COERCION VERSUS PERSUASION

AN ANALYSIS OF THE SHORT- AND LONG- TERM EFFECTS OF DIFFERENT ENFORCEMENT MECHANISMS IN FREE TRADE AGREEMENTS WITH ENVIRONMENTAL PROVISIONS

Master Thesis

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Summary

This study investigated the short- and long-term effect on the environmental performance of a country that has ratified a Free Trade Agreement (FTA) with environmental provisions depending on the enforcement mechanism in place. Two different enforcement mechanisms were distinguished: Firstly, coercive (hard) enforcement mechanisms that entail trade sanctions or fines on the infringing country. Secondly, persuasive (soft) enforcement mechanisms that encompass dialogue among political and civil stakeholders in case of non-compliance with environmental provisions. The environmental performance of a country was measured by the Yale and Colombia University's Environmental Performance Index (EPI). Subject of this analysis were FTAs that were ratified or already in place in the period between 2002 and 2012 and to which either the USA or the EU were a partner. Based on theories on coercive and persuasive enforcement mechanisms, it was hypothesized that hard enforcement mechanisms were not correlated with a significant change in EPI in the short-term (one year after ratification) or long-term. Long-term was defined as having ratified a FTA with the respective enforcement mechanism for at least three or at least five years. Soft enforcement mechanisms were expected to be associated with a significant increase in EPI in the long-term. To test these hypotheses, a pooled least square regression analysis was conducted. The main results confirmed the hypotheses and showed that FTAs with hard enforcement mechanisms do not lead to a significant increase in the EPI in the long-term. In contrast, countries that have ratified a FTA with soft enforcement mechanisms display a significant increase in EPI in the long-term. When EU member states were excluded from the sample, the statistically significant effect on the EPI increased in magnitude in the long-run. In the short-term, no significant effect was associated with neither hard nor soft enforcement mechanisms.

These results demonstrate how international trade agreements can improve environmental performance when environmental provisions are coupled with different enforcement mechanisms in FTAs. This is of particular interest in the light of increasing environmental degradation and a growing popularity of FTAs.

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1. Introduction

Most climate scientists agree that anthropogenic global warming and its negative impacts on the environment have increased in the last decades (Cook et al., 2016; Parmesan & Yohe, 2003; Vorosmarty, 2000). National efforts are not enough to halt global environmental degradation. Cross border cooperation and commitment are essential requirements in preserving the environment. The salience of international political action to protect the environment has been more and more acknowledged by global political leaders. This has been demonstrated during the 21st Conference of the Parties (COP21) meeting in Paris in 2015 when a rising number of countries showed the willingness to commit to ambitious climate goals (United Nations Framework Convention on Climate Change, n.d.). However, even among high income European countries the current policies and practices are not in compliance with the EU's pledge of cutting carbon emissions by 40% by 2030 (Neslen, 2017). The negative consequences of inaction are experienced globally in form of natural catastrophes with devastating economic consequences.

This development is paired with an augmented interconnectedness between countries through trade (WTO, 2015). This might cause new environmental threats, but also implies potential opportunities for linking environmental protection to economic issue areas. This is why attention of scholars and politicians alike has been drawn to the potential relationship between environment and trade. It is of particular interest, how trade can prevent further environmental degradation or even actively promote environmental protection. The inclusion of environmental provisions in Free Trade Agreements (FTAs) represents one way to achieve this. These environmental provisions set certain environmental standards and rules that all the contracting countries must adhere to.

Until now, several decades have passed since the first FTA with environmental provisions has been ratified and many more new trade agreements have been concluded in recent years. This opens up the possibility to learn from past experience by evaluating the effect of certain elements of environmental provisions. Previous studies in this field have shown that different enforcement mechanisms lead to divergent effectiveness (Bastiaens

& Postnikov, 2014). However, little is known about the long-term consequences of FTAs with environmental provisions, differing in their enforcement mechanisms. Therefore, this thesis aims at answering the research question whether divergent enforcement mechanisms of environmental provisions in FTAs result in different environmental performances of contracting partners in the short- and long-term after ratification.

The thesis is organized as follows. First, the societal and theoretical relevance of the research question is revealed. The second chapter reviews the main empirical literature in the field of trade liberalization and environment in general and FTAs and environmental protection in particular. Subsequently, in chapter 3 the theories underpinning the two different enforcement mechanisms that are analyzed in this thesis are presented. It is distinguished between coercive (hard) and persuasive (soft) enforcement mechanisms. In chapter 4, the research method and the dependent and independent variables are presented. This empirical strategy is then applied in chapter 5 where the data and the results of the analysis are described. The results, their policy and theoretical implications and the limitations of the study are discussed in chapter 6. In chapter 7, a conclusion is drawn and potential fields for further research are pointed out.

1.1 Societal Relevance

The importance and necessity to take action to halt environmental degradation has been acknowledged at the international level some 30 years ago. In 1987, for the first time, the United Nations World Commission on Environment and Development proclaimed the need for global action to preserve the environment in the so called Brundtland report (The United Nations World Commission on the Environment and Development, 1987). Despite these early international efforts 30 years ago, little action has been undertaken since then to limit environmental damage and to reduce its economic, ecological and societal consequences as indicated in the most recent report of the Intergovernmental Panel on Climate Change (IPCC, 2014).

In 1992, the United Nations started another attempt to streamline global efforts by initiating a Framework Convention on Climate Change (FCCC) during the 1992 Earth Summit in Rio de Janerio and in the following up conference in Kyoto in 1997 (Molle, 2014). However, the absence of a meaningful international commitment underlined once again that the differences in wealth and development hinder common agreements and multilateral efforts among countries. A lack of agreement eventually leads to inertia. The following up conference in Paris in 2015 (COP21) brought more countries than ever on board and was praised for its ambition (Goldenberg et al., 2015). But now, two years after, even among highly industrialized countries only few have actually undertaken measures to reach their pledges made at the Paris conference (Neslen, 2017). Moreover, the USA has announced its intention to withdraw from the COP21 accord (Shear, 2017).

Despite these unsuccessful undertakings, global action is strongly needed as climate change and environmental degradation has neither lost its threat nor its relevance for society. On the contrary, increasing production, processing and consumption of consumer goods has led to growing negative implications for the environment. For instance, production is often interwoven with an unsustainable exploitation of resources, processing requires energy resources that set free greenhouse gases accelerating global warming and consumption results in waste that pollutes water and soil (Molle, 2014). Following from that, a decrease in biodiversity can already be observed (Tilman et al., 2017) and the wide spanning future consequences thereof are yet impossible to predict to full extend (Molle, 2014). Moreover, a plethora of negative consequences of environmental degradation are already evident in the daily life of people all over the world. For instance, the health effects of poor air quality are alarming: half of the world's population is exposed to air pollution levels that on average exceed the ones that the World Health Organization considers to be safe (HSU et al., 2016). In future, these effects are even expected to aggravate due to demographic pressure and increasing demand for resources (Charles et al., 2010).

Thus, the widely-recognized problem[1] of increasing environmental degradation is paired with a slow process and almost inertia on the global political level. Some scholars argue

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[1] Despite the fact that climate change skepticism became predominant again among some political leaders recently, scientifically there is consensus among researchers that climate change

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that this lack of significant progress on the international level is due to missing provisions of monitoring, sanctions, dispute settlement mechanisms and of incentives for taking the lead in Multilateral Environmental Agreements (MEAs) (Molle, 2014). For society, it is therefore crucial to find effective means to overcome those shortcomings.

At the same time, trade activities have become more international and nowadays span all over the globe (WTO, 2015). This increasing economic interconnectedness raises concerns towards its effects on the environment[2]. However, it also provides new possibilities to influence the environmental policies of other countries if concerns and provisions for the environment are taken into account when Free Trade Agreements (FTAs)[3] are concluded. In fact, the number of FTAs with environmental provisions has increased in the last years. Moreover, the number of different dimensions of environmental protection covered by environmental provisions has augmented, even though the scope differs between the FTAs (George, 2014).

FTAs as a channel to promote environmental protection is promising for mainly three reasons. Firstly, FTAs often include arrangements for non-compliance with trade related issues, like dispute settlement mechanisms and enforcement mechanisms like sanctions. Their application can be extended to non-trade related issues like environmental provisions.

Secondly, the economic advantages linked to a FTA, for instance the access to new markets, can incentivize compliance with environmental provisions.

Thirdly, due to the smaller number of trading partners, FTAs allow tailor-made commitments that can be even more ambitious than it has been possible on the global level so far.

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is happening and that it represents a threat for life on earth (The Royal Society & National Academy of Sciences, 2014).

[2] For further elaboration upon the different theories on the relationship between the environment and trade and the empirical findings in this field see chapter 2 of this thesis.

[3] Here the definition of FTAs encompasses bilateral and regional agreements that liberate trade among the partnering countries. Preferential trade agreements and regional trade agreements are used as synonyms to FTAs in this thesis.

Despite the potential advantages of FTAs to preserve the environment, little is known about the actual impacts on the environment and whether different designs can make a difference in the short- and long-term after the ratification of a FTA.

By analyzing the consequences of different enforcement mechanisms in FTAs, this thesis contributes to answering the question on how and if FTAs can be an effective channel to promote environmental protection. The lessons learned can be highly relevant as they offer insights into effective designs of FTAs and how environmental degradation can be limited and reversed in the international arena. This knowledge is crucial for society to guarantee that future generations are not compromised in their needs because of depletion of resources and the negative consequences of climate change. Moreover, political leaders might be enabled to take stronger actions even if those are unpopular among the domestic population, as evidence about its effectiveness can be used as a justification. This seems of particular importance considering the strong domestic opposition that FTAs like the Transatlantic Trade and Investment Partnership between the EU and the USA are facing due to environmental concerns (Neslen, 2016).

In summary, linking environmental protection to trade agreements bears a compelling opportunity to reduce environmental degradation. A deeper understanding of the mechanisms underpinning the effectiveness of environmental provisions in FTAs is therefore of great relevance for today's and future political leaders and society.

1.2 Scientific Relevance

Studying the effectiveness of different enforcement mechanisms of environmental provisions in FTAs, contributes to the scientific literature in mainly four areas:

Firstly, it provides further insights into the relationship between trade and environment on which scholars have not reached consensus yet (Copeland & Taylor, 2003). The analysis of impacts of FTAs on the environment reflects the increasing importance of FTAs that have been concluded in growing numbers in recent years (George, 2014) and the need for further investigation of its role in the theory on global governance.

Secondly, as this thesis analyzes the effects over a longer time frame, it makes a valuable contribution to the understanding of when effects materialize. It is hoped that the results of this study can be applied to other non-trade related issue areas in FTAs, as, for instance, labor provisions.

Thirdly, the focus on enforcement mechanisms, and coercive and persuasive mechanisms in particular, enhances the understanding of various underlying theories and can potentially advance their refinement.

Finally, the results of this thesis contribute to the scientific discourse on the influence of different designs of trade agreements.

2. Literature Review

To begin with, the relationship between environment and trade liberalization is presented. This is crucial to understand the link between trade and environment in general and why the inclusion of environmental provisions might be even more necessary in the case of free trade. Subsequently, the current state of research on the relationship between environmental provisions in FTAs and their effects on the environment are outlined and existing shortcomings are revealed.

2.1 Trade Liberalization and the Environment

From a theoretical perspective, the impact of trade liberalization on the environment has been described in the pioneering work by Grossman & Krueger (1991). They argued that the effect of trade on the environment could be decomposed into three distinct effects, i.e. *scale, technique and composition effect*.

An increased scale of trade is assumed to lead to economic growth. This *scale effect* implies expanding demand. In consequence, an increase in demand requires more energy, increases transportation routes and results in an accumulation of waste. Environmental degradation and an increase in pollution can follow as a consequence.

However, pollution can partly be offset by the *technique effect* which may reduce the emissions per output through the use of modern technology. Trade stimulates technological innovations through three channels: first, it enables knowledge transfers from developed to developing countries. Secondly, if environmental quality is a normal good, an increase in income due to trade will increase the demand for emission reduction which requires the improvement of technologies. This argument is linked to the Environmental Kuznets Curve which argues that economic growth can reduce environmental degradation, when it leads to an improvement of services, technology and information transfer which in turn reduces the need for natural resources. However, empirical evidence in favor of the relationship theorized by the environmental Kutznet Curve, has been mixed (Kaika & Zervas, 2013). Thirdly, according to the Porter-hypothesis

an increase in competition, for instance due to international trade, demands investments in efficient technologies (Porter & Van der Linde, 1995). However, the Porter hypothesis lacks conclusive empirical evidence (Ambec et al., 2011).

The *composition effect* is based on the notion that due to trade liberalization, national economies focus on those sectors in which they have a comparative advantage, i.e. where they can produce at lower relative costs compared to the other country. This might be due to less (environmental) regulations, or lower production costs. Depending on the pollution-intensity of the industry that the country enjoys a comparative advantage in, this shift in production can cause more or less environmental damage. This holds true, even if neither the scale of production has changed, nor technical improvements have been made (Grossman & Krueger, 1991). However, environmental standards can also be used to create a competitive advantage for domestic products if it is more difficult for foreign countries to comply with those standards (Vogel, 1997).

Depending on which of the three effects dominate, trade liberalization can affect the environment negatively or positively (Copeland and Taylor, 2003).

Moreover, relatively poor countries may lack the willingness or domestic pressure to enact environmental standards and / or controls without international pressure. The case where other nations adopt higher foreign standards, for instance to keep its access to the foreign market, is referred to as the *California effect*. This can also lead to an adaption of domestic standards to the higher foreign standards, as investments to meet the foreign environmental standards have already been made (Vogel, 1997). For instance, Korea has decreed that Korean produced cars sold on the domestic market must have the same abatement device as those required for cars produced for export. This meant a considerable upgrade in its regulatory standards. From this example, it can be followed that market incentives can trigger higher environmental product and production standards. However, the California effect has only been observed for a limited number of products, often highly visible and symbolic (ibid., 1997).

When it comes to international trade, the World Trade Organization (WTO) is the prominent international organization for international agreements, negotiations, and disputes. So far, the WTO has not encouraged the enhancement of environmental

standards. The General Agreement on Tariffs and Trade's (GATT) Article XX allows member states of the WTO to deviate from GATT rules if the policy measures are "necessary to protect human, animal or plant life or health" (paragraph (b)) or "relating to the conservation of exhaustible natural resources" (paragraph (g)) and are not a pretext for protectionist measures (WTO, n.d.). This means that the burden of proof, namely that a removal of trade-distorting environmental measures would damage the environment, is put on the country attempting to protect the environment. However, this proof is difficult to provide (Berger et al., 2017). Moreover, the influence of countries on trading partners on non-trade issues through the WTO is limited (Bartels, 2015).

Other means to promote global environmental protection are Multilateral Environmental Agreements (MEAs). The most prominent examples encompass the Vienna Convention for the Protection of the Ozone Layer of 1985 and the Framework Convention on Climate Change including the Kyoto Protocol of 1997 and the most recent Paris Agreement in 2015. However, those agreements have not always been successful, due to noncompliance of signing countries or non-participation of less affluent nations (Kanie, 2015).

As many attempts have failed so far to enhance environmental protection, a promising mechanism is presented in the inclusion of environmental provisions in FTAs. This is of particular interest considering the increasing popularity of FTAs in recent years (Dür, Baccini, & Elsig, 2014). An extensive overview on why FTAs might yield a greater success rate compared to MEAs is provided in chapter 3 of this thesis.

2.2 Free Trade Agreements and Environmental Provisions

The coupling of environmental policies to FTAs is predominantly found in trade agreements signed by the USA, the EU, New Zealand and Canada with other countries (Baghdadi, Martinez-Zarzoso, & Zitouna, 2013). These environmental provisions can differ in their scope, concreteness, and level of ambition. Some FTAs include environmental side agreements, or dedicate a whole chapter to the environment, others only mention environmental protection in the preamble (Jinnah & Morgera, 2013). Moreover, the content of environmental provisions in FTAs differ. For instance, some proclaim a

modification or enhancement of the WTO exception rules. Reference to MEAs and their supremacy over the trade agreement is another possible form an environmental provision can take. Finally, it is possible to include additional obligations to adhere to environmental standards (Bartels, 2015). All these complementing environmental policies aim at influencing the environmental regulations and policies of trading partners. It has been theorized that the design and enforcement mechanisms of FTAs may have an impact on the effectiveness and compliance with these international rules (Johns & Peritz, 2015).

Therefore, different attempts have been made to distinguish the diverse designs of environmental provisions. For instance, Berger et al. (2017) differentiated between nine designs of environmental provisions in FTAs with emerging countries. These dimensions covered where in the FTA references to environmental ambitions could be found (preamble or a whole chapter), their reference level (MEAs, environmental laws) and mechanisms to deal with conflicts between trade and environmental issues (environmental exception clauses, right of environmental regulation, commitments to transparency and cooperation in environmental matters and the role of the public). The aim of Berger et al.'s (2017) study was to describe and reveal the occurrence of each design in FTAs that emerging countries have ratified. Similarly, Dawar (2010) analyzed the legal environmental provisions of 28 FTAs by dividing them up, based on four distinctive facets. This encompassed the analysis of the objectives stated in the preamble of the agreement, the scope of obligations, the institutional settings provided by the trade agreements and the dispute settlement mechanism that is in place. She concluded that environmental provisions have grown in both their scope and judicial strength.

This division can be further refined by focusing on diverging enforcement mechanisms of environmental provisions. For instance, these can incorporate sanctions or can be based on policy dialogues among civil stakeholders and trading partners (Bastiaens & Postnikov, 2014).

It is assumed that the inclusion of environmental provisions in FTAs can have a direct or indirect effect on trading partners' environmental policies. Binding commitments in FTAs create a direct effect. In contrast, raised awareness of environmental issues is an indirect effect of environmental provisions even if they are not binding.

Whether environmental provisions have an effect at all, might depend on the content of the provision and the enforcement mechanisms that secure compliance. In the following, it is outlined to which extent scholars have analyzed the impact of environmental provisions in general, but also in respect to different enforcement mechanisms.

In respect to the effects of environmental provisions, a profoundly studied FTA coupled to environmental policies is the North American Free Trade Agreement (NAFTA) between the USA, Canada and Mexico in 1994. Hufbauer & Schott (2005) demonstrated that important Mexican environmental policies were introduced due to NAFTA, but also that "NAFTA's environmental record affords ample room for improvement" (ibid., p.178). This assessment was further confirmed by the findings of Stern (2007) who provided evidence for lower levels of energy use and emissions of sulfur and NO_x per unit of GDP for the trading partners after having signed NAFTA. However, he also showed that in the case of carbon emissions a moderate upward trend was observed.

Only few studies have evaluated to what extent different enforcement mechanisms influence the impact of environmental provisions. For instance, Kirby (2009) analyzed the enforcement mechanisms of three different FTAs, involving the USA, Canada and Chile. He argued that enforcement mechanisms involving citizens were crucial to increase environmental protection, as they raised interest in environmental issues and put domestic pressure on states to increase their environmental regulations.

This qualitative case study explains the outcome in one, specific case, however it neither allows to draw conclusions on the effects of environmental provisions in FTAs in general, nor on the effectivity of different enforcement mechanisms. To be able to assess its general impact, bigger samples of FTAs have to be examined. However, analyses that included a greater sample of observations have mostly been descriptive in nature (Colyer, 2011). To the author´s knowledge, only four studies have conducted a quantitative empirical analysis on the effects of environmental provisions in FTAs so far.

Baghdadi et al. (2013) compared the relative (per-capita) and absolute CO_2 pollution levels of countries that had signed FTAs with and without environmental provisions. Their findings supported the notion that only when environmental provisions were included in FTAs, pollution levels decreased in absolute terms and converged between trading partners.

These findings have been confirmed by a similar study by Zhou, Tian, & Zhou (2017) and Martínez-Zarzoso & Oueslati (2016). Both examined the influence of environmental provisions in FTAs on the concentration of fine particulate matter. Once again, members of a FTA with environmental provisions showed better air quality compared to those without these provisions. Convergence among contracting countries could only be observed where cooperation on environmental issues was a distinct element of the environmental provision (Zhou et al., 2017).

However, Baghdadi et al. (2013), Zhou, Tian, and Zhou (2017) and Martínez-Zarzoso and Oueslati (2016) only looked at air pollution levels. However, environmental provisions do not exclusively aim at reducing air pollutant particles, but also take into consideration other areas of environmental degradation such as the problem of environmentally hazardous chemicals (Bourgeois, Dawar, & Evenett, 2007). The limited focus on one particular environmental indicator makes it difficult to draw conclusions on the effects of environmental provisions in FTAs in general.

In their study, Bastiaens and Postnikov (2014) used a more comprehensive dependent variable to evaluate the environmental performance of trading partners that have signed a FTA with environmental provisions. The index that was used as dependent variable was the Environmental Performance Index (EPI). Among the air and water quality, the EPI utilizes multiple other indicators such as energy and biodiversity (for a more comprehensive description on the EPI see A. Hsu et al., (2014) or chapter 4.2 of this thesis.) As various factors are incorporated in the EPI, this index provides a comprehensive method of quantifying the overall environmental performance of a country. Bastiaens and Postnikov (2014) concluded that environmental provisions in FTAs increased the environmental performance of developing states. However, the positive effect on environmental performance was found at different times of the negotiation and signing process depending on the enforcement mechanism that was in place. Two enforcement mechanisms were distinguished: coercive or hard enforcement mechanisms like sanctions and persuasive or soft enforcement mechanisms like dialogue. When hard enforcement mechanisms were included they were correlated with a significant increase in EPI during the negotiation process. In contrast, soft enforcement mechanisms were not

associated with significant changes in the EPI during the negotiation process, but after the signature of the FTA.

However, the authors' analysis was limited to the negotiation process and the signing of a FTA, but did not cover the period after ratification. To evaluate the overall effect, this would have been highly important, as it is conceivable that the enforcement mechanisms have an impact on the environmental performance after some period of time. In support of this notion, they acknowledged themselves that "socialization in international institutions is a lengthy and also a cumulative, process [...]" (Bastiaens & Postnikov, 2014, p. 10).

For this reason, it is still an open question to what extend different enforcement mechanisms affect a nation´s EPI after the ratification of a FTA. The aim of this thesis is to address this research gap. In consequence, the analysis of this thesis is guided by the following research question:

How do the effects of environmental provisions in FTAs with soft or hard enforcement mechanisms differ in their impact on the environment in the short- and long-term after ratification?

3. Theoretical Framework

The advantage of including environmental provisions in FTAs over already existing MEAs that have the preservation of the environment as its sole purpose, is not immediately evident. Therefore, in the theoretical framework of this thesis, reasons are given for why FTAs with environmental provisions have the potential to be more successful in increasing environmental protection in comparison to MEAs. Subsequently, theories on the enforcement mechanisms of international agreements are introduced. Taken together, these theories provide the theoretical framework on why divergent effects of soft and hard enforcement mechanisms of environmental provisions can be expected over time.

3.1 Environmental Provision in FTAs vs. MEAs

Multilateral Environmental Agreements (MEAs) aiming at solving diverse, anthropogenic environmental problems, vary in their content and effectiveness. The success or failure to meet the agreement's regulations often depends on economic, political and environmental interests and preferences of the member countries (Mitchell, 2003). Therefore, a general or final assessment of the superiority of environmental provisions in FTAs over MEAs is not within the scope of this study.

However, FTAs have some characteristics that many MEAs that have failed, were lacking. Two well-known MEAs are the Montreal Protocol on Substances that deplete the Ozone Layer (Montreal Protocol in 1987) and the Kyoto Protocol (1997), aiming at the reduction of greenhouse gas emissions. Based on those two MEAs, Barrett (1999) revealed potential reasons for the success of the former and failure of the latter. According to him, the Montreal Protocol was successful because it provided positive, monetary incentives for developing countries and threatened to impose trade sanctions on non-signatory countries. The Kyoto Protocol aiming at the reduction of greenhouse gas emission was lacking this kind of incentive scheme, which led to its ineffectiveness (Barrett, 1999).

Likewise, Vogel (1997) claimed that developing nations "might well change their behavior in response to economic incentives from rich countries. […] In the short run, they are unlikely to make any significant changes in their environmental policies. This is not

because international competition is pressuring them to lower their regulatory standards; it is rather that their current level of economic development has made them unwilling to trade off economic growth for environmental quality [...]" (p.568). Thus, to increase poor nations' environmental standard, adequate mechanisms are needed that combine economic incentives and environmental protection.

A potentially successful mechanism to solve this dilemma is the inclusion of environmental provisions in FTAs. FTAs with environmental provisions have great potential in preventing environmental degradation and promoting environmental protection for the following reasons:

First of all, the outcome of an international agreement and its success depends on the structure of the institutional system. If there are great asymmetries in the distribution of wealth and capabilities, the outcome will be most likely the lowest common denominator that all parties are still willing to commit to (Sand, 1992). FTAs offer the possibility of accommodating this lack of significant commitment for the following reasons:

According to collective action theory, the group size and incentives play a crucial role in the provision of a public good such as environmental protection. Small numbers of participants increase the efficiency and likelihood of cooperation (Olsen, 2002). Most FTAs are bilateral or regional agreements, which fulfill the criterion of small numbers (Dür et al., 2014). In addition, the regional dimension increases the likelihood that the contracting countries are facing the same consequences of environmental degradation or are directly influenced by the externalities caused by the other party. This common interest increases the likelihood of cooperation. Furthermore, if there are only few contracting countries, it is more probable that ambitious and individualized goals for environmental protection are set (Gaines, 2008).

Moreover, transnational cooperation beyond the field of trade is a substantial part of many FTAs and often particularly emphasized (OECD, 2007). Cooperation might compensate for potential asymmetries in capabilities of fulfilling environmental standards which are often the reason for a lack of commitment to protect the environment.

Secondly, competitive disadvantages and the potentially market distortive effects of higher environmental standards are often given as a reason for impeding the

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enhancement of environmental protection. This reasoning has been supported by several decisions of WTO's Dispute Settlement Body, favoring free trade over environmental protection (Gaines, 2001). However, this prioritization of trade over the environment does not have to be made. In FTAs, issues of environmental protection can directly be linked to the furthering of trade liberalization. The perspective of new export markets, that might not have been lucrative when high tariffs were still in place, can create incentives to adopt the higher environmental standards of the trading partner. It has for example been shown that developing countries have increased automobile emission standards prior to ratifying a FTA, to heighten the chances of the entry into force of FTAs with the respective developed countries (Baccini & Urpelainen, 2014).

It is also conceivable that an overall positive economic effect of trade liberalization can compensate for the additional costs of higher environmental standards in some sectors. For instance, Büthe and Milner (2008) showed that developing countries participating in more FTAs, benefited from higher inflows of foreign direct investment which could impact economic growth positively.

Moreover, as uninternalized environmental externalities can lead to market failure reducing the efficiency and gains from international trade, member countries of a FTA have a shared interest in ensuring that environmental externalities are diminished (Esty, 2001).

Finally, collective action can be incentivized by negative consequences, or the threat thereof, in case of inaction or non-compliance (Drezner, 2003). Many FTAs include dispute settlement mechanisms in the case of non-compliance with environmental provisions (Bourgeois et al., 2007). Even though dispute settlement mechanisms also exist in some MEAs, they are often lacking effective enforcement mechanisms. FTAs can fill this gap as they mostly provide for enforcement mechanisms and therefore improve compliance rates (Bourgeois et al., 2007).

To conclude, FTAs with environmental provisions have the potential to increase environmental standards by overcoming obstacles of collective action. FTAs provide for the option of issue linkage, creating positive incentives (e.g. compensation and side payment or concessions in other areas) and negative incentives (e.g. through

enforcement mechanisms). This holds the promise of more ambitious environmental standards and higher compliance rates (Martin, 1993).

3.2 Theories on Enforcement Mechanisms

Environmental degradation and environmental preservation are not confined to national borders. They are often described as public goods/ bads as they are non-excludable and non-rivalrous (Kaul, Grundberg, & Stern, 1999). Consequently, global action is required to fight environmental degradation. On the other hand, there is a strong incentive for free riding i.e. an incentive for countries not to contribute to enhancing environmental protection, as even then they can reap the benefits of the provision by the remaining countries (Barrett, 1999).

Therefore, international agreements do not itself guarantee compliance. The reasons for defection are diverse. For instance, the circumstances under which the agreement was signed, might have changed (Chayes & Chayes, 1993) or the signatory state does not value the content of the agreement, but the act of signing and participating is of importance to the signing country (Tallberg, 2002). Consequently, enforcement mechanisms are needed to ensure compliance with environmental provisions.

There are mainly two different enforcement mechanisms: hard enforcement mechanisms like *Coercion* and soft enforcement mechanisms like *Persuasion*. In the following the difference between those two mechanisms and the theoretical working are presented. These assumptions are supported by empirical evidence of the effect of provisions in FTAs in the field of labour rights and human rights. Particular emphasis is laid on the effect over time. There is theoretical reason to believe that the effect might diverge over a longer time frame depending on the enforcement mechanism.

3.2.1 Coercion

Coercion in this thesis is based on the definition of Drezner (2003). According to him, coercion describes an act or threat of one or several governments to interrupt economic interaction with the infringing country until it complies with the stated demand. This mainly

alters the cost-benefit calculations of states via economic rewards and punishments, as it increases the costs of noncompliance or increases the benefits of compliance. This implies that a lasting change of preferences of the targeted party has not necessarily happened even after renewed compliance (Goodman & Jinks, 2004).

Thus, in the case of FTAs, coercion is exercised if benefits of free trade are conditional on the compliance with environmental provisions that are outlined in the agreement. In fact, trade is limited or interrupted if the commitment to environmental provisions is not met or significant monetary compensation is demanded. This is also referred to as *hard enforcement mechanism*.

It can be theorized that coercion has an almost immediate impact as it does not require the long process of changing preferences. Similarly, coercive demands can cause changes at a short time horizon, as the potential gains of trade e.g. market access, can be conditioned on compliance with environmental standards (Dawar, 2010). This gives an incentive to take fast action to avoid forgoing economic benefits. This reasoning assumes that countries behave rationally and confront benefits and costs of cooperation when deciding to comply or to defect.

Moreover, coercive instruments are independent from the governmental leadership and therefore have a stable impact across legislative periods, as long the tradeoff of noncompliance is constantly communicated to the new government (Hafner-Burton, 2005).

Besides the economic costs of coercion, the behavior of target and sender countries depends on the consequences for future interactions (Drezner, 1999). As most international agreements do not determine their exact expirations beforehand, both parties can assume an infinite number of potential disputes. Thus, experiences of reciprocity, i.e. present behavior is followed by certain future consequences, can create a stable cooperation and outcomes. This reasoning is based on the assumption that defection is recognized and strategies of reciprocity can be implemented (Oye, 1985).

In the field of human-rights, it has already been analyzed whether the inclusion of human rights provisions in FTAs paired with hard enforcement mechanisms could lead to an improvement of the protection of human rights of the trading countries (Hafner-Burton,

2005). However, Hafner-Burton (2005) did not take into account the point in time when effects materialize, but evaluated the overall effect after ratification. Her findings confirmed that human rights provisions in FTAs with coercive enforcement mechanisms have a statistically significant effect on the protection of human rights after the ratification.

The effects of environmental provisions in FTAs that are bound to hard enforcement mechanisms were central to the study by Bastiaens and Postnikov (2014). They showed that environmental provisions with hard enforcement mechanisms are correlated with a significant improvement of the environment during the negotiation period. Moreover, this positive effect was no longer observable in the time between the signature and ratification of the FTA. The period after ratification, thus the long-term effect after ratification, was not part of the study by Bastiaens and Postnikov (2014).

These findings from non-trade related fields and the theoretical considerations lead to the first hypothesis of this thesis:

> *H1: The level of environmental performance of states being part of a FTA with hard enforcement mechanisms, remains the same in the short- and long-term after ratification.*

3.2.2. Persuasion

Persuasion is here defined as an action that actively aims at changing the beliefs and norms of the infringing party about what is considered as an appropriate action. This is achieved through rationalization and communication of targeted information. Discussions can either address directly the infringing government or aim at creating structural opportunities for domestic stakeholders like non-governmental actors to voice their concern (Goodman & Jinks, 2004). However, the alternation of preferences and norms is a process that needs time to emerge, going through stages of diffusion and internalization (Finnemore & Sikkink, 1998). Persuasion is considered to be successful if governments replace a previous set of principles about, in this case, appropriate environmental standards, by a new set of norms (Hafner-Burton, 2005). The setting of an

institution can affect the likelihood and degree of persuasiveness. According to Johnston (2001), institutional designs favoring persuasion exist when there are only a few members, when decisions are based on consensus and when some actors possess more authority in certain issue areas. This is the case for most FTAs, as they include a limited number of countries. In addition, those countries differ in their economic power and decisions are mostly made by consensus.

Persuasion, however, is built on the alternation of preferences of political leaders, which is expected to be a slow process, as beliefs are hard to change (Anderson, 1989). Moreover, new governmental leaders need to be addressed repetitively to avoid falling behind in the process of changing environmental protection preferences.

Civil society actors can play a crucial role in the change of preferences acting as 'norm entrepreneurs (Finnemore & Sikkink, 1998) that advocate for environmental protection and guarantee that adopted norms outlast the legislative period of governing elites. International obligations can put vital weight on the voice of civil actors, as it increases the reputational cost of non-compliance for the infringing governments (Simmons, 1998). Moreover, civil society can undertake the job of monitors exposing defections (Tallberg, 2002) when considered as valuable stakeholders.

Moreover, the interaction of trading partners can provide new, credible information that changes the strategy or preferences of a country (Johnston, 2001). Provided that this information has not been considered by the noncompliant country, behavioral change in respect to environmental provisions could occur in the years following ratification. Affection towards the informant positively influences behavioral change (Kuklinski & Hurley, 1996). Relationships strengthen with more interaction, exposure and familiarity (Petty, Wegener, & Fabrigar, 1997) and persuasiveness relies on the perception that the opponent is knowledgeable and trustworthy (Johnston, 2001). Therefore, the effectiveness of persuasion might be experienced only after several encounters.

Furthermore, persuasion as an enforcement mechanism is linked to the managerialist's view on compliance. This approach of international cooperation theory considers capacity building, increased transparency and correct interpretation of rules as a solution to solve cooperation problems on international stage (Tallberg, 2002). If the reason for noncompliance is a lack of capacity, punishment through sanctions might be

unjustified and ineffective (Chayes & Chayes, 1995). The lack of capacity is particularly important in the context of low-income countries (Urpelainen, 2010). Non-compliance can also be due to ambiguous treaty language in which case the clarification of treaty rules is crucial in ensuring compliance (Tallberg, 2002). However, these reasons for non-compliance might only become apparent after a certain period of time after ratification when the lack of capacity or clarification becomes evident and can be successfully addressed.

To conclude, in the context of FTAs, persuasive enforcement mechanisms do not provide for sanctions in the case of non-compliance, but instead rely on dialogue with trading partners and civil society stakeholders to enforce compliance with, for instance, environmental provisions. This is also called *soft enforcement mechanism*.

The effect of soft enforcement mechanisms to guarantee compliance with non-trade related provisions in FTA, has already been analyzed in the case of labour and human rights. However, in the two areas the findings differed.

Hafner-Burton (2005) did not observe any significant positive effects of human rights provisions in FTAs with soft enforcement mechanisms after ratification. This is in contrast to Postnikov and Bastiaens (2014) who showed in their study on labor provision that soft enforcement mechanisms have a positive effect on labour standards in trading countries. However, this positive impact was only revealed after the parties had signed the FTA. Analyzing the effect of environmental provisions coupled onto soft enforcement mechanisms was the focus of the study by Bastiaens and Postnikov (2014). Their findings were in line with those in the case of labour provisions. It was shown that effects on the environment of trading partners of FTAs with soft enforcement mechanisms, only materialize after the signature and not during the negotiation period. The long-term effects after ratification of the FTA was not part of the study by Bastiaens and Postnikov (2014).

The findings of previous studies suggest that the observed effect depends on the period that is analyzed. Therefore, based on these previous empirical findings and theoretical considerations the following hypothesis is derived:

H2: The level of environmental performance of states being part of a FTA with soft enforcement mechanisms, increases in the long-term after ratification.

In this thesis, long-term is defined as at least three years or at least five years after ratification.

To conclude, the theories on Coercion and Persuasion imply different short- and long-term effects of FTAs with hard or soft enforcement mechanisms compared to countries which do not have a FTA with the respective enforcement mechanism in place. In the following chapter, the research design to verify these hypotheses is presented.

4. Research Design

In order to test the hypotheses stated above, a quantitative analysis is conducted. To begin with, the research design of previous studies is presented before the research method of this thesis is outlined in more detail.

4.1 Research Methods of Previous Studies

Most studies on the effect and effectiveness of environmental provisions in FTAs are qualitative, small number case studies (Bourgeois et al., 2007). However, to draw conclusions that hold on a larger scale, it is common to apply a quantitative approach (Mahoney & Goerts, 2006). The few quantitative studies that have been carried out, have significant limitations. Three out of four use air pollution levels as dependent variable, limiting the analysis to a very specific dimension of the environment (Baghdadi et al., 2013; Martínez-Zarzoso & Oueslati, 2016; Zhou et al., 2017). Even though they all confirm a positive relationship between FTAs with environmental provisions and a reduction in air pollution, it is still not possible to draw final conclusions on the effect that FTAs with environmental provisions have on the overall environment of trading partners.

To overcome this shortcoming, a broader indicator for environmental performance of a country is needed. Bastiaens and Postnikov (2014) acknowledged this limitation and took advantage of the Yale and Colombia University's Environmental Performance Index (EPI). This comprehensive index on the environmental performance of countries represents also the dependent variable of this thesis. For this reason, the following subchapter 4.2.2 is dedicated to the detailed illustration of the characteristics and formation of this index.

Moreover, even though all quantitative studies confirmed the positive effects of environmental provisions in FTAs, little is known about the contribution of the single elements, such as the enforcement mechanism, of environmental provisions to these positive results. Especially the aspect of time plays a crucial role when analyzing the effectiveness of enforcement mechanisms and environmental provisions in the context of FTAs. This has been illustrated by two studies. Postnikov and Bastiaens (2014) showed

that labour provisions in FTAs with different enforcement mechanisms result in a different timing of effects prior to ratification, while Bastiaens and Postnikov (2014) drew the same conclusion in the context of environmental provisions.

The formation of a FTA mostly consists of three stages: the negotiation process, the signature, and the ratification. Only after ratification the Vienna Convention on the Law of Treaties proclaims that "a State establishes on the international plane its consent to be bound by a treaty" (The United Nations, 1969, p. 333). Therefore, the full effect of enforcement mechanisms can only be evaluated in the years after ratification, as only by then enforcement mechanisms can be applied. However, the previous study by Bastiaens and Postnikov (2014) focused on the effects before and after signing a FTA only. Yet, no other study has been conducted to analyze the long-term effects of soft and hard enforcement mechanisms after ratification of a FTA.

This thesis aims at filling this gap by testing whether the effects of environmental provisions with soft or hard enforcement mechanisms differ in their impact after a certain time the FTA was ratified, namely after one year and when a FTA is in force for at least three or at least five years.

The empirical methods that are applied in the studies of Baghdadi et al. (2013), Martínez-Zarzoso and Oueslati (2016), Zhou et al. (2017) are very similar. All three of them, analyzed both convergence levels and absolute levels of CO_2 emission and PM2.5 air pollution levels of countries, when FTAs with or without environmental provisions were signed. When estimating in the absolute effect, Ordinary Least Squares regression was run including a wide range of control variables to account for other factors that might be correlated with a change in CO_2 or PM2.5 air pollution levels, to isolate the effect that can be attributed to the FTA with environmental provisions that was signed. As the dependent variable of these three studies focuses on one dimension of environmental degradation only, some control variables and issues of endogeneity addressed in those studies are specific to that choice of dependent variable. In this thesis, the EPI is used as a dependent variable, just like in the study of Bastiaens and Postnikov (2014). The authors applied a fixed effect model including control variables for economic development and growth, for the democratic situation of civil society and environmental factors. Only the variable accounting for the openness of a country, time trends and fossil fuel

consumption as a percentage of total energy consumption were statistically significant. However, the research question and the sample of this study differed from the one applied in this thesis. For this reason, the research method and choice of control variables used in this thesis are not identical to the study of Bastiaens and Postnikov (2014), but show some overlap. The following chapter presents the empirical model of this thesis in more detail.

4.2 Empirical Model

To analyze the short- and long-term effects of having ratified a FTA with soft or hard enforcement mechanism, respectively, a Pooled Least Squares model was used. In a pooled model, coefficients neither vary depending on individuals (here: states), nor on time. Thus, they are expected to be constant for all states in all time periods (Hill, Griffiths, & Lim, 2011).

The sample of the analysis encompasses all countries for which data on the EPI was available in the years between 2002 and 2012. The unit of analysis are countries at each year. The EPI of 178 countries was available in the period between 2002 and 2012, however Taiwan, Somalia, Lesotho, Ethiopia and Syria were excluded from the sample and analysis due to a lack of data for the control variables. Thus, 173 countries in the period between 2002 and 2012 represent the sample of this analysis. 71 out of these countries have ratified a FTA with environmental provisions and soft or hard enforcement mechanisms by the end of 2012

A particular challenge to this thesis is the fact that the ratification of FTAs with either hard or soft enforcement occurred at different points in time during the years 2002-2012. Short-term is defined as one year after the ratification. As a consequence, an analysis of the long-term and short-term effect of FTAs with environmental provisions and soft or hard enforcement mechanisms was only possible for a subsample of countries. This leads to a different number of countries that can be analyzed in the short- and long-term as summarized in Table 1. Total is the number of countries that had ratified a FTA with hard or soft enforcement mechanism by the end of 2012.

Table 1. Number of Countries that have a FTA with Soft or Hard Enforcement Mechanism in place in the period between 2002 and 2012.

Soft Enforcement Countries	53	29	48	36
WITHOUT NEW EU COUNTRIES	41	17	36	24
WITHOUT ALL EU COUNTRIES	26	17	21	9
Hard Enforcement Countries	19	13	16	14
WITHOUT USA	18	13	15	13

Source: Office of the United States Trade Representative. (2017) and European Commission. (2017). Depiction: Author's own.

Between 2002 and 2012, 12 countries have become new member states of the European Union. From the moment of accession, all the FTAs and their provisions also apply to these countries. Strictly speaking, they can be considered as being party of a FTA from the accession date on. However, the accession process to become a member of the EU can take several years (Smith, 2011). In addition, it is a prerequisite that prospective EU countries adjust to environmental standards of the other EU member states beforehand (European Commission, n.d.). It is therefore conceivable that the effect of environmental provisions in FTAs only have moderate effects on the EPI of new EU member states, once a country has joined the EU. To accommodate for this potential bias, a robustness check was conducted where new EU member states were coded as being treated from 2002 onwards, independently of the actual year of accession. For example, Poland only joined the EU in 2004, thus when the robustness check was run, it was coded as having ratified a FTA with soft enforcement mechanism already in the years 2002 and 2003. Croatia was never included in the sample of countries that have a FTA with soft enforcement in place, because it became an EU member state in 2013.

Figure 1 and Figure 2 depict the countries that have ratified a FTA with soft and hard enforcement mechanisms for environmental provisions between 2002 and 2012[4]. The

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[4] In 2008, the EU has ratified a FTA with some small islands, namely Saint Lucia, Saint Vincent and the Grenadines, Saint Kitts and Nevis. However, data on the EPI of these countries was not available and therefore, they were neither included into the analysis, nor are they displayed in the Figure 2. Moreover, countries that joined the EU in 2004 and 2007 are not depicted, but included in the analysis.

crosses indicate the year of ratification of a FTA. It appears that ratifications of FTAs occurred at several years, but accumulated in 2008 in the EU and in 2005 in the USA. Moreover, the lines of the graph do not suggest a clear pattern or trend.

Five countries are parties to both FTAs with the EU and the USA. These countries are Mexico, Chile, the Dominican Republic, Jordan, and Morocco. Additionally, Jordan and Chile are special cases because the FTA between Chile and the EU was the only exception when the EU included hard enforcement mechanisms and the FTA between Jordan and the USA is the only FTA that provides for soft enforcement mechanisms. For this reason, the first ratification is assumed to represent the beginning of the period to analyze the effect in the case of Jordan and Chile. The year of the ratification of the second FTA is indicated with a black box in Figure 1 and Figure 2. During the years between the first and the second ratification the line in the graph is dotted. Morocco ratified a FTA with soft enforcement mechanism in 2000, thus prior the date of analysis. Therefore, no black box is indicating the ratification in 2000. However, the line in the graph is dotted from 2002 until 2006 because 2002 and the following years lay after the ratification of the FTA, but prior to the second FTA that Morocco has ratified. The FTA with soft and the one with hard enforcement mechanism with Mexico were both ratified before 2002 and therefore Mexico is neither among the countries shown in Figure 1 nor in Figure 2.

In the analysis, first these five countries were included in the sample and not treated any different from the countries that have only ratified one FTA with either the US or the EU. To rule out that the results of this thesis were distorted by these special cases, afterwards an additional regression was run excluding those five countries from the sample.

Figure 1. EPI of Non-EU Countries that have ratified a FTA with Soft Enforcement Mechanism between 2002-2012
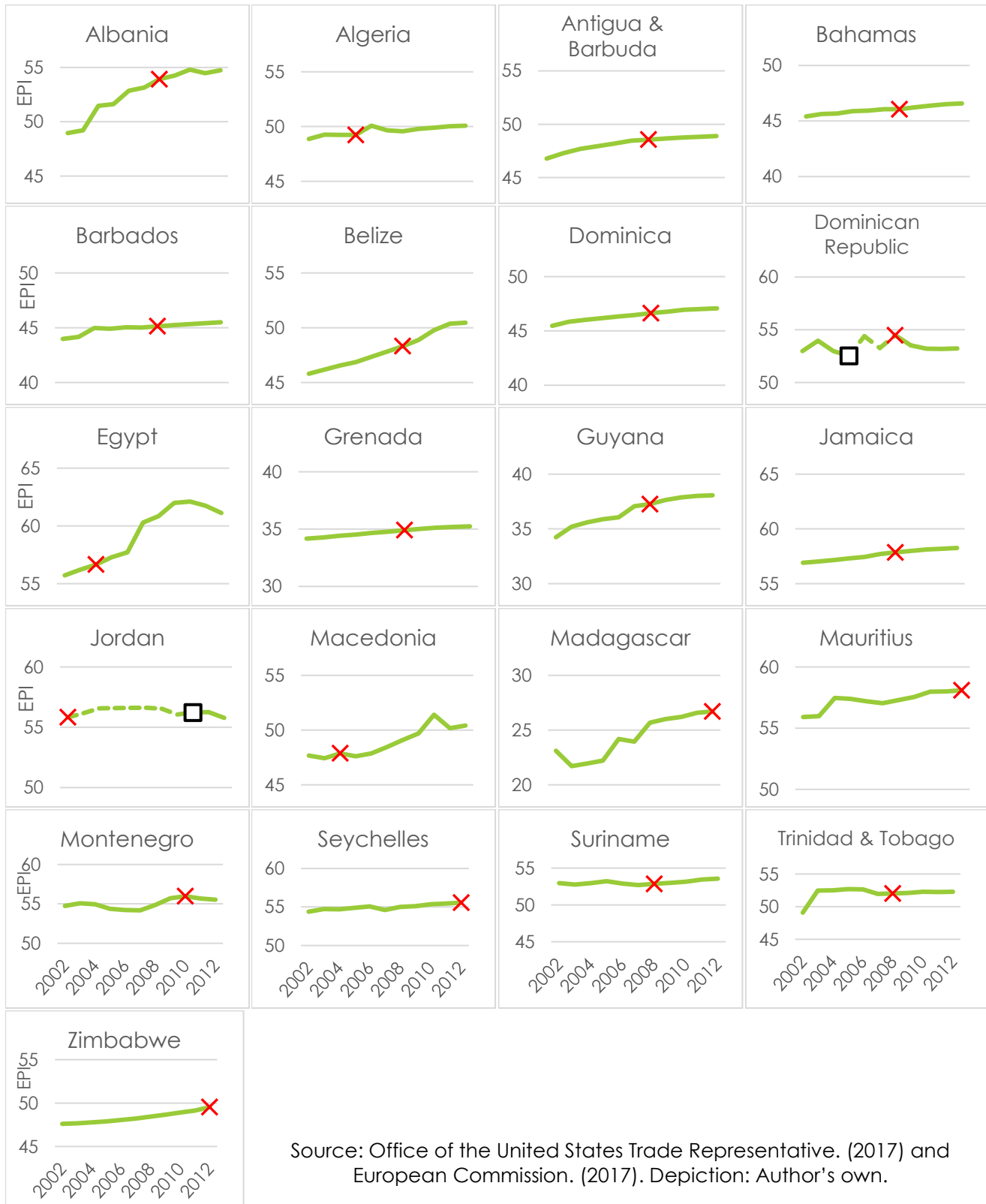
Source: Office of the United States Trade Representative. (2017) and European Commission. (2017). Depiction: Author's own.

Figure 2. EPI of Countries that have ratified a FTA with Hard Enforcement Mechanism between 2002-2012

Source: Office of the United States Trade Representative. (2017) and European Commission. (2017). Depiction: Author's own.

4.2.1 Empirical Model Review

The analysis is based on time-series cross-sectional data. A data set with these properties is also called panel data. Hereafter, the cross-sectional units will be referred to as countries and the time units are years. As t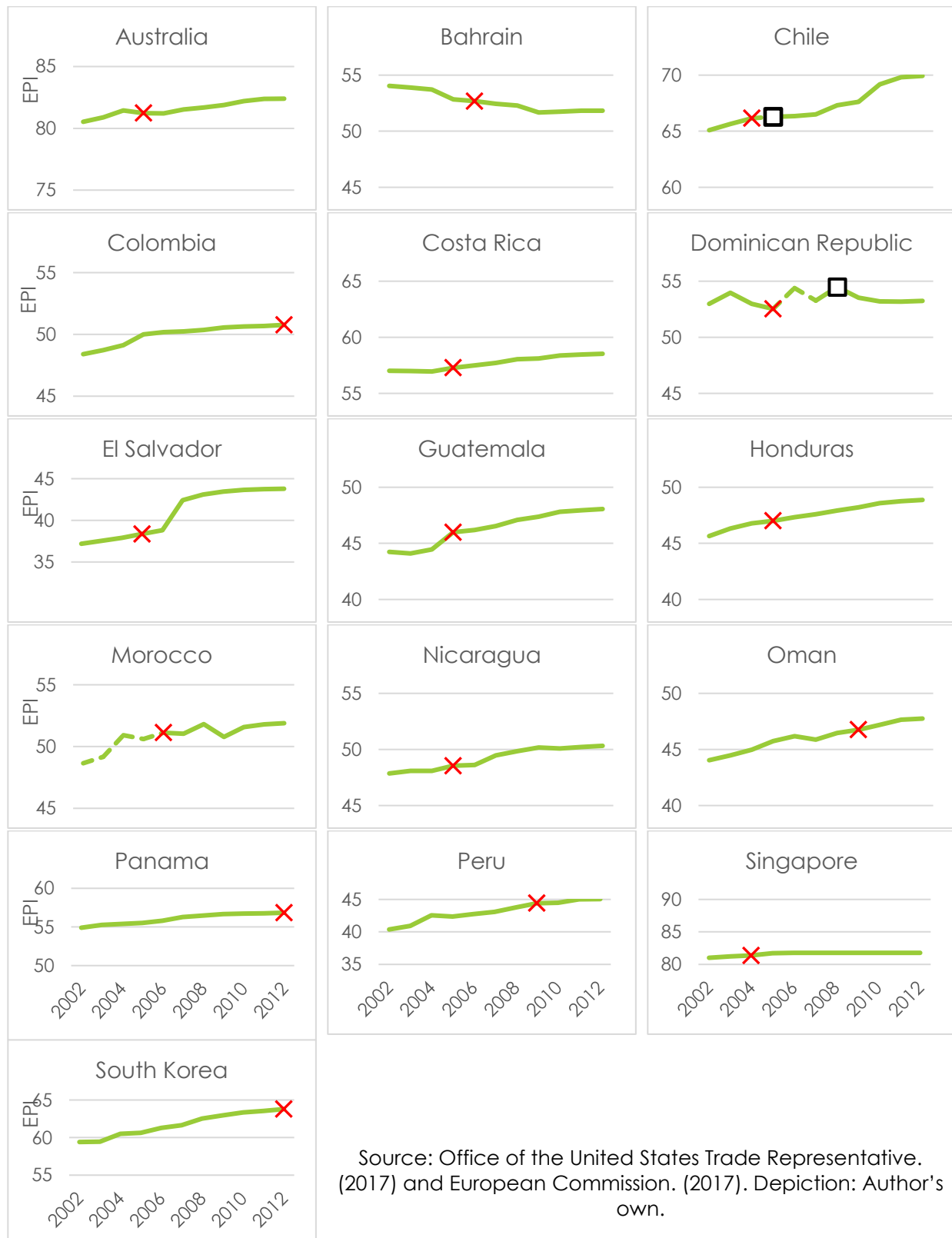he data set encompasses a large number of countries and only 11 time periods (i.e. the years from 2002-2012), it possesses the characteristic of a *short* panel data set (Hill et al., 2011). Importantly for the analysis, assumptions underpinning Ordinary Least Squares regression must be fulfilled to generate econometrically sound analysis. Therefore, several tests were conducted and adjustments made to validate the empirical model.

First, the linear relationship between the dependent variable EPI (ln) and the independent variables was analyzed and confirmed by augmented partial residuals plots, as recommended by Mallows (1986). Secondly, the potential control variables, identified by theory, were selected by stepwise regression. The selection of independent variables was based on the adjusted R^2, the Akaike Information Criterion and Bayesian Information Criterion.

Secondly, the population variance of the error term ε should be constant and should not depend on the observations. This is also called homoscedasticity. In return, if the variance of the error term varies across observations, the error term is heteroskedastic. Three versions of the Breusch-Pagan and Cook-Weisberg test were conducted to test for heteroskedasticity in this thesis. The results indicated that the variance of the error term is heteroskedastic. This was further confirmed by a graphical analysis of a plot between the residuals and fitted values. For this reason, robust standard errors were incorporated into the model.

The third assumption concerns the relationship between error terms. It is required that the values of the error terms of an observation are distributed independently of one another i.e. a random shock affecting the error term for one observation ε_i does not influence the error term of another observation ε_m. In that case, they are said to be uncorrelated. If this assumption is violated, serial correlation, also known as autocorrelation, is in place. This is a common phenomenon in the context of time series data, as often external shocks are not only consequential for the observations in one year, but are likely to be carried over

to the following years too. As pointed out by Bertrand et al. (2004) there is a risk of serial correlation of the outcome variables when the same units are compared over time which can lead to over-estimation of significance levels and t- statistics. The scale of this bias depends on the length of the time series used, on the serial correlation of dependent variables and if procedures were applied to correct for it. Nevertheless, it is advisable to apply alternative estimation techniques as suggested by Bertrand et al. (2004) to account for potential serial correlation. Therefore, following the recommendation of Bertrand et al. (2004) and Angrist and Pischke (2008) standard errors are clustered by country to remedy the violation of the assumption of autocorrelation and homoscedastic variance of the error terms.

As significant tests are based on the assumption that error terms are normally distributed, this assumption was controlled for by plotting the quantiles of residuals against quantiles of normal distribution and by graphing standardized normal probability plot of standardized residuals. Both indicated an approximately normal distribution of the residuals.

Finally, the independent variables should not be perfectly correlated. If this assumption is violated, the independent variables are multicollinear, and the effects on the dependent variable by each independent variable cannot be distinguished. This was tested by calculating the centered and uncentered variance inflation factors of the independent variables. As none of them passed the critical threshold, multicollinearity does not threaten the validity of the empirical model of this analysis.

To conclude, all the classical assumptions are fulfilled and it can be said that the coefficients obtained from the Ordinary Least Squares regression are the best linear unbiased estimators (Hill et al., 2011) for the analysis of this thesis.[5]

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[5] These tests were guided by the overview on the assumptions, the consequences for the regression model when they are violated and how this can be fixed according to the study of Graddy and Wang (2008).

4.2.2 Dependent Variable

The Yale and Colombia University's Environmental Performance Index (EPI) is used as a dependent variable to evaluate the environmental performance of states' policies. It is obtained from the Yale University's website (see Table 13 in the Appendix). The EPI has been established with the goal to quantify the environmental performance of a country, which allows to make a comparison of the environmental protection across countries. The EPI can guide policy makers to make progress in the protection of the environment based on empirical evidence. The EPI is the result of a joint project of the Yale Center for Environmental Law & Policy and Yale Data-Driven Environmental Solutions Group at Yale University, the Center for International Earth Science Information Network at Columbia University, in collaboration with the Samuel Family Foundation, McCall MacBain Foundation and the World Economic Forum. They jointly publish a report every two years starting in 2006 (Hsu et al., 2016). This calculation is updated every two years and allows to analyze effects over time. Therefore, this index provides an adequate measurement for the analysis of this thesis.

The EPI was preceded by the Environmental Sustainability Index (ESI) that was measured from 2000 until 2005. However, the ESI as much as the EPI have been subject to changes in respect to its composition and measurement every two years. This implies that the results are not comparable over time i.e. the changes in the EPI of a country could be due to a different measurement of the EPI and not due to an actual improvement or deterioration of the environmental performance of this country. This disadvantage has been acknowledged by the authors of the EPI. Consequently, they provide annual, back casted scores for the framework and methodology of the EPI 2014 and 2016, respectively for the eleven previous years. For instance, for the calculation of the back casted scores of 2014, the 2014 EPI's methodology was used to recalculate the EPI country's score for the each year between 2002 and 2012. Even though there exist a more recent dataset, the back casted score of 2014 will be the basis for the analysis of this thesis. This is justified by the fact that there have been more FTAs ratified in the period covered by the back casted years of the EPI 2014 than of the EPI in 2016. Consequently, it increases the sample size that can be analyzed.

As the EPI used in this study reposes on the calculation of the EPI of 2014, the following description and illustration in Table 2. of the EPI relates to the methods and framework used for the calculation of the EPI in 2014. Many general remarks however, also apply to the EPI of preceding and subsequent years.

The EPI ranks countries' performance in the areas of protection of human health from environmental harm and protection of ecosystems. These two categories can be further subdivided into nine subcategories: water and sanitation, health impacts, air quality, climate and energy, biodiversity and habitat, fisheries, forests, agriculture, and water resources. These nine subcategories are further divided in 20 indicators (see Table 2.).

Each of the 20 indicators is weighted subsequently within the issue dimension (Table 2. in brackets), resulting in a single-issue category score. The weightings are based on the quality of the data and the indicator's relevance and fit for the evaluation of a set policy issue. Notably, not all environmental threats affect all countries equally. For instance, a landlocked country will not be assigned a Marine Protected Areas score. In that case, the weight is distributed equally among the other indicators within this issue field. In the end, the two main objectives of Environmental Health and Ecosystem Vitality are weighted equally and result in a single value for each country: the EPI score.

Table 2. The EPI 2014 Framework

	Objective	Dimensions	Indicator
Environmental Performance Index 2014	Environmental Health (40%)	Health Impacts (33%)	Child Mortality (100%)
		Air Quality (33%)	Household Air Quality (33%)
			Air Pollution- Average exposure to PM2.5 (33%)
			Air Pollution- PM2.5 Exceedance (33%)
		Water and Sanitation (33%)	Access to Drinking water (50%)
			Access to Sanitation (50%)
	Ecosystem Vitality (60%)	Water resources (25%)	Wastewater Treatment (100%)
		Agriculture (5%)	Agricultural Subsidies (50%)
			Pesticide Regulation (50%)
		Forest (10%)	Change in Forest Cover*** (100%)
		Fisheries (10%)	Costal Shelf Fishing Pressure (50%)
			Fish Stocks (50%)
		Biodiversity and Habitat (25%)	Terrestrial Protected Areas (National Biome Weights) (25%)
			Terrestrial Protected Areas (Global Biome Weights) (25%)
			Marine Protected Areas (25%)
			Critical Habitat Protection (25%)
		Climate and Energy (25%)	Trend in Carbon Intensity*** (Varies according to GDP)
			Change of Trend in Carbon Intensity *** (varies according to GDP)
			Trend in CO2 Emissions per KWH*** (33%)
			Access to Electricity (not used for calculation)

Source: Hsu et al., (2014). Depcition: Author's own.

The scores that are assigned to each country are based on a "proximity-to-target" method. Depending on how well a country performs compared to an identified policy target, it can reach a score from a scale of 0 to 100 with 100 being the closest to the target (Figure 3.). The targets are composed of performance benchmarks set by international or national policy agreements or are derived from scientific consensus (Hsu et al., 2014).

When the scores of indicators are based on trends (indicated with *** in Table 2.), the score of this indicator is not back casted, but its value stays the same over the years. On the one hand, this might cause a problem if the scores would have changed significantly over the decades. On the other hand, it makes rescaling and reweighting of the score unnecessary which would also distort the results, as some estimators would be overrated in their importance. Even if this reduces the number of substantial indicators, the EPI still gives a more comprehensive and therefore more accurate picture of the environmental performance of countries than those studies only focusing on air quality (Baghdadi et al., 2013; Martínez-Zarzoso & Oueslati, 2016; Zhou et al., 2017).

Figure 3. The Proximity-to-Target Method
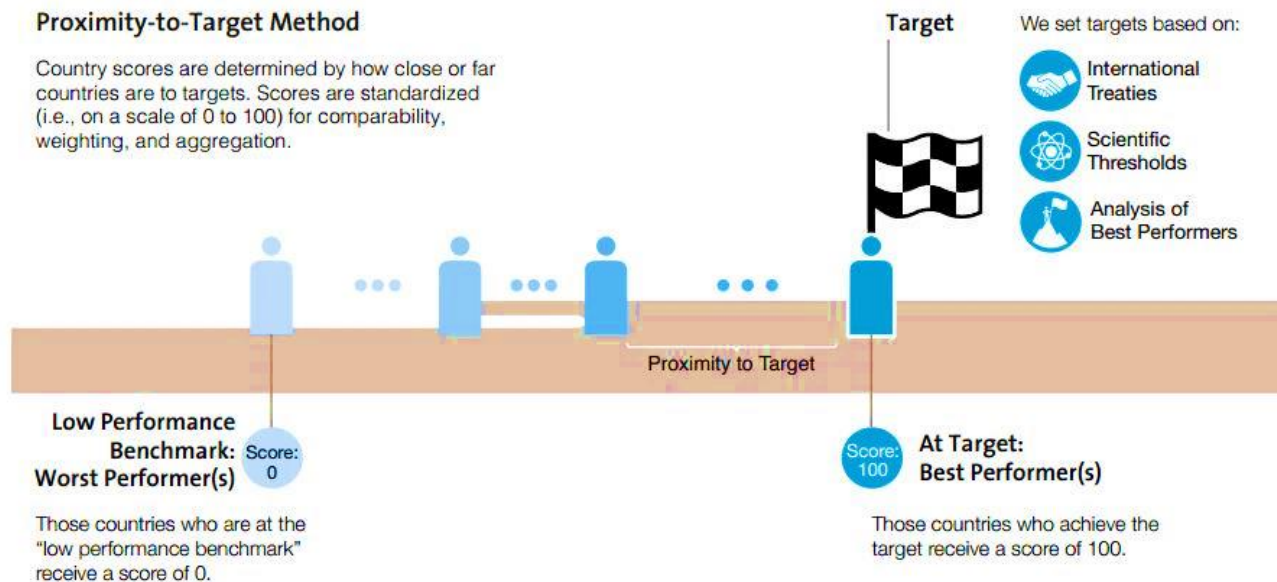
Source: Hsu et al. (2016, p. 29).

Depending on the score, 178 countries are ranked. In 2016, Finland ranked first, with the highest score of 90.68 and Somalia had the lowest rank and a score of 27.66. The ranking offers the possibility of comparing countries' performance in reaching environmental targets in relation to each other, however it does not provide information on the actual status of environmental protection in each country (Moldan et al., 2012). Therefore, when analyzing the impact of environmental provisions in FTAs, not the rank of an individual country will be considered, but its score.

Data for the indicators comes from primary and secondary sources. In addition, certain selection criteria must be met before a dataset is included. This is to guarantee a high standard of quality. For instance, a dataset is only chosen if it offers the global and temporal coverage needed (Hsu et al., 2016).

Despite its comprehensiveness, there are certain environmental issues that lacked globally available data and they were therefore not included in the EPI. Among them are agricultural soil quality and degradation, toxic chemical exposures and recycling rates (Hsu et al., 2014). However, considering the wide range of other environmental fields covered by the EPI, it remains, to the author's knowledge, the most comprehensive and widely used environmental index available at the moment.

4.2.3 Independent Variables

4.2.3.1 Main Explanatory Variables

It is the goal of this thesis to evaluate the impact of FTAs with environmental provisions with differing enforcement mechanisms on the environment. This requires a differentiation between FTAs with environmental provisions and within them, a further selection depending on the enforcement mechanisms in place.

In general, more and more countries have ratified FTAs with environmental provisions, a trend that has been described by the OECD in their report on Regional Trade Agreements and the Environment (OECD, 2007). For three reasons, this thesis focused on FTAs completed with the USA or the EU as one of the trading partners.

Firstly, as countries differ in their trading activities and their wealth, not all FTAs can be considered as equally important for countries from an economic point of view. The EU and USA score highest in the amount of merchandise imports and exports (Central Intelligence Agency, 2013). Therefore, their economic power and importance is comparable. Moreover, trading partner countries have a great incentive to comply with environmental provisions in FTAs with these parties to secure the access to their large markets. This is because the economic benefits or losses of free trade with the USA and

EU can be safely assumed to be higher than for any other country, and similar if compared with each other.

Secondly, both the EU and USA have officially committed themselves to promote sustainable development via trade beyond their borders in the beginning of this century. In 2001, the EU published 'A European Union Strategy for Sustainable Development', in which the EU declared their responsibility to "contribute towards sustainable development in the rest of the world. […] policies – internal and external- must actively support efforts by other countries […] to achieve development that is more sustainable." (European Commission, 2001, p. 9). In the review of this strategy, five years later, the appeal was even more explicitly linked to trade: "The Commission and Member States will increase efforts to make globalisation work for sustainable development by stepping up efforts to see that international trade and investment are used as a tool to achieve genuine global sustainable development. In this context, the EU should be working together with its trading partners to improve environmental and social standards and should use the full potential of trade or cooperation agreements at regional or bilateral level to this end." (Council of the European Union, 2006, p. 21).

Correspondingly, the USA stated in the 'Trade Act of 2002' within the overall trade negotiating objectives to "ensure that trade and environmental policies are mutually supportive and to seek to protect and preserve the environment and enhance the international means of doing so, while optimizing the use of the world's resources" and to " to seek provisions in trade agreements under which parties to those agreements strive to ensure that they do not weaken or reduce the protections afforded in domestic environmental and labor laws as an encouragement for trade" (United States Congress, 2002, p. 63). This explains why both the USA and the EU were among the countries to include the most comprehensive environmental provision in FTAs (OECD, 2007).

Thirdly, both countries have implemented environmental provisions at a large scale in FTAs. Both countries have ratified a similar number of FTAs so far and in the period between 2002 and 2012. Moreover, the USA has mainly implemented hard enforcement mechanisms in FTAs whereas the EU mostly provides soft enforcement mechanisms in FTAs. This qualifies the FTAs that have been concluded with the USA and the EU for testing the research question of this thesis.

For these three reasons, this analysis of the impact of environmental provisions in FTAs on the environment was limited to FTAs where either the USA or EU is a contracting partner.

The term "FTA" is not always used by the EU in a well-defined manner. Differences between FTAs, the Stabilization and Association Agreements and Economic Partnership Agreements that the EU has concluded are not always clear cut. Thus, agreements are regarded as FTAs in this thesis if they remove or reduce tariffs and therefore promote free trade. For reasons of simplicity they are all referred to as FTAs. Agreements that leave custom tariffs unchanged, like Partnership and Cooperation Agreements (European Commission, 2017), are not considered as FTAs here.

A second criterion for the selection of FTAs was the requirement that they have already been ratified. Only then are environmental provisions potentially enforceable and their effects on the environment measurable. The same logic is applied to 'provisionally applied FTA', i.e. only countries that have ratified the agreement, are treated as partnering in a FTA with environmental provisions. Crucial for the evaluation of the environmental impact of a FTA with environmental provisions is the date the FTA came into force. In case where countries ratified both FTAs with hard enforcement mechanisms and FTAs with soft enforcement mechanisms, it is analyzed whether major changes occurred in the aftermath of one ratification or another. Information on the date of enforcement and texts were derived from the official websites of the US government and the EU institutions respectively (Office of the United States Trade Representative, 2017and European Commission, 2017).

Next, FTAs were distinguished based on environmental provisions. Environmental provisions were considered to exist if the commitment to environmental protection was either mentioned in the preamble or was referred to in a chapter of the FTA. There was no differentiation made between the different forms of environmental provisions i.e. if they referred to MEAs or national environmental laws (for an overview on the distinction between those provisions see Berger et al. (2017)).

When environmental provisions are in place, a distinction between hard and soft enforcement mechanisms was made. This differentiation was based on the rules of dispute settlement. A hard enforcement mechanism explicitly incorporates either a monetary punishment on the infringing country (e.g. FTA between USA and Bahrain in

2006) or suspension of benefits (e.g. FTA between USA and Colombia in 2012). This enforcement mechanism can only be found in one FTA where the EU is one of the trading partners, namely in the one with Chile in 2005. In contrast, this kind of hard enforcement mechanism prevails in most FTAs to which the USA is one of the trading partners. The only exception being the trade agreement with Jordan in 2010 which only provides for soft enforcement mechanisms as defined in this thesis.

In the soft enforcement mechanism, prevalent in FTAs with the EU, a strong emphasis is put on dialogue between the conflicting parties. Soft enforcement mechanisms intend in case of non-compliance that the matter is referred to a certain institutional body that mediates between the parties. For instance, in the case of the Stabilization and Association Agreement between the EU and Montenegro the enforcement mechanism for environmental provisions is stated as the following: "As long as the dispute is not resolved, it shall be discussed at every meeting of the Stabilization and Association Council […]. A dispute shall be deemed to be resolved when the stabilization and Association Council has taken a binding decision to settle the matter […] or when it has declared that there is no dispute anymore."(European Union, 2010, article 130, para. 3). In only a few FTAs, there is a provision for taking 'appropriate measures' or for calling an arbitration panel, if consultation between the parties has failed. However, due to a lack of explicit reference to monetary or trade related sanctions, these FTAs are here subsumed into soft enforcement mechanisms. A detailed overview of the different FTAs and their enforcement mechanisms is provided in Table 13. in the Appendix.

4.2.3.2 Control Variables

This study seeks to analyze the effect of different enforcement mechanisms in FTAs with environmental provisions on the EPI. To do so, other factors that might also affect the EPI must be taken into careful consideration. Therefore, several control variables were added to the analysis to ensure that there were no other factors driving the change in the EPI and to avoid spurious correlations caused by omitted variables bias. The potential control variables were identified based on theory and previous studies in this field. The

final selection of control variables was based on the adjusted R^2, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC).

Economy: *GDP per capita* and economic growth (in *GDP growth*) was included to account for the economic situation and development and therefore different starting points and development in the environmental performance of a country. Economic growth could be the potential cause for a temporary environmental deterioration and subsequent improvement as described for instance by Grossman & Krueger (1995). The data was obtained from the World Bank Databank (see Table 13. in Appendix).

Trade: The scale, technique and composition effects predict different impacts of trade liberalization on the environmental performance of a country. On the one hand, trade liberalization could exacerbate environmental degradation if trade liberalization increases demand (scale effect), or if it leads to a concentration in pollution intensive industries (composition effect). On the other hand, the composition effect could also lead to an increase in environmental-friendly industries. Improvement of the environment performance can also be driven by technical advancement and exchange (technique effect). Depending on the composition of these three effects, international trade could either lead to an increase or decrease in environmental degradation (see Chapter 2.1 of this thesis). To control that the results of the analysis are not driven by trade liberalization as such, but by the environmental provisions and enforcement mechanisms in place, a variable *trade* was added as a control variable. This variable stands for the sum of exports and imports of a country in goods and services as a percentage of GDP in each year. The data on a country's trade activities was obtained from the World Bank Databank (see Table 13. in Appendix).

Societal Development: *Population* was included as control variable as increasing population is a threat to finite resources on which production depends. A higher population increases the demand for products and energy, putting additional stress on the environment (Dasgupta, 1995). It has also been shown that the need for more agricultural yields for an increasing population has led to new land management that can result in overgrazing, deforestation and depletion of water resources implying a significant threat to the environment (World Bank, 1992). The data for total population of a country was obtained from the World Bank Databank (see Table 13. Appendix).

Political Situation: There are several mechanisms through which democratic regimes could have an effect on environmental degradation (Li & Reuveny, 2006). It is conceivable that political rights, freedom of speech and information can help environmental interest groups to raise public awareness, report on deficiencies, initiate environmental legislation and eventually improve the environmental performance of a country (For a more comprehensive overview on this reasoning see Li & Reuveny, 2006; Payne, 1995). However, is also plausible that democratic governed countries do not increase the environmental performance or even worsen environmental degradation. This could be caused by the fact that property rights of environmental resources are mostly missing even when countries are democratic (Hardin, 1968), or by the global dimension of the problem and inaction of politicians trying to avoid opposition (For an overview on these arguments see: Li & Reuveny, 2006). To exclude the possibility that the scores of the EPI are distorted in any direction by the governance structure in place, a variable on the degree of *the freedom status of a country* was included as a control variable. The freedom status of a country in each year 2002-2012 was defined according to the non-governmental organization Freedom House (see Table 13. in Appendix).

CO$_2$: Furthermore, a variable for the *CO$_2$ emissions* in metric tons per capita was included following the example of Bastiaens and Postnikov (2014). CO$_2$ is the main contributor to anthropogenic emissions of greenhouse gases (Victor et al., 2014) that are responsible for climate change. The reduction of CO$_2$ has been in the spotlight for combatting climate change and has been central to global initiatives like the Paris Agreement in 2015 (UNFCCC, 2015). In contrast, the reduction of CO$_2$ is not directly addressed in the FTAs that are subject to the analysis of this thesis. Moreover, CO$_2$ is only considered as a trend variable in the EPI and therefore remains unchanged over the period of 2002-2012[6]. Therefore, the CO$_2$ per capita of a country, is a good proxy for indicating national commitments to environmental preservation being made independently of FTAs that influence the EPI. Data on the absolute CO$_2$ emissions per capita of a country was obtained from the World Bank Databank (see Table 13. in the Appendix).

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[6] For more information on this matter see chapter 4.2.2 of this thesis.

4.3 Regression Equations

To test whether countries that have ratified a FTA with hard enforcement mechanism also show a significant change in their EPI compared to countries without a FTA with such enforcement mechanism, the following regression model was derived:

$$(1)\ EPI_{t,i} = \alpha + \beta_{1*}HARD_{it} + \beta_{2*}GDP_{t,i} + \beta_{3*}GROWTH_{t,i} + \beta_{4*}TRADE_{t,i} + \beta_{5*}POP_{t,i} +$$

$$\beta_{6*}FREE_{t\,i} + \beta_{7*}CO2_{ti} + \varepsilon_{t,i}$$

The index i represents a country i, the index t indicates the year t.

EPI stands for the natural logarithm of the environmental performance index score[7] that a country i has reached in year t. *HARD* is a dummy variable that is one if at a time t a country i has ratified a FTA with environmental provisions that has a hard enforcement mechanism in place. Thus, in the years up to ratification of the FTA with hard enforcement mechanism, a country is coded with zero, in the years after with one. The analysis covers countries in the period between 2002 and 2012 which represent the unit of analysis. If the FTA was ratified prior to 2002, the country is coded with one throughout the period analyzed in this thesis.

When analyzing the effect of soft enforcement mechanisms, the variable HARD was replaced by a variable *SOFT*. SOFT is coded equivalently one if a soft enforcement came into force with the ratification of a FTA, and zero in all other cases. β_1 is in the coefficient of interest, displaying the effect if FTAs with different enforcement mechanisms are in place. If HARD or SOFT is coded with one, this is associated with a $100 \times \beta_1$ percentage point change in the EPI of a country.

GDP is transformed to the natural logarithm *and* accounts for the GDP per capita in constant US dollars of a county i at time t. GDP Growth in annual percent of GDP is displayed in the variable *GROWTH*. To account for openness, the variable *TRADE* is

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[7] In what follows, the EPI score of a country is referred to as the EPI of a country for reasons of simplicity.

included to reflect the sum of exports and imports of a country in goods and services as a percentage of GDP. Again, this variable is logged. *POP* depicts natural logarithem of the countries' total population in million. The data for GDP, GROWTH, TRADE and POP are all obtained from the World Development Indicators database from the World Bank for the years 2002 until 2012. *FREE* reflects the freedom status of a country based on the categorization of Freedom House. Countries are assigned a score from 1 to 7 depending on the state of political and civil rights. Countries that are most free receive a score of 1. *CO2* is logged and represents CO_2 emissions in metric tons per capita. The data is also obtained from the World Bank Databank[8]. ε depicts the error term and α is the intercept.

4.3.1 Short-term

The short-term effect is defined as one year after ratification in this thesis. To analyze the short-term effect the following regression equation was used:

$$(2)\ EPI_{t,i} = \alpha + \beta_1 * \boldsymbol{YEARHARD_{it}} + \beta_2 * GDP_{t,i} + \beta_3 * GROWTH_{t,i} + \beta_4 * TRADE_{t,i} + \beta_5 * POP_{t,i}$$
$$+ \beta_6 * FREE_{t\,i} + \beta_7 * CO2_{ti} + \varepsilon_{t,i}$$

The only difference from equation (1) is the variable *YEARHARD* (depicted in bold). It is a categorical variable that is coded with zero prior to and in the year of ratification, with one in the year after ratification and coded with two in all the years that follow. This allowed to see whether the effect stayed stable one year after ratification or if the absolute value of the EPI changes significantly. For instance, Singapore ratified a FTA with the USA in 2004 that provided for a hard enforcement mechanism. Therefore, in the case of Singapore, in 2002, 2003 and 2004 YEARHARD is coded with zero, in 2005 with one, in 2006, 2007 etc. with two (see Table 3.).

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[8] For an overview on the source of the data see Table 13. in the Appendix of this thesis.

Table 3. Coding Example for YEARHARD: Singapore

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0	0	0	1	2	2	2	2	2	2	2

Countries that ratified a FTA with hard enforcement mechanism prior to 2002, were coded similarly. For instance, Canada ratified a FTA with the USA already in 1994. Therefore, YEARHARD for Canada is coded with 2 in 2002. This implies that the short-term effect can only be assessed for the countries that ratified the FTA in the period between 2002 and 2012.

In the case of soft enforcement mechanism, YEARHARD was replaced by YEARSOFT that is coded equivalently to YEARHARD, only for countries that have ratified a FTA with soft enforcement mechanisms.

4.3.2 Long-term

To estimate the long-term effect of a ratified FTA with environmental provisions with hard or soft enforcement mechanisms a different method was utilized. The following regression equation was applied:

$$(3) EPI_{t,i} = \alpha + \beta_{1*}\textbf{\textit{L3.HARD}}_{it} + \beta_{2*}GDP_{t,i} + \beta_{3*}GROWTH_{t,i} + \beta_{4*}TRADE_{t,i} + \beta_{5*}POP_{t,I}$$
$$+ \beta_{6*}FREE_{t\,i} + \beta_{7*}CO2_{ti} + \varepsilon_{t,i}$$

The only difference from equation (1) and (2) is the variable *L3.HARD* (depicted in bold). It is a dummy variable that is one if a country *i* in year *t* has ratified a FTA with hard enforcement for at least three years and zero in all other cases. For instance, Singapore ratified a FTA with the USA in 2004 that included a hard enforcement mechanism. Therefore, in the case of Singapore, the years 2002 until 2006 YEARHARD were coded with zero and in all following years with one (see Table 4.).

Table 4. Coding Example for L3.HARD: Singapore

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0	0	0	0	0	1	1	1	1	1	1

The coefficient β_1 stands for the delayed effect on the EPI of having a ratified FTA with hard enforcement mechanism in place for at least three years. Thus, β_1 subsumes the effect on the EPI that occurs in the years subsequent to three years after ratification.

To make sure that the effect is not driven by rather medium-term effects that occur when a FTA is ratified for three or four years only, it is analyzed if the effect differs when a FTA with hard enforcement mechanism is in force for at least five years. In that case the L3.HARD in equation (1) is replaced by a variable L5.HARD. L5.HARD is also a dummy variable being one when a FTA with hard enforcement mechanism is in place for at least five years and zero in all other cases. For an example of the coding of L5.HARD demonstrated for Singapore, see Table 5.

Table 5. Coding Example for L5.HARD: Singapore

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0	0	0	0	0	0	0	1	1	1	1

Countries that ratified a FTA with hard enforcement mechanism prior to the period of analysis 2002 until 2012, were coded correspondingly depending on the year of ratification. For instance, Canada ratified a FTA with the USA already in 1994. Therefore, L3.HARD for Canada is coded with one in all years 2002 until 2012.

When analyzing the effect for soft enforcement mechanisms after at least three years and after at least five years, respectively, L3.HARD and L5.HARD were replaced by L3.SOFT and L5.SOFT. They are coded according to the same system as L3.HARD and L5.HARD, but for countries that have ratified a FTA with soft enforcement mechanism.

4.3.3 Validity Check

To make sure, that the results are valid, the above regressions equations ((1), (2), (3)) were run again, excluding the USA from the sample of countries that were party to a FTA with hard enforcement mechanism and the EU member states from those countries that have ratified a FTA with soft enforcement mechanism.

This was done because an inclusion of these countries could yield a biased estimation of the effect of FTAs with environmental provisions guaranteed through soft and hard enforcement mechanism for the following reasons:

First, as both the EU and the USA are global leaders when it comes to the export and import levels (Central Intelligence Agency, 2013), their negotiation power can be assumed to be higher. This might imply that the environmental standards of the EU and USA were taken as a yardstick in the formulation of the FTA. As a consequence, they would have met the requirements already before the ratification of the FTA and therefore, there would be little reason to believe that the ratification caused any additional positive change in the EPI of these countries. To include the EU member states and USA might result in an underestimation of the effect of ratifying a FTA with environmental provisions with soft or hard enforcement mechanisms.

Secondly, both the EU and the USA have officially taken up the cause of promoting sustainable development beyond their borders via trade (see chapter 4.2.3.1 of this thesis). This implies a certain willingness to commit to environmental protection independently of whether any FTA was ratified. As a consequence, the potentially high level of EPI in the USA or EU member states might have been set before and cannot be attributed to the ratification of the first FTA. In that case, the effect of ratification of a FTA with different enforcement mechanisms would be overestimated.

Other than the sample size nothing had been changed on the equations compared to the case where the EU member states and USA were included in the sample of treated countries.

After having reviewed and controlled for potential biases, the research design and empirical models as described in this chapter 4., were applied to assess the short- and long-term effects of FTAs with environmental provisions that differ in enforcement mechanisms.

5. Analysis

In this section, the data is described in more detail before the results of the different regression models are presented.

5.1. Descriptive Statistics

Table 6. displays the summary statistics that include the mean, standard deviation, minimum and maximum of the dependent and independent variables. The variables of EPI, GDP per capita, trade, population, CO_2 emissions have been transformed with the natural logarithm[9] to approximate them to a normal distribution. As CO_2 emissions include values of zero, a small constant (0.0001) was added before the data was transformed.

Table 6. Descriptive Statistics

VARIABLE	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
EPI	49.89431	16.31867	16.16	88.79
GDP per capita in constant US$	12,387.14	18,021.48	219.2	111,968.3
GDP GROWTH	4.305374	4.649653	-17.7	38
TRADE	89.56264	49.25347	.2	439.7
POPULATION	3.75e+07	1.38e+08	19,575	1.35e+09
FREEDOM STATUS	3.370205	1.914915	1	7
CO2 EMISSIONS in metric tons per capita	4.878928	6.753768	0	64.5

Source: See Table 13. in Appendix. Calculations and Depiction: Author's own.

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[9] Table 6. depicts the values prior to the transformation.

5.2 Results

In the analysis, the above specified regression models were applied to the data to distinguish between countries that have ratified FTAs with hard and soft enforcement mechanisms. Subsequently, some robustness checks were conducted to rule out that the results were biased or driven by particular cases.

5.2.1 Effect on EPI: Hard Enforcement Mechanism

In the theoretical chapter, the following hypothesis concerning FTAs with hard enforcement mechanisms was derived:

> H1: The level of environmental performance of states being part of a FTA with hard enforcement mechanisms, remains the same in the short- and long-term after ratification.

If this hypothesis was correct, the analysis of the effect of having ratified a FTA with hard enforcement mechanisms on the environmental performance of countries i.e. the EPI, should not reveal any statistically significant effect when looking at the short-term effect after one year after ratification or at the long-term effect when a FTA has been in force for at least three or five years. Table 7. depicts the results of testing this hypothesis with the specified empirical model.

In Model 1, in the first column of Table 7., the hard enforcement variable indicates the average effect on the EPI, if a country has ratified a FTA with hard enforcement mechanism compared to countries that have not ratified a FTA with the same enforcement mechanism, independently of the years since ratification. The results indicated no statistically significant effect (p-value > 0.1).

Short-term and long-term effects of ratified FTAs with a hard enforcement mechanism were analyzed with model 2, 3 and 4. Model 2 tested the short-term effect which is the average effect on EPI one year after ratification. Having ratified a FTA with hard

enforcement mechanism is not associated with statistically significant decrease or increase in the EPI (p-value > 0.1).

The long-term effect was evaluated by analyzing the effect of ratification with a delay of three and five years. Model 3 tested the effect when a FTA was in place for at least three years. The finding is not statistically significant (p-value > 0.1). There was neither any statistically significant effect when a FTA has been in force for at least five years (Model 4; p-value > 0.1).

As for the control variables, the coefficient of GDP per capita indicates a positive and significant relationship with the EPI (p-value < 0.01), suggesting that if a country's per capita wealth increases by one percent in one year this is correlated with a 0.156 percentage point higher EPI[10]. GDP growth does not show a statistically significant effect on the environmental performance of a country (p-value > 0.1). A one percent increase in trade is found to be related with an increase in EPI by 0.035 percentage points, suggesting that the overall effect of trade on the environment is positive (p-value < 0.05). Total population is positively correlated with the EPI. An increase in population by one percent is correlated with an EPI that is higher by 0.014 percentage points (p-value < 0.1). The fact that these results do not confirm the assumption that an increasing population worsens environmental degradation might be explained by the relatively short time frame of this analysis. It is possible that negative impacts are only perceivable over several decades. The coefficient of the freedom status of a country indicates that the less political and civil rights are guaranteed in a country i.e. an increase by one unit in the Freedom status of a country, is associated with a EPI that is lower by 1.9 percentage points (p-value < 0.05). The analysis reveals that an increase of CO_2 emissions per capita by one percent are correlated with a statistically significant increase in EPI by approximately 0.023 percentage points (p-value < 0.01). This suggests that the worsening in one dimension of the environment (here emission of CO_2) does not have to be correlated with an overall increase in environmental degradation. This finding however could also stem from the fact that CO_2 emissions are slightly correlated with the wealth

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[10] The results of the control variables differ only marginally between Model 1-4. Therefore, the reported results are rounded to three decimal places.

of a country, which is in turn associated with a higher EPI as indicated by the coefficient of GDP per capita.

In summary, the statistical analysis confirmed the hypothesis that a ratified FTA with hard enforcement mechanism does not lead to significant changes in the environmental performance of a country neither in the short-run (one year later), nor in the long-run (at least three to five years later). In addition, the analysis revealed that having ratified a FTA with hard enforcement mechanism is not correlated with a statistical significant change in the EPI, when not distinguishing between short- and long-term effects.

Table 7. Results: Hard Enforcement Mechanism

	Model 1	Model 2	Model 3	Model 4
Hard Enforcement	0.0278 (0.0320)			
After One Year		0.0409 (0.0400)		
At least Three Years			0.0215 (0.0335)	
At least Five Years				0.00462 (0.0360)
More than One Year (categorical)		0.0250 (0.0329)		
GDP per capita in constant US$ (ln)	0.156*** (0.0139)	0.156*** (0.0139)	0.156*** (0.0139)	0.157*** (0.0139)
GDP Growth in % of GDP	-0.00202 (0.00186)	-0.00201 (0.00186)	-0.00198 (0.00186)	-0.00201 (0.00186)
Trade in % of GDP (ln)	0.0351** (0.0159)	0.0351** (0.0159)	0.0352** (0.0160)	0.0352** (0.0160)
Population in total (ln)	0.0138* (0.00786)	0.0138* (0.00787)	0.0139* (0.00787)	0.0142* (0.00789)
Freedom Status of a Country	-0.0187** (0.00893)	-0.0188** (0.00893)	-0.0188** (0.00892)	-0.0189** (0.00892)
CO_2 emissions in metric tons per capita (ln)	0.0233*** (0.00757)	0.0233*** (0.00758)	0.0234*** (0.00757)	0.0233*** (0.00758)
Constant	2.229*** (0.211)	2.228*** (0.211)	2.225*** (0.212)	2.219*** (0.213)
Observations	1898	1898	1898	1898
R^2	0.742	0.742	0.742	0.742
F	81.70	71.65	81.46	81.61
Residual Degrees of Freedom	172	172	172	172

Standard errors clustered at the country level in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

However, as elaborated upon in chapter 4.2.1 of this thesis, there are some countries that have ratified both, FTAs with hard and soft enforcement mechanisms or twice a FTA with soft or hard enforcement mechanism, for instance Jordan and Chile. It is conceivable that the potential effects on EPI might no longer be attributable to one FTA only. To make sure that these particular cases did not bias the resulting coefficients, regressions were run excluding these ambiguous countries. Notably, the resulting coefficients are smaller in magnitude, but remain not to be statistically significant (p-value > 0.1) (see Table 14. in the Appendix of this thesis).

5.2.2 Effect on the EPI: Soft Enforcement Mechanism

Based on the theory of soft enforcement, the following hypothesis was formulated:

H2: The level of environmental performance of states being part of a FTA with soft enforcement mechanisms, increases in the long-term after ratification.

If this hypothesis is correct, the analysis of the data should indicate a positive correlation between soft enforcement mechanisms in place and the EPI in the long-term. This change in EPI should be statistically significant and increase in magnitude over time.

Table 8. illustrates the findings of testing hypothesis H2 with the specified empirical model.

Model 1 in Table 8. shows the average effect of a ratified FTA with soft enforcement mechanism on a country´s EPI, holding all other factors constant. Notably, the EPI increases significantly in countries with ratified FTAs with soft enforcement mechanism by 6.30 percentage points, compared to other countries with no ratified FTAs or with FTAs with hard enforcement mechanisms (p-value< 0.05).

Next, it was tested, whether the magnitude of the effect in the short-term stayed stable or if one year after ratification of a FTA, this is correlated with a change in the trading country's EPI (Model 2). In the short-term, having ratified a FTA with soft enforcement mechanism is not associated with statistically significant effect on the EPI (p-value >0.1; Model 2).

It was further analyzed whether the effect was significant in the long run. When a FTA with soft enforcement mechanism has been ratified for at least three years (Model 3) the EPI is significantly higher (raise by 6.45 percentage points, p-value<0.01) compared to countries that have no similar FTA in place. The positive effect of having ratified a FTA with soft enforcement mechanism on the EPI at least five years after ratification, amounts to 7.53 percentage points (Model 3, p<0.01). The increase of 6.45 percentage points when considering the time after at least three years after ratification, and of almost 7.53 percentage points after at least five years after ratification is substantial.

Overall, these findings confirmed the hypothesis that the ratification of a FTA with environmental provisions with soft enforcement mechanism is associated with a significant increase in the environmental performance of a country, i.e. the EPI, in the long-run. In the short-term, having ratified a FTA with soft enforcement mechanism is not related to a significant change in EPI.

The coefficients of the control variables have the same sign and do not differ greatly in magnitude compared to the analysis of hard enforcement mechanisms (Table 7.). The only differences when analyzing the effect of soft enforcement mechanisms compared to hard enforcement mechanism, are that the coefficient of the population variable is no longer statistically significant (p-value > 0.1) and that the control variables for trade and Freedom status of a country become less significant (p-value < 0.1).

Table 8. Results: Soft Enforcement Mechanism

	Model 1	Model 2	Model 3	Model 4
Soft Enforcement	0.0630***			
	(0.0233)			
After One Year		0.0418		
		(0.0293)		
At Least Three Years			0.0645***	
			(0.0228)	
At Least Five Years				0.0753***
				(0.0255)
More than one year (categorical)		0.0648***		
		(0.0233)		
GDP per capita in constant US$ (ln)	0.151***	0.151***	0.150***	0.149***
	(0.0142)	(0.0143)	(0.0145)	(0.0148)
GDP Growth in % of GDP	-0.00125	-0.00122	-0.00126	-0.00119
	(0.00186)	(0.00186)	(0.00186)	(0.00187)
Trade in % of GDP (ln)	0.0308*	0.0309*	0.0310*	0.0306*
	(0.0158)	(0.0158)	(0.0158)	(0.0157)
Population in total (ln)	0.0126	0.0122	0.0117	0.0109
	(0.00781)	(0.00779)	(0.00776)	(0.00770)
Freedom Status of a Country	-0.0155*	-0.0158*	-0.0164*	-0.0168*
	(0.00905)	(0.00903)	(0.00900)	(0.00896)
CO_2 emissions in metric tons per capita (ln)	0.0239***	0.0243***	0.0247***	0.0254***
	(0.00752)	(0.00760)	(0.00771)	(0.00785)
Constant	2.280***	2.294***	2.307***	2.335***
	(0.216)	(0.217)	(0.217)	(0.218)
Observations	1898	1898	1898	1898
R^2	0.746	0.746	0.745	0.746
F	84.24	85.89	89.44	93.57
Residual Degrees of Freedom	172	172	172	172

Standard errors clustered at the country level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

Just like in the case of FTAs with hard enforcement mechanism, a robustness check was conducted to rule out that ambiguous cases caused the significant findings. Excluding countries that have ratified both, FTAs with soft enforcement mechanisms twice or once with soft and once with hard enforcement mechanisms, led to a slight reduction in the magnitude of the effect. Moreover, the long-term effect after at least three or five years after ratification were only significant at the 5% level (p-value< 0.05; see Table 15. in the Appendix). However, the overall trend is the same and statistically significant.

In most FTAs with soft enforcement mechanisms, the EU is one of the trading partners. This leads to an additional challenge, as in the period between 2002 and 2012, twelve new countries joined the EU. New EU member states were only coded as belonging to the countries that have ratified a FTA of the EU, once they officially joined to the EU. Considering the complicated and lengthy accession process for new EU countries that also encompass significant adjustments to (environmental) standards of the other EU countries (European Commission, n.d.). It is conceivable that an increase in EPI might have taken place before the official accession date. If this was the case, the effect of soft enforcement mechanism would be underestimated with the previous way of coding, as major improvements in the EPI would have taken place prior to the year of accession. To control for this, an additional regression model was derived. In this model, old and new EU member states were considered to having ratified an FTA with soft enforcement mechanism already from 2002 onwards, independently of their member state status to the EU at that time. That means, new and old EU member states were coded exactly the same throughout the period of analysis. The results are presented in Table 9.

Making no distinction between old and new member states increases coefficient values compared to the previous model, in which new and old EU member states were coded differently in the soft enforcement variable. To have a FTA with soft enforcement mechanism in place is related to an EPI that is on average 7.10 percentage points higher (p-value<0.01; Model 1, Table 9.). One year after ratification, countries that have ratified a FTA with soft enforcement mechanism are not related to a statistically significant effect in the EPI (p-value> 0.1; Model 2).

At least three years after ratification, the effect of being part of a FTA with soft enforcement mechanism is associated with an increase in EPI by 8.39 percentage points

(Model 3) and five years later by 10.00 percentage points (Model 4), keeping all other factors constant. Both results of Model 3 and 4 are statistically significant ($p<0.01$).

These findings might be an indicator that previous results, as shown in Table 8., had been downward biased by 1- 2 percentage points. It further suggests that the previous results rather represent a lower limit for the estimation of coefficients.

Table 9. Soft Enforcement Mechanism: No Difference between New and Old EU Member States

	Model 1	Model 2	Model 3	Model 4
Soft Enforcement	0.0710***			
	(0.0242)			
After One Year		-0.00165		
		(0.0442)		
At Least Three Years			0.0839***	
			(0.0240)	
At Least Five Years				0.100***
				(0.0259)
More than one year (categorical)		0.0789***		
		(0.0241)		
GDP per capita in constant US$ (ln)	0.151***	0.150***	0.149***	0.147***
	(0.0141)	(0.0142)	(0.0143)	(0.0145)
GDP Growth in % of GDP	-0.00127	-0.00135	-0.00137	-0.00135
	(0.00185)	(0.00186)	(0.00184)	(0.00184)
Trade in % of GDP (ln)	0.0299*	0.0289*	0.0281*	0.0259
	(0.0158)	(0.0158)	(0.0158)	(0.0159)
Population in total (ln)	0.0124	0.0114	0.0108	0.00954
	(0.00778)	(0.00770)	(0.00765)	(0.00751)
Freedom Status of a Country	-0.0144	-0.0140	-0.0138	-0.0132
	(0.00911)	(0.00913)	(0.00913)	(0.00912)
CO_2 emissions in metric tons per capita (ln)	0.0235***	0.0241***	0.0244***	0.0251***
	(0.00741)	(0.00747)	(0.00751)	(0.00758)
Constant	2.284***	2.313***	2.330***	2.374***
	(0.215)	(0.215)	(0.215)	(0.215)
Observations	1898	1898	1898	1898
R^2	0.747	0.748	0.748	0.750
F	84.17	82.70	88.86	92.99
Residual Degrees of Freedom	172	172	172	172

Standard errors clustered at the country level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

5.2.3 Effect on EPI: Excluding EU Member States and the USA

For the following analysis, the USA and the EU member states were excluded from the sample of countries that have ratified a FTA with hard or soft enforcement mechanism, respectively. There are several reasons why an inclusion of these countries could result in a biased estimation of the effect of the different enforcement mechanisms (For an overview of these reasons see chapter 4.3.3 of this thesis).

Given those reasons, the results presented in the following were obtained by excluding the USA from the sample of countries that have ratified a FTA with hard enforcement mechanism (Table 10.) and by excluding all old and new EU member states form the sample of countries that have ratified a FTA with soft enforcement mechanism (Table 11.).

Model 1 in Table 10. indicates that ratified FTAs with hard enforcement mechanism is not associate with a statistically significant change in a country´s EPI (p-value> 0.1). Neither there is a statistically significant effect on the EPI observable one year after ratification of a FTA with hard enforcement mechanism (p-value> 0.1; Model 2).

Model 3 and 4 depict the long-term effect. Model 3 displays the effect after at least three years after ratification and Model 4 the effect after the FTA has been ratified for at least five years. However, the results are not statistically significant (p-value > 0.1).

In conclusion, even if the USA was excluded from the sample of countries that are part of a FTA with hard enforcement mechanism, the results do not indicate a statistically significant relationship between ratification of a FTA with hard enforcement mechanism and the environmental performance of a country in the short- or long-run. Therefore, the hypothesis concerning the short- and long-term effect of hard enforcement mechanism remains confirmed.

Table 10. Hard Enforcement Mechanism: Excluding USA

	Model 1	Model 2	Model 3	Model 4
Hard Enforcement	0.0419 (0.0311)			
After One Year		0.0405 (0.0399)		
At least Three Years			0.0429 (0.0314)	
At least Five Years				0.0331 (0.0342)
More than One Year (categorical)		0.0435 (0.0311)		
GDP per capita in constant US\$ (ln)	0.157*** (0.0139)	0.157*** (0.0139)	0.157*** (0.0139)	0.157*** (0.0139)
GDP Growth in % of GDP	-0.00207 (0.00186)	-0.00204 (0.00186)	-0.00199 (0.00186)	-0.00204 (0.00186)
Trade in % of GDP (ln)	0.0324** (0.0155)	0.0324** (0.0155)	0.0326** (0.0156)	0.0328** (0.0157)
Population in total (ln)	0.0145* (0.00791)	0.0145* (0.00791)	0.0146* (0.00791)	0.0148* (0.00793)
Freedom Status of a Country	-0.0191** (0.00895)	-0.0192** (0.00894)	-0.0192** (0.00893)	-0.0193** (0.00893)
CO_2 emissions in) metric tons per capita (ln	0.0234*** (0.00765)	0.0234*** (0.00765)	0.0234*** (0.00764)	0.0234*** (0.00764)
Constant	2.224*** (0.211)	2.224*** (0.211)	2.222*** (0.211)	2.217*** (0.212)
Observations	1887	1887	1887	1887
R^2	0.742	0.742	0.742	0.742
F	82.38	72.63	82.04	81.99
Residual Degrees of Freedom	171	171	171	171

Standard errors clustered at the country level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

Table 11. illustrates the findings when EU member states were excluded from the sample of countries that have ratified a FTA with soft enforcement mechanism. The effect of a ratified FTA at a given year is no longer associated with a statistically significant effect (p-value>0.1).

The short-term effect one year after the ratification of a FTA with soft enforcement mechanism (Model 2) is not statistically significant (p-value > 0.1). Model 3 and 4 depict the long-term effect, i.e. the effect on the EPI at least three or at least five years after ratification. The long-term effect when a FTA is in place for at least three years is associated with a statistically significant increase in EPI by 7.03 percentage points (Model 3; p-value< 0.1). When a FTA with soft enforcement mechanism has been in force for at least five years, this is associated with a statically significant increase in the EPI of the partnering country by 12.60 percentage points (p-value< 0.01).

These long-term effects (Model 3 and Model 4) are of higher magnitude compared to the effect that was found when EU member states were included in the sample (see Table 8.).

To summarize, when excluding the EU member states from the sample of countries that have ratified a FTA with soft enforcement mechanism, the effect of having ratified such a FTA on the EPI increases considerably in magnitude in the long-term. Moreover, the testing does not produce statistically significant results in the short-term (one year later) or when disregarding the period a FTA has already been into force. This suggests that including EU member states in the sample led to an overestimation of the overall effect and to an underestimation of the effect in the long run. In the long-term (when defined as after at three years), the effect is still very similar in magnitude (EPI increase by 7.03 percentage points without EU member states versus EPI increase by 6.45 percentage points with EU member states), but is less statistically significant (p-value< 0.1 versus p-value<0.01 when EU member states are included in the analysis). When a FTA has been ratified for at least five years, the effect on the EPI was substantially higher (12.60 percentage points increase in EPI, p-value< 0.01), compared to the situation when EU member states were included (7.53 percentage points increase in EPI, p-value< 0.01). These findings confirm the hypothesis on a long-term increase in EPI when having ratified a FTA with soft enforcement mechanism.

Table 11. Soft Enforcement Mechanism: Excluding EU Member States

	Model 1	Model 2	Model 3	Model 4
Soft Enforcement	0.0475 (0.0376)			
After One Year		-0.000941 (0.0442)		
At Least Three Years			0.0703* (0.0392)	
At Least Five Years				0.126*** (0.0467)
More than one year (categorical)		0.0599 (0.0386)		
GDP per capita in constant US$ (ln)	0.154*** (0.0154)	0.154*** (0.0154)	0.154*** (0.0153)	0.154*** (0.0153)
GDP Growth in % of GDP	-0.00132 (0.00210)	-0.00138 (0.00211)	-0.00140 (0.00209)	-0.00139 (0.00209)
Trade in % of GDP (ln)	0.0293* (0.0162)	0.0291* (0.0162)	0.0288* (0.0162)	0.0275* (0.0162)
Population in total (ln)	0.0115 (0.00811)	0.0110 (0.00810)	0.0107 (0.00808)	0.00960 (0.00799)
Freedom Status of a Country	-0.0122 (0.00945)	-0.0123 (0.00945)	-0.0124 (0.00944)	-0.0129 (0.00940)
CO2 emissions in metric tons per capita (ln)	0.0218*** (0.00738)	0.0219*** (0.00739)	0.0219*** (0.00738)	0.0216*** (0.00734)
Constant	2.265*** (0.225)	2.276*** (0.224)	2.283*** (0.223)	2.308*** (0.223)
Observations	1601	1601	1601	1601
R^2	0.667	0.668	0.668	0.671
F	51.78	47.60	51.32	51.46
Residual Degrees of Freedom	145	145	145	145

Standard errors clustered at the country level in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

6. Discussion

This thesis studied the short- and long-term effect on the environmental performance of a country that has ratified a Free Trade Agreement (FTA) with environmental provisions depending on the enforcement mechanism in place. Two different enforcement mechanisms exist: First, coercive (hard) enforcement mechanisms with trade sanctions or monetary compensation by the infringing country. Secondly, persuasive (soft) enforcement mechanisms that provide for dialogue among stakeholders in case of non-compliance with environmental provisions. The following two hypotheses were tested:

> H1: The level of environmental performance of states being part of a FTA with hard enforcement mechanisms, remains the same in the short- and long-term after ratification.

> H2: The level of environmental performance of states being part of a FTA with soft enforcement mechanisms, increases in the long-term after ratification.

In the following, the results of this thesis are discussed in the light of the theories underpinning them and of the results of previous studies. Furthermore, the policy and theoretical implications of this study are examined and potential limitations of this thesis are revealed.

6.1 Coercion

This thesis demonstrated that environmental provisions in FTAs with hard enforcement mechanism are not correlated with a significant change in the environmental performance of a country in the short- or long-term after ratification. These findings are robust to validity checks.

Theories on coercive (hard) enforcement mechanism suggest that a potential effect of FTAs with environmental provisions and hard enforcement mechanisms should materialize without delay, as it does not require a change in preferences but simply changes the cost-benefit considerations of countries (Goodman & Jinks, 2004). In consequence, it was hypothesized that the effect of ratifying a FTA with hard

enforcement mechanism would not change significantly with the time the FTA was in force. The analysis conducted in the thesis has confirmed this hypothesis.

The fact that having ratified a FTA with hard enforcement mechanism is not correlated with a significant higher EPI, does not imply that hard enforcement mechanisms have no effect on enhancing environmental protection at all. It is conceivable that effects materialize prior to the ratification, which was not considered in this thesis. For instance, Baccini and Urpelainen (2014) have shown that developing countries adjust their emission standards in the automobile sector to those of developed countries in the time between signature and ratification of a FTA to secure that the FTA enters into force. In the case of hard enforcement mechanisms, Bastiaens and Postnikov (2014) showed that FTAs with hard enforcement mechanisms have an effect on the environmental performance of the trading countries only during the negotiation process. This significant effect was no longer observable after the signature.

In this thesis, the time prior to ratification was not included in the analysis due to limitations in the availability of data. Therefore, it is not within the scope of this thesis to draw any conclusions on the comparative effectiveness in enhancing environmental provisions depending on soft or hard enforcement mechanisms in general.

6.2 Persuasion

As for countries that have ratified a FTA with soft enforcement mechanism, the analysis revealed that there is a positive and significant correlation between the environmental performance of a country and the ratification of a FTA in the long-run. Moreover, this correlation increases in magnitude over time and is robust to validity checks. As there is reason to believe that EU member states might bias the results, they were excluded from the sample. Under this assumption, FTAs with soft enforcement mechanisms are still associated with a significant increase in EPI when the FTA has been in place for at least three and five years, but increased in magnitude. In the short-term, no significant changes in environmental performance of countries that have ratified a FTA with soft-enforcement mechanism were detected.

These findings confirm the hypothesis derived from the theories on the functioning of persuasive (soft) enforcement mechanisms that claim that effects of having ratified a FTA with soft enforcement mechanism do not translate into a significant change in the short-term. Conversely, persuasive enforcement mechanisms are rather associated with an increase of the environmental performance in the long-term. This might be because soft enforcement mechanisms aim at changing the norms and preferences of the opponent which is a lengthy process (Finnemore & Sikkink, 1998).

The significant effect of having ratified a FTA with soft enforcement mechanism is in line with the findings of previous studies. For example, it was shown that absolute air pollution level shrink in countries that are part to a FTA with environmental provisions (Martínez-Zarzoso & Oueslati, 2016; Zhou et al., 2017). However, these studies did not distinguish between different enforcement mechanisms and did not focus solely on FTAs were either the EU or the USA were partner.

Bastiaens and Postnikov (2014) focus in their study on the effect of soft enforcement. They showed that FTAs with soft-enforcement mechanism lead to a significant increase in the environmental performance of contracting partners in the time after the signature and before ratification. The fact that the analysis of this thesis revealed insignificant short-term effects might be explained by the results of the study by Baccini & Urpelainen (2014). They found empirical evidence for environmental standards being adjusted prior to the ratification to secure entry into force of the FTA. If this holds also true to FTAs with soft enforcement mechanism, it is conceivable that once entry into force is achieved, there is little incentive to continue stepping up environmental protection.

The effect that environmental performance increases significantly in the long-term can be explained by the important role of civil society in the case of environmental provisions that rely on soft enforcement mechanisms like social dialogue. Civil society actors often act as norm-entrepreneurs through organizational platforms like non-governmental organizations promoting the change of preferences and norms of policy makers (Finnemore & Sikkink, 1998). However, this is a process that takes time, which could explain the delay of some years before the effect materializes. This explanation is further supported by the findings of Bastiaens and Postnikov (2014) indicating that countries that were part of a FTA with soft enforcement mechanism and had strong civil societies are

correlated with a higher increase in environmental performance compared to countries with weak civil societies.

The fact that the positive effect of having ratified a FTA with soft enforcement on the EPI of a country is higher when EU countries were excluded from the sample could be explained if environmental provisions in FTAs were oriented towards EU standards in their formulation. If this was the case, EU member states would have met the environmental requirements beforehand, independently of the ratification of the FTA. In consequence, the inclusion of EU member states reduces the long-term effect of having ratified a FTA with soft enforcement mechanism that can be observed.

6.3 Policy and Theoretical Implications and Limitations

The motivation of analyzing the effect of FTAs with environmental provisions and soft or hard enforcement mechanism was derived from the demand for international action to combat environmental degradation. This becomes more and more important considering the severe negative impacts climate change already has and its potential future consequences (Tilman et al., 2017). FTAs coupled with environmental protection are means to channel multinational efforts to combat climate change. For this reason, this thesis studied how different enforcement mechanisms can effectively enhance environmental protection. In fact, it demonstrated that especially FTAs with environmental provisions and soft enforcement mechanisms are correlated with a significant increase in a county´s environmental performance after some years after ratification, indicating that FTAs can reduce environmental degradation.

The relevance of this study is underlined by the current political situation. The USA's declared intention in June 2017 to withdraw from the Paris accord (Shear, 2017) has demonstrated once more that political leaders do not honor commitments made in MEAs. Even in times when the urgent need for global action for the protection of the environment has not declined (Victor et al., 2014). In the face of these challenges, exploring different channels to promote environmental protection internationally is of great importance. The increase of FTAs including environmental provisions in the last two decades, illustrates that the mood of the times has been recognized by linking trade and

environment. Previous studies have revealed that there is a positive correlation between having FTAs with environmental provisions in place and an improvement of some environmental indicators (Baghdadi et al., 2013; Martínez-Zarzoso & Oueslati, 2016; Zhou et al., 2017). Moreover, it has been shown that treaty design matters (Johns & Peritz, 2015) and that a distinction between soft and hard enforcement mechanism can influence the timing and magnitude of an effect prior to ratification (Bastiaens & Postnikov, 2014). This thesis built on these previous studies and evaluated the potential effect of different enforcement mechanisms after ratification and over a longer time frame.

The results of this thesis emphasize that considering long-term effects is crucial when assessing the effectiveness of enforcement mechanisms. At least in the case of soft enforcement mechanism, a limited focus on the immediate effect would have led to an underestimation of the effect of implementing soft enforcement mechanisms.

From a theoretical point of view, the analysis of this thesis confirmed that different treaty designs can make a difference in the timing of effects after ratification of FTAs. The difference in enforcement mechanism is the most evident and probably most relevant feature that distinguishes FTAs. Notably, there is some variety in the scope of environmental provisions. When contrasting the environmental provisions of American and EU FTAs against each other, there are some common features, but also differences in their design (Jinnah & Morgera, 2013). These differences were observable between FTAs that were concluded with the USA and the EU, respectively, but also within the American FTAs and among the European FTAs. So far, little is known about why environmental provisions differ depending on the FTA. If differences in environmental provisions are due to unobservable factors that also influence the environmental performance of a country, this would impact the effect of the enforcement mechanisms. Further research is needed in this field to assess whether there is a correlation between the design of the environmental provision and the environmental performance of a country that might lead to a biased estimation of the effect of different enforcement mechanisms.

This study evaluated the effect of different enforcement mechanisms by using the EPI as the dependent variable. This was motivated by the fact that most environmental provisions do not only address one environmental issue like air pollution. The

comprehensiveness of the EPI makes sure that all aspects of the environmental provisions are covered. The alternative of using one single environmental criterion to evaluate the effect of different enforcement mechanisms might be severely biased if the conclusion of a FTA leads to a shift in the sectors of industry. This effect, also called *composition effect* (see chapter 2.1 of this thesis) can lead to a decline in one environmental dimension (e.g. air pollution) and an increase in another (e.g. soil pollution). This implies that the overall effect on the environment could not be correctly captured by a single environmental dimension as dependent variable. Therefore, the comprehensiveness of the EPI implies a more precise estimation of the overall effect on the environment.

However, the EPI has some limitations as an indicator for a state's environmental performance. Just like other indicators the EPI might suffer from a certain degree of subjectivity despite attempts to remain impartial and objective (Morse & Fraser, 2005). This manifests itself when it comes to the data and source selection, how data is scaled up to the country level and potentially manipulated in the process of calculating the index and how indicators are aggregated and weighted. This can lead to a certain bias in favor of some countries. For instance, if the index does not account for the national environmental damage that is caused by other, neighboring countries. In the field of environment this is likely to be the case. For instance, the Indonesian practice of burning forests as a cheap way of clearing land does not only cause great damage to wildlife in Indonesia (Vidal, 2015), but also has detrimental effects on the environment of its neighboring country Malaysia, which suffers from acid haze (Holmes, 2015). These critiques cannot be entirely ruled out in the case of EPI. However, to the author's knowledge there exists currently no other environmental index that equals the EPI's comprehensiveness and transparency in its methods and calculations.

Another limitation of this study is due to the fact that the USA mainly provides for hard enforcement mechanisms in their FTAs and the EU mostly for soft enforcement mechanisms. This limits the generalizability of the results. The EU and USA were chosen explicitly due to their similarities in economic power and commitment to environmental protection through trade. However, it is still possible that the difference in short- and long-term stems more from the fact that the trading partners EU and USA, are different in some unobservable factors, than from the diverging enforcement mechanism that are in place.

For instance, the fact that the long-term effect was significant when FTAs included soft enforcement mechanisms, could also be explained if the EU was stricter in scrutinizing compliance than the USA after ratification. A potential solution to rule out this bias, would be to include FTAs between countries other than the USA and the EU in the sample. However, this might create too much variety in terms of the design of enforcement mechanisms, which makes it difficult to attribute changes in environmental provisions to the feature of enforcement mechanism alone. For this reason, among other, this study focused on FTAs ratified by the USA and the EU.

From a policy point of view, the results of this thesis imply that environmental provisions in FTAs when coupled with soft enforcement mechanisms, represent a way to positively affect the environmental performance of trading partners. However, purely relying on FTAs for enhancing environmental protection might have certain drawbacks.

Firstly, it is possible that outcomes are based on an unbalanced distribution of costs and benefits. This is because there are often power asymmetries between trading partners, which gives one of the countries more negotiation power (Sherov-Ignatiev & Sutyrin, n.d.). This can eventually lead to a circumvention of principles that are crucial to MEAs like the principle of common but differentiated responsibility[11].

Secondly, as pointed out by Johns and Peritz (2015) the growing number of FTAs bears the threat of creating conflictual obligations from different bilateral and regional agreements. This complexity can lead to uncertainty and might reduce the national commitment. Global coordination and cooperation is still preferable, especially if environmental provisions in FTAs are shallow or divergent.

However, FTAs can be a sensible complement to MEAs, if environmental provisions either encompass the requirement to meet obligations made under MEAs or if they go even further in their commitment to protect the environment. In this case, compliance with

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[11] This principle was first formulated in the Rio Declaration on Environment and Development in 1992. In principle 7 of this declaration, it is stated that "states have common but differentiated responsibilities". It means that all countries share the responsibility to halt environmental degradation, but differ in their degree of responsibility, taking into consideration the economic development status of a country (The United Nations, 1992).

and effectiveness of MEAs would be ensured and one-sided outcomes would be prevented even when power asymmetries are prevalent (Morgera, 2012).

To summarize, carefully designed FTAs with environmental provisions linked to enforcement mechanisms, have great potential to lead to more ambitious commitments in the long-run and significant enhancement of the protection of the environment. In that case, FTAs with environmental provisions represent a valuable supplement to MEAs in achieving an enduring level of environmental protection.

7. Conclusion

It was the aim of this thesis, to evaluate the short- and long-term effect of Free Trade Agreements (FTAs) with environmental provisions and different enforcement mechanisms on the environmental performance of countries. More precisely, the effect of two different enforcement mechanisms were analyzed: soft (persuasive) enforcement mechanisms that rely on a discourse with stakeholders of the infringing country and hard (coercive) enforcement mechanisms that provide for trade sanctions or monetary compensation. Based on theories of compliance, it was hypothesized that hard enforcement mechanisms would not be correlated with a significant change in environmental performance in the short- or long-term. Moreover, it was hypothesized that the effect of soft enforcement mechanism would only materialize in the long-term. Short-term was defined as one year after ratification. Long-term encompassed the effects that are observable after at least three or at least five years after ratification.

The analysis has confirmed both hypotheses. FTAs with environmental provisions and soft enforcement mechanisms are associated with a significant increase in EPI in the long-run, whereas hard enforcement mechanisms do not relate to any significant effect on the environment over time. In both cases, no statistically significant changes were observed in the short-term.

These findings match the theoretical expectations and make further investigation in this field a promising undertaking from a theoretical point of view. More research is needed to understand the interplay between different designs of environmental provisions and enforcement mechanisms. Moreover, expanding the period of analysis can elucidate the overall effectiveness of soft versus hard enforcement mechanisms, taking into consideration the negotiation period, the implementation period after the signature and the time after ratification.

The analysis of the short- and long-term effects of FTAs with different enforcement mechanisms contributes to the discourse on how FTAs with environmental provisions and different enforcement mechanisms impact the environment. A better understanding of the multifaced interactions between global trade and environmental protection is highly

important nowadays as the negative consequences of climate change and environmental degradation are alarmingly accumulating. According to this study, FTAs constitute promising means to tackle that problem and contribute significantly to environmental protection.

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Picture on cover page:

[Untitled illustration of Shaking Hands between Industry and Environment] Retrieved May 30, 2017 from http://www.europeanfinancialreview.com/?p=413

Appendix

Table 12. Overview FTAs with Environmental Provisions

Year of ratification	Country	EU	USA	Hard enforcement	Soft Enforcement
1994	Mexico		X	X	
	Canada		X	X	
1998	Tunisia	X			X
1999	South Africa	X			X
2000	Israel	X			X
	Mexico	X			X
	Morocco	X			X
2002	Jordan	X			X
2004	Chile		X	X	
	Singapore		X	X	
	Egypt	X			X
	Macedonia	X			X
2005	Australia		X	X	
	Costa Rica		X	X	
	Dominican Republic		X	X	
	El Salvador		X	X	
	Guatemala		X	X	
	Honduras		X	X	
	Nicaragua		X	X	
	Chile	X		X	
	Algeria	X			X
2006	Bahrain		X	X	
	Morocco		X	X	
2008	Antigua and Barbuda	X			X
	The Bahamas	X			X
	Barbados	X			X
	Belize	X			X
	Dominica	X			X
	Grenada	X			X
	Guyana	X			X
	Jamaica	X			X
	Saint Lucia*	X			X
	Saint Vincent and the Grenadines*	X			X
	Saint Kitts and Nevis*	X			X
	Surinam	X			X

	Trinidad and Tobago	X			X
	The Dominican Republic	X			X
2009	Oman		X	X	
	Peru		X	X	
	Albania	X			X
2010	Jordan	X			X
	Montenegro	X			X
2012	Colombia		X	X	
	Panama		X	X	
	South Korea		X	X	
	Madagascar	X			X
	Mauritius	X			X
	The Seychelles	X			X
	Zimbabwe	X			X

*These countries were excluded from the analysis as the EPI for these countries was not available.

Source:

Office of the United States Trade Representative. (2017). Free Trade Agreements. Retrieved February 3, 2017 from https://ustr.gov/trade-agreements/free-trade-agreements.

European Commission. (2017). Directorate General Trade- Agreements. Retrieved February 2, 2017 from http://ec.europa.eu/trade/policy/countries-and-regions/agreements/. Depiction: Author's own.

Table 13. Source of Data

Variable	Source
EPI	Yale University. (2017). 2014 EPI Indicator Scores and Backcasted Data (2002-2012). Retrieved February 11, 2017 from www. epi.yale.edu
GDP per capita in constant 2010 US$	World Bank. (2017). Created from: World Development Indicators. Series: GDP per capita (current US$). Retrieved February 15, 2017 from www.databank.worldbank.org.
GDP Growth in % of GDP	World Bank. (2017). Created from: World Development Indicators. Series: GDP growth (annual %). Retrieved February 15, 2017 from www.databank.worldbank.org.
Trade in % of GDP	World Bank. (2017). Created from: World Development Indicators. Series: Trade (% of GDP). Retrieved February 15, 2017 from www.databank.worldbank.org.
Population in total	World Bank. (2017). Created from: World Development Indicators. Series: Population, total. Retrieved February 15, 2017 from www.databank.worldbank.org.
Freedom Status of a country	Freedom House. (2017). Country Statuses Distribution, 1972-2016. Retrieved February 17, 2017 from https://freedomhouse.org/report-types/freedom-world.
CO_2 Emissions in metric tons per capita	World Bank. (2017). Created from: World Development Indicators Series: CO2 emissions (metric tons per capita). Retrieved February 15, 2017 from www.databank.worldbank.org.

Table 14. Hard Enforcement Mechanism: Excluding Ambiguous Cases

	Model 1	Model 2	Model 3	Model 4
Hard Enforcement	0.0139			
	(0.0390)			
After One Year		0.0139		
		(0.0471)		
At least Three Years			0.0135	
			(0.0420)	
At least Five Years				-0.000547
				(0.0459)
More than One Year (categorical)		0.0147		
		(0.0408)		
GDP per capita in constant US$ (ln)	0.158***	0.158***	0.158***	0.158***
	(0.0139)	(0.0139)	(0.0139)	(0.0139)
GDP Growth in % of GDP	-0.00211	-0.00210	-0.00209	-0.00211
	(0.00188)	(0.00188)	(0.00188)	(0.00188)
Trade in % of GDP (ln)	0.0332**	0.0332**	0.0333**	0.0332**
	(0.0159)	(0.0159)	(0.0159)	(0.0159)
Population in total (ln)	0.0136*	0.0136*	0.0136*	0.0138*
	(0.00789)	(0.00789)	(0.00789)	(0.00790)
Freedom Status of a Country	-0.0191**	-0.0191**	-0.0191**	-0.0192**
	(0.00901)	(0.00901)	(0.00900)	(0.00900)
CO2 emissions in metric tons per capita (ln)	0.0223***	0.0223***	0.0223***	0.0222***
	(0.00750)	(0.00750)	(0.00750)	(0.00750)
Constant	2.227***	2.227***	2.226***	2.222***
	(0.212)	(0.212)	(0.213)	(0.213)
Observations	1843	1843	1843	1843
R^2	0.745	0.745	0.745	0.745
F	81.95	72.11	81.70	81.89
Residual Degrees of Freedom	167	167	167	167

Standard errors clustered at the country level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.

Table 15. Soft Enforcement Mechanism: Excluding Ambiguous Cases

	Model 1	Model 2	Model 3	Model 4
Soft Enforcement	0.0567** (0.0246)			
After One Year		0.0330 (0.0306)		
At Least Three Years			0.0600** (0.0241)	
At Least Five Years				0.0678** (0.0269)
More than one year (categorical)		0.0594** (0.0245)		
GDP per capita in constant US$ (ln)	0.153*** (0.0142)	0.152*** (0.0144)	0.152*** (0.0145)	0.150*** (0.0149)
GDP Growth in % of GDP	-0.00146 (0.00187)	-0.00141 (0.00188)	-0.00144 (0.00188)	-0.00139 (0.00189)
Trade in % of GDP (ln)	0.0299* (0.0159)	0.0299* (0.0158)	0.0299* (0.0158)	0.0300* (0.0158)
Population in total (ln)	0.0125 (0.00785)	0.0121 (0.00783)	0.0117 (0.00780)	0.0110 (0.00775)
Freedom Status of a Country	-0.0158* (0.00925)	-0.0161* (0.00922)	-0.0165* (0.00918)	-0.0168* (0.00916)
CO_2 emissions in metric tons per capita (ln)	0.0230*** (0.00749)	0.0234*** (0.00757)	0.0237*** (0.00766)	0.0244*** (0.00780)
Constant	2.274*** (0.216)	2.287*** (0.217)	2.300*** (0.217)	2.322*** (0.218)
Observations	1843	1843	1843	1843
R^2	0.748	0.747	0.747	0.748
F	85.23	89.76	91.84	98.22
Residual Degrees of Freedom	167	167	167	167

Standard errors clustered at the country level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: Data see Table 13. in the Appendix. Calculations and Depiction: Author's own.