressed on varying leads, and their coefficients were graphed below against the number of years that were led, with data in Table 1 of the Appendix. Model 1's relevant IV was the environmental provisions, while Model 2's relevant IV was the environmental provisions linearly combined with the interaction effect between dispute settlement mechanisms and environmental provisions. The latter was multiplied by the average number of dispute settlement mechanisms that were signed onto (6).



Model 1's trend (equation $y=0.049x-0.0387$, $R^2=0.15947$) does display an upward-sloping, weakly correlated linear relationship between the lead year and the coefficient. All but one lead year have negative values for their coefficients (year 8), but the trend of the data suggests that it gets less negative as more years pass between the entry into force and when the environmental quality is measured. This could be a function of the number of observations dropping out as time goes on (each year of lead, you lose more data), but it does lend support to the theory that the timeseries was not long enough to see a measurable positive effect on the environmental quality of the state.



Model 2's trend (equation $y=0.0068x-0.0409$, $R^2=0.2551$) is somewhat different. While most terms seemed to be nearly identical to their coefficients in Model 1, they were all slightly higher. When regressed on a nine-year lead, the coefficient became positive. The correlation between number of years passing between ratification and measurement is stronger for Model 2's coefficients than it is for Model 1's coefficients, and the increase as time goes on is more pronounced. This is also indicative of confirming H2 over time—agreements with both an environmental provision and a dispute settlement mechanism seem to have a greater impact on the environmental quality of the state. While these results may also be a function of observations dropping out as the lead increases, it does indicate that H2 can be confirmed both for the specified model and over time.

VII. CONCLUSIONS

The relationship between trade and the environment is a valuable thing to study—as the world becomes more globalized and interconnected, humanity's impact on the environment is only going to increase. Rules at the World Trade Organization over process and product methods

and nondiscrimination prevent states from taking action in their trading techniques when the environment is at stake. However, in recent years, preferential trade agreements have been proliferating rapidly through the world and offer a new way to rectify environmental damages—environmental provisions within the texts of these agreements are increasingly being integrated into the trading system.

It was therefore worth questioning whether or not environmental provisions in preferential trade agreements had an effect on the environmental quality of the state. In this paper, I argued that environmental provisions would be associated with improved environmental quality; I also argued that these effects would be higher if the agreement also contained an enforcement mechanism in the form of a dispute settlement. It was theorized that these provisions create an incentive to improve the environmental quality of a state without risking its economic development. Because access to markets is conditional on the provisions outlined in the trade agreement, states will be more likely to follow the goals outlined in the text of the agreement. These provisions include those on the environment, and so a state will be more likely to develop sustainable industries and improve its environmental quality—the economic costs of noncompliance are too great to risk cheating on the agreement.

Ultimately, my predictions did not come to fruition. Both hypotheses were tested using a linear regression model, and both the hypothesis focusing solely on environmental provisions and the hypothesis focusing on both environmental provisions and a dispute settlement mechanism (for enforcement) were found to have a negative impact on the environmental quality of the state according to the metric used in this paper. Neither result was statistically significant and both constituted a very small decrease in environmental quality; however, the results failed to confirm the hypotheses presented. This was theorized to be because the data used did not

encompass policies that were created at the domestic level—the metric was purely a performance-based measure and didn't account for increased efforts in the domestic political sphere. Trade itself was also shown to make the environmental quality of a state worse (which is widely examined in the existing literature), and these provisions fail to have an effect on the environment at all. The provisions may have been placed there to placate domestic environmental groups, and are not enforced because largely states tend to engage in dispute settlement if a purely economic interest is at stake. The environment does not provide many opportunities to make a profit, and so there aren't any cases brought to courts. Lastly, no one wants to hold the burden of enforcing environmental regulations because the benefits of continued noncompliance extend to all parties.

The leads on the effect of the provisions were also tested, and both models provided evidence for increased environmental quality as the lead is extended into the future. These results generated an upward-sloping trend to the data that reflected an improvement in the coefficients as time increased. It was therefore possible that the models did not have a long enough lead on the data to give a positive result and the provisions take longer to come into effect than was theorized initially. However, it is also possible that these results are due to the fact that the sample size gets smaller as the lead gets larger.

Overall, environmental provisions were found to be simply boilerplate language that does not have an effect on the environmental quality of the state—they even seem to make the quality worse due to increased trade. This isn't seen in other areas of provisions because there's no one to bear the costs—human rights provisions and labor provisions have agendas that extend through the world and have global regimes dedicated to their improvement. The environment does not have this luxury—NGOs from Western, industrialized states seem to have the most

influence. The UN's recent Climate Summit provides some hope for increased environmental cooperation, but the incentive structure discourages action. This study did find that multilateral environmental agreements had a positive, statistically significant impact on environmental quality, and so it is possible that alternate mechanisms are going to have a better effect on improving the environmental quality of states. Further research may be needed to confirm this, but in any case, time seems to be the biggest factor.

However, just because a large-scale result is not seen does not mean that environmental provisions should be abandoned—change happens slowly but surely in the environmental realm. A quantitative result may not be immediately available; however, if countries keep adopting these solutions to an insurmountable problem, change could be seen in the long run. The qualitative studies done mostly on NAFTA suggest an impact over time. In the complicated relationship between trade and the environment, any effort to reconcile the two should be applauded.

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