ORIGINAL ARTICLE

The World Economy WILEY

Kick-starting diffusion: Explaining the varying frequency of preferential trade agreements' environmental provisions by their initial conditions

Jean-Frédéric Morin[1] [iD] | Dominique Blümer[2,3] | Clara Brandi[3] | Axel Berger[3]

[1]Political Science, Universite Laval, Quebec City, Canada

[2]Eidgenossische Technische Hochschule Zurich Center of Economic Research, Zurich, Switzerland

[3]German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE), Bonn, Germany

1 | INTRODUCTION

Recent preferential trade agreements (PTAs) include ever more far-reaching provisions on environmental protection (Lechner, 2016; Milewicz, Hollway, Peacock, & Snidal, 2016; Morin, Dür, & Lechner, 2018). Such PTA provisions do not just appear in the form of exceptions to trade commitments for environmental purposes, modelled on article XX of the General Agreement on Tariffs and Trade (GATT). Rather, they include specific prescriptions, requiring states to adopt high environmental standards. Some of these provisions address specific environmental issues, such as the protection of fish stocks, deforestation and the mitigation of CO_2 emissions. Other environmental provisions promote the harmonisation of environmental policies, encourage trade in environmental goods, reinforce multilateral environmental agreements (MEAs) or call for the transfer of green technologies to developing countries. Modern PTAs also include various instruments to support the implementation of these environmental provisions, ranging from intergovernmental committees to binding dispute settlement mechanisms.

Negotiators rarely reinvent the wheel when integrating environmental provisions in new PTAs. Most of the time, they copy environmental provisions that have been included in their earlier PTAs, their trading partners' PTAs or even third countries' PTAs (Allee & Elsig, 2016; Alschner, Seiermann, & Skougarevskiy, 2017; Baccini, Dür, & Haftel, 2015). For example, while the Trans-Pacific Partnership concluded in 2015 entails a record number of environmental provisions, only one of them, on fisheries, is really a new provision (Morin, Pauwelyn, & Hollway, 2017).[1] All the other provisions included in the 26-page-long chapter devoted to the environment were duplicated from previous PTAs.

---

[1]Due to the withdrawal of the USA from the agreement, the other 11 signatories signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership. The main text, including the environmental provisions, of the new agreement remains largely unchanged.

This uncoordinated spread of similar policy models among interdependent political units is often referred to as policy diffusion (e.g., Elkins & Simmons, 2005). Consider the following diffusion of a provision that states that certain MEAs shall prevail over the trade agreement in case of legal inconsistency. This provision was first introduced in the trade system with the conclusion of the North American Free Trade Agreement (NAFTA) in 1992 (Article 104). It was subsequently replicated in dozens of trade agreements, including in PTAs that involve none of the NAFTA partners, such as the 2008 agreement between ASEAN and Japan.

While some environmental provisions were duplicated in more than 100 PTAs, other environmental provisions are only rarely included in subsequent PTAs or are unique to only one PTA (Morin & Gauthier-Nadeau, 2017). For example, the requirement to ratify the Montreal Protocol on the Ozone Layer is unique to the 1993 agreement establishing the Common Market for Eastern and Southern Africa. No other PTA has replicated this requirement. This paper addresses this puzzle and investigates why certain environmental provisions diffuse more than others.

Explaining the diffusion of environmental provisions in PTAs matters for several reasons. First, a number of studies suggest that the inclusion of environment-related content in PTAs is linked to improved environmental performance (Baghdadi, Martinez-Zarzoso, & Zitouna, 2013; Bastiaens & Postnikov, 2017; Jinnah & Lindsay, 2016; Martinez-Zarzoso, 2018). Thus, understanding the conditions of their diffusion matters for those who care about environmental performance and would like to see more of these provisions diffusing into the trade regime. Second, it is important to study the diffusion of environmental provisions in order to better understand how the increasingly fragmented trade governance architecture remains coherent and relatively ordered (Biermann, Pattberg, van Asselt, & Zelli, 2009). While the entropic forces that contribute to fragmentation are relatively well known, including coalitions obstructing multilateralism and power asymmetries fuelling bilateralism, the forces that glue the trade regime together and prevent it from falling into a regulatory chaos are less well understood. Third, it is necessary to understand under which conditions environmental provisions diffuse in order to assess the prospect and the legitimacy of a potential future multilateralisation of environmental provisions (Morin, Brandi, & Berger, 2019). If the diffusion of environmental provisions is driven merely by powerful countries taking advantage of asymmetrical power relations, then their multilateralisation might be viewed as a hegemonic enterprise. If the diffusion of environmental provisions is instead driven by environmental leaders, then the fragmentation of trade governance could be regarded as productive from the perspective of environmental protection.

In this paper, we hypothesise that the initial conditions under which provisions first emerge in the trade system determine the scope of their diffusion. In doing so, this paper makes two key contributions to current scholarship. First, the existing literature on trade negotiations tends to explore the diffusion of PTAs in general or the diffusion of certain PTA models. We depart from this literature by analysing the diffusion of specific provisions. This fine-grained analysis allows us to offer micro-level insights that are distinct—but related—to the more macro-diffusion of PTA models and PTAs in general.

Second, most of the literature on policy diffusion tries to explain how the process of diffusion takes place and assesses the explanatory power of different causal mechanisms (Gilardi, 2013). Elkins and Simmons (2005), for example, make it clear that they study the process of diffusion, not its outcome. We take a different but complementary approach by investigating why certain provisions diffuse more often than others rather than how provisions are diffusing. Our aim is to explain the diffusion outcome, not document the diffusion process.

The remainder of this paper is structured as follows. Section 2 provides a review of the relevant strands of literature. Section 3 outlines hypotheses about the determinants of diffusion outcomes.

Section 4 contains a description of the data and methodology used for the empirical analysis. Section 5 presents our findings on the determinants of diffusion outcomes, and Section 6 undertakes some sensitivity analysis to assess the robustness of the results. Section 7 concludes and discusses the contributions of this research.

2 | INSTITUTIONAL DESIGN, INTERACTION AND DIFFUSION

This paper builds on three distinct strands of literature. First, it contributes to the literature on the design of PTAs (e.g., Baccini, Dür, & Elsig, 2015; Bearce, Eldredge, & Jolliff, 2016; Büthe & Milner, 2014; Hafner-Burton, 2009). In earlier studies, PTAs were grouped by whether they favour deep or shallow commitments (Dür, Baccini, & Elsig, 2014), positive or negative integration (Kim & Manger, 2016) and WTO-plus or WTO-extra obligations (Horn, Mavroidis, & Sapir, 2010; Kohl, Brakman, & Garretsen, 2016). This paper looks more specifically at environmental provisions as an increasingly important subset of PTA design features. Figure 1 plots the number of PTAs signed since 1947 as well as the average number of environmental provisions per agreement. The importance of environmental provisions becomes evident since the 1990s, with a sharp increase in the most recent decades.

Some studies have already documented the incorporation of environmental provision as an increasing feature of PTA design. Many of these studies analyse the design of only a small and unrepresentative sample of PTAs (Bastiaens & Postnikov, 2017; Jinnah & Morgera, 2013; OECD, 2007). Those that have looked at a more comprehensive collection of PTAs ask why PTAs include environmental provisions and do not offer any explanation why some provisions diffuse more often than others (Lechner, 2016; Milewicz et al., 2016; Morin et al., 2018).
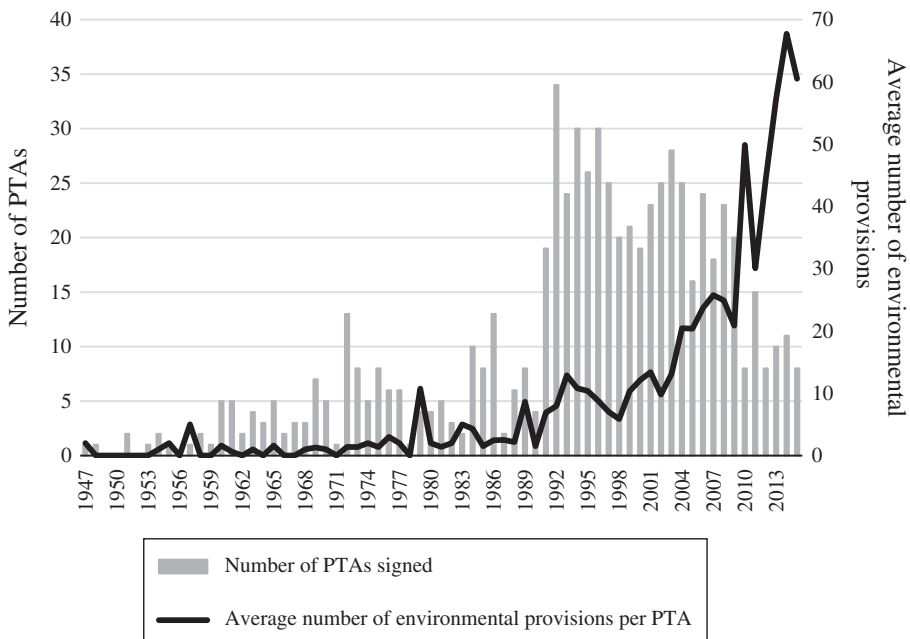

FIGURE 1   Average number of environmental provisions per agreement

The second strand of scholarship informing this paper is on institutional interactions. This literature argues that international agreements are not negotiated in an institutional vacuum and do not develop in isolation from one another, as initially assumed by the earlier regime theory and some of the treaty design literature. Instead, this literature emphasises that new institutions are embedded in a broader complex and interact with each other (Keohane & Victor, 2011; Raustiala & Victor, 2004).

The relation between the trade and the environmental regimes is one of the most puzzling and widely studied institutional interactions (e.g., Bastiaens & Postnikov, 2017; Egger, Jessberger, & Larch, 2013; Hauer & Runge, 1999; Jinnah & Morgera, 2013; Johnson, 2015; Melser & Robertson, 2005; Oberthür & Gehring, 2006; Zelli, Gupta, & van Asselt, 2013). While one might presume that trade and environmental agreements are in frequent opposition as each has adverse consequences for the other, they co-evolve with little open conflict or blatant legal incompatibility. This co-evolution occurs in part thanks to the gradual introduction of environmental provisions into PTAs, mitigating the risk of legal conflict. These provisions include exceptions to specific trade commitments to fulfil the requirement of an environmental agreement, the appointment of environmental experts to assist trade arbitrators, and the explicit prevalence of a set of environmental agreements over an entire trade agreement. Yet, some of these rules are not widely replicated and it remains unclear how they can further diffuse in the trade system to increase the predictability of these institutional interactions.

The third main source of inspiration for this paper is the policy diffusion literature. Much of this literature focuses on the processes driving the diffusion of policies from one country to another. These processes can be grouped into four main categories, namely coercion, competition, learning and emulation (Dobbin, Simmons, & Garrett, 2007; Elkins & Simmons, 2005; Gilardi, 2013). Studies have assessed the explanatory power of these processes to account for the diffusion of environmental (Tews, Busch, & Jörgens, 2003) and trade policies (Simmons & Elkins, 2004). Several contributions to this literature claim that characteristics of the source or the adopting actor make diffusion more or less likely (Fay & Wenger, 2016; Gilardi, 2010; Makse & Volden, 2011; Martin, 2010; Meseguer, 2006; Neumayer & Plümper, 2012; Shipan & Volden, 2008).

Yet, this paper adds to the policy diffusion literature in different ways. Most studies ask how policies diffuse rather than why certain policies diffuse more often than others. As such, they look at cases of successful diffusion, rather than cases with varying degrees of diffusion. Also, diffusion experts tend to look at international treaties as part of the causal process driving diffusion from one domestic legal system to another, but not as the original source nor the final destination of the diffusion process, as this paper does.

In short, this paper speaks to the treaty design literature by seeking to explain the frequency of certain treaty provisions, to the institutional interaction literature by building on the assumption that some earlier treaties influence the content of later ones, and to the policy diffusion literature by studying the conditions that can kick-start a diffusion process.

Other studies have blended similar strands of literature. Building on the policy diffusion and institutional interaction literature, some studies explain the dyadic presence or the absence of a PTA between two countries by a contagion effect, by which countries are induced to sign an agreement if their neighbours or their peers have previously signed a similar agreement (Baccini & Dür, 2012; Baldwin & Jaimovich, 2012; Chen & Joshi, 2010; Egger & Larch, 2008; Tobin & Busch, 2010). These studies, however, tend to ignore the design of PTAs and assume that all PTAs are similar. Only recently have studies implemented a finer grained level of investigation, thanks to new databases offering more specific information on the content of PTAs. For example, Milewicz et al. (2016) explain the diffusion of comprehensive PTAs addressing non-trade issues by network pressures created by earlier PTAs. This

paper privileges an ever-finer grain of analysis. Rather than studying the diffusion of PTAs in general or the diffusion of certain models of PTAs, it looks at what drives the diffusion of specific provisions.

Digging into a fine-grained level of analysis is important to understand trends at higher levels of analysis. Research can be conducted at the macro-level of a treaty (e.g., sign or not sign), the meso-level of a treaty class (e.g., negative or positive integration) or the micro-level of specific provisions (e.g., the inclusion of the precautionary principle or not). Competition between various models of PTAs at the meso-level can fuel the proliferation of PTAs in general at the macro-level. In turn, we can assume that competition among PTA models is fuelled by the diffusion of some specific provisions at the micro-level.

Other recent studies at this micro-level have looked at the diffusion outcomes of a few specific PTA provisions. For example, Kim and Manger (2016) and Pelc (2016) studied diffusion of exceptions to service liberalisation and escape clauses, respectively. They found that strong path dependence explains the success of the most widely diffused provisions. In contrast to these studies, however, we do not focus on a few specific provisions that have successfully diffused, but we look at several different environmental provisions, some of which have widely diffused while others have not. In doing so, we hope to contribute to the uncovering of the inter-institutional determinants of diffusion outcomes in PTA design.

3 | EXPLAINING SUCCESSFUL DIFFUSION BY CONDITIONS OF EMERGENCE

We expect that the scope of diffusion of a specific environmental provision is related to the conditions of its first introduction in the trade system. This expectation is consistent with studies on policy diffusion across domestic systems (Miller, 2003) and international norms dynamics (Finnemore & Sikkink, 1998).[2] These strands of literature argue that the origin of a policy or a norm will likely impact its acceptance and its reproduction rate by making it either more appealing, more prominent or more competitive. Following this line of argument, we look at the agency as well as the institutional dimension of the emergence of an environmental provision to predict its diffusion outcome. More specifically, we expect two different types of conditions to determine the diffusion outcomes of PTA environmental provisions: (a) the characteristics of the country that first introduced them and (b) the characteristics of the agreement in which they first appeared.

First, we expect that the diffusion of environmental provisions can be explained by characteristics of the innovating country that first introduced it in a PTA. We believe that two characteristics of the innovating country matter. The first is its bargaining power. Whether through imperialistic, coercive or knowledge-based means, the stream of diffusion usually proceeds from the most powerful actor to the least powerful one (Ikenberry & Kupchan, 1990). While less powerful countries are not merely passive containers of alien norms, they do not have the same capacity to diffuse their norms globally as powerful countries do (Dobbin et al., 2007). The NAFTA agreement is a case in point. While the agreement was highly innovative, with about half of its environmental provisions being actually unprecedented, the agreement would probably not have had such an impact on the international trading system without the USA being its main architect. Many of the NAFTA environmental provisions have been replicated by the USA in its subsequent treaties with other countries, as the USA has the

---

[2]At the same time, the policy diffusion literature typically pays little attention to the initial factors that influence the diffusion (or non-diffusion) of certain policy models (Graham, Shipan, & Volden, 2013; Holzinger & Knill, 2005; Meseguer & Gilardi, 2009).

capacity to impose its template agreement on its partners. Knowing that NAFTA provisions would likely become expected standards in trade negotiations, third countries have themselves replicated these provisions in their own PTAs. Powerful countries, therefore, may have clear leverage in influencing the uptake of their novel provisions in PTAs that they themselves negotiate with a weaker partner. Moreover, we expect that the legal innovations introduced by powerful countries are more likely to attract attention and can be expected to become global standards. Third countries might want to duplicate these innovations in their own template, especially if they hope to conclude a PTA with these more powerful partners in the future. Thus, our first hypothesis relating to the agency dimension is the following:

Hypothesis 1a *Environmental provisions that are first introduced by a powerful country diffuse more often than those introduced by less powerful countries.*

Second, we expect that countries with a strong environmental credibility record are more likely to see the environmental provisions that they have originally designed to be duplicated by other countries. If environmentally credible countries are considered "norm entrepreneurs," they might prompt other countries to take up their standards (Finnemore & Sikkink, 1998). The adoption of environmental provisions by environmentally credible countries sends a signal to other countries about the importance and the expected effectiveness of such a policy innovation. Countries that want to improve their own environmental credibility are likely to emulate countries they perceive to be the most credible. For example, the European Union, which is seen as a credible player on climate change policy, has recently announced that it will systematically include a reference to the Paris Agreement in its future trade agreements (Stone, 2018). This will likely set a new standard in trade negotiations for countries that care about climate change. Therefore, our second hypothesis relating to agency is the following:

Hypothesis 1b *Environmental provisions that are first introduced by a country with a good environmental record diffuse more often than those introduced by countries with a weak record.*

A second set of hypotheses puts the spotlight on the institutional characteristics of PTAs in which the environmental provision was first included. One expectation is that negotiators are likely to duplicate the provisions that they know best or that are closest to them. As DiMaggio and Powell (1983) point out, the proliferation of institutions provides negotiators with strong incentives to favour "institutional isomorphism." By duplicating existing provisions, they have already endorsed, negotiators can rationalise their limited resources while engaging in simultaneous negotiations, and they can reduce transaction and management costs that arise from the supervision of several negotiations (Allee & Elsig, 2016). Other studies have found that the number of entities that have previously adopted a policy influences the subsequent uptake by other entities (Levi-Faur, 2002). We therefore expect that the more countries have signed up to a certain design feature, the stronger the signal is that is sent to the other countries that have not yet adopted this policy.

Hypothesis 2a *Environmental provisions diffuse more often if they were first introduced by a PTA with a large number of parties.*

The policy diffusion literature shows that countries often adopt the policies of other countries from their region (Simmons, Dobbin, & Garrett, 2008; Weyland, 2005). For example, if a Caribbean country signed up to a set of specific environmental provisions, then other Caribbean countries may conclude that these provisions are also acceptable or even helpful given their specific needs, capacities

and preferences. This might explain that the literature on network analysis (e.g., Cao, 2010; Hollway & Koskinen, 2015) and the literature on contagion (Baccini et al., 2015; Baccini & Dür, 2012; Baldwin & Jaimovich, 2012; Chen & Joshi, 2010; Egger & Larch, 2008) have found that that cross-regional agreements can better pollinate different regions. Insofar as countries are induced to sign an agreement if their neighbours have previously signed a similar agreement, cross-regional PTAs are more likely to pollinate more than one region. We can expect that the inclusion of certain provisions in intercontinental agreements sends out a stronger signal to other countries within the regions involved, by drawing more attention to the content of these agreements, making these pieces of information more readily available for policy learning (Poulsen, 2014). Moreover, when countries from more than one region with varying social, economic, cultural and ecological conditions are involved in the introduction of a new provision, this consensus makes the relevant provisions more likely to be of interest for and accepted by many—and thus likely diffuse successfully.

Hypothesis 2b *Environmental provisions that are first introduced in an intercontinental PTA diffuse more often than those introduced in PTAs that entail only parties from one region.*

4 | DATA, METHODOLOGY AND DESCRIPTIVE STATISTICS

Our analysis relies on the TREND data set (Morin et al., 2018). This comprehensive data set covers 685 trade agreements signed between 1945 and 2016 and identified by the Design of Trade Agreements (DESTA) project (Dür et al., 2014).[3] TREND also stands out because of its fine-grained content-based coding of 283 different environmental provisions, some of which are very common while others are found in only one or two agreements. In our analysis, we incorporate 259 provisions that are sufficiently distinct from each other to be treated as independent observations.[4]

Our dependent variable, *total diffusion*, is defined as the number of times an environmental provision is adopted in further agreements after its first introduction. Diffusion can also be defined more exclusively to cover only the adoption of a design feature in treaties concluded between third parties, not treaties involving those countries that have participated in the original development of the design feature (Elkins & Simmons, 2005). We therefore propose an alternative definition of the dependent variable, *external diffusion*, which is defined such that we count only those treaties after the provision's first introduction in which none of the innovating parties is involved.[5] For example, if a clause first appeared in the trade law system with the conclusion of NAFTA in 1992, its reproduction in the 2003 US–Chile agreement would be included in *total diffusion*, but it would not count as an occurrence of *external diffusion*. However, the reproduction of the same clause in the 2002 agreement

---

[3]The TREND data set, which supports the findings of this study, is openly available at www.trend.ulaval.ca. The dataset can also be visualized at www.TRENDanalytics.info

[4]In such cases where two related provisions depend on each other and can only occur together, we treat them as one.

[5]We assume that the policy decisions that lead to the uptake of environmental provisions are interdependent. It is unlikely that two sets of negotiators will design the same specific provision independently, a process often referred to as spurious diffusion (e.g. Braun & Gilardi, 2006: 305; Kelemen & Sibbitt, 2004). This is mainly due to the nature of our fine-grained data: we assume that spurious diffusion is unlikely with highly specific and narrowly defined design features. This is further supported by evidence that negotiators closely monitor third countries' trade agreements to find inspiration for their environmental provisions (Morin & Rochette 2017; OECD 2007).

between the European Union and Chile would be included in external diffusion, as neither the European Union nor Chile is a party to NAFTA.

Figure 2 illustrates the distribution of the independent variables. Both dependent variables, total and external diffusion, are right-skewed, indicating that a large number of provisions diffuse only a couple of times after their first introduction. We therefore opt for a count data approach in our empirical analysis of diffusion outcomes. The test for equidispersion rejects the Poisson distribution as a good fit for our data in all specifications, leading to our choice of the negative binomial.

Our data allow us to identify exactly how many times diffusion could have occurred. In our empirical analysis of (external) diffusion counts, we therefore include the number of (external) PTAs signed after the environmental provision's first introduction as the exposure variable. We use robust standard errors for all our estimations to remedy potential misspecification of the variance. As a measure for the goodness of fit, we calculate the squared correlation coefficients between the fitted and the actual counts.

The level of observation is the provision, as opposed to the agreement or the dyad in earlier studies. This means that our approach entails investigating how well we can predict the dependent variable (the diffusion counts of each provision i) by the conditions of its emergence, namely the characteristics of the country first introducing provision i and the characteristics of the agreement first introducing provision i.

In defining the innovating country for H1a and H1b, we need to make assumptions about which country was the driving force behind the introduction of a new environmental provision. We propose two alternative logics to define the innovator.[6] First, we assume that the country with the most eco-

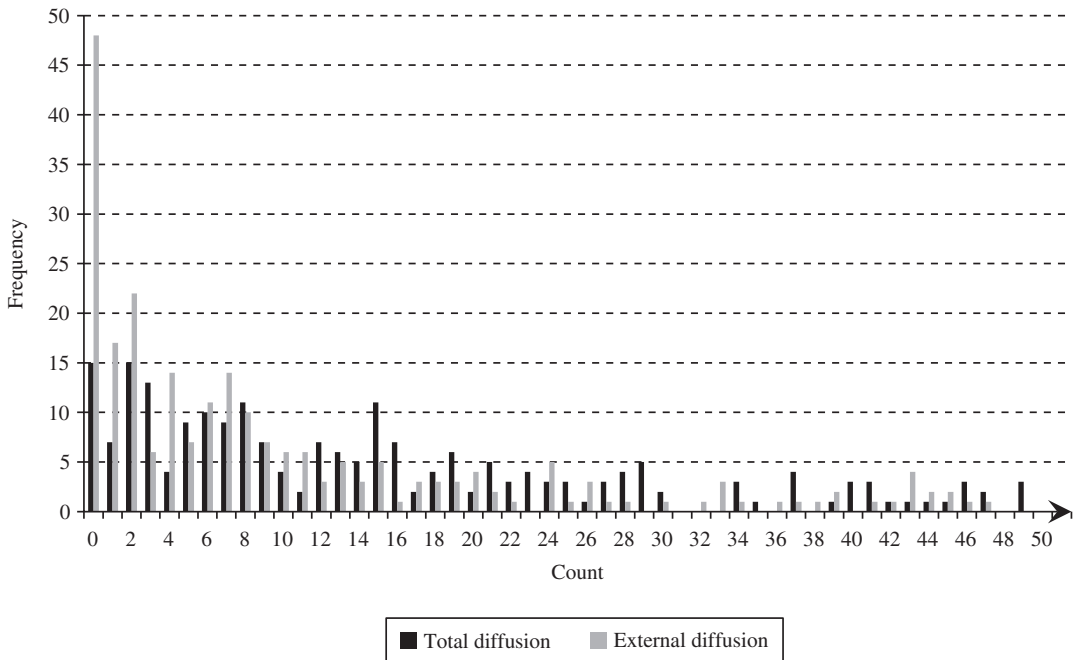**FIGURE 2** Frequency of diffusion counts

Notes: For better readability, the x-axis wasome provisions that have diffused significantly more often. For total diffusion, the mean diffusion count is 28.5, and the median is 15. For external diffusion, the mean diffusion count is 16.8, and the median is 7. Please refer to Table 1 for summary statistics of the independent and dependent variables.

TABLE 1   Descriptive statistics

Variable	Obs.	Mean	SD	Min.	Max.
Total diffusion	259	28.4672	40.1645	0	323
External diffusion	259	16.6988	27.0617	0	190
Total diffusion (excluding intra-EU)	259	27.5599	39.6976	0	323
External diffusion (excluding intra-EU)	259	16.4015	26.8784	0	190
PTAs since innovation	259	381.3398	196.1159	1	684
PTAs since innovation (excluding intra-EU)	259	375.0541	192.6196	0	670
External PTAs since innovation	259	314.9344	169.7370	0	598
External PTAs since innovation (excluding intra-EU)	259	312.1815	168.6026	0	586
Number of parties	259	23.5174	30.8862	2	123
Intercontinental agreement	259	0.3784	0.4859	0	1
Economic power of innovator (defined by GDP/world GDP)	256	0.1873	0.1119	0.0003	0.3087
Economic power of innovator (defined by GDPpc)	256	34034.39	15128.85	851.07	78699.23
Economic power of innovator (defined by environmental credibility)	256	0.1773	0.1301	0.0002	0.3415
Economic power (GDP, PTA average)	251	25.34	2.31	21.25	30.34
Environmental credibility of innovator (defined by GDP/world GDP)	256	0.2541	0.0701	0.0041	0.4762
Environmental credibility of innovator (defined by GDPpc)	255	0.2712	0.0773	0.0213	0.3484
Environmental credibility of innovator (defined by environmental credibility)	259	0.2816	0.0751	0.0385	0.4762
Environmental credibility (PTA average)	259	0.1796	0.0812	0.0086	0.3081
MEAs	259	0.2239	0.4177	0	1
Enforcement	259	0.0965	0.2959	0	1
Development	259	0.0579	0.2340	0	1
Environmental protection	259	0.2548	0.4366	0	1
Level playing field	259	0.0502	0.2188	0	1
Policy coherence	259	0.0849	0.2793	0	1
Implementation	259	0.1042	0.3062	0	1
Regulatory space	259	0.1274	0.3341	0	1
Issue-specific	259	0.5792	0.4947	0	1
EU involved	259	0.4298	0.4947	0	1
US involved	259	0.3205	0.4676	0	1

nomic power drives the inclusion of a new environmental provision. The country with the most economic power is assumed to be most capable of designing new PTA elements and convincing the negotiating partners to agree to them. We measure economic power by GDP, divided by world GDP, at

the time of signature, based on the World Development Indicators (World Bank, 2016). As an alternative for measuring economic power, we use GDP per capita in constant US\$ (World Bank, 2016). Second, we propose that the PTA member with the best environmental track record was the one asking for the introduction of new environmental provisions into the PTA. We thus identify the innovator as the country with the highest environmental credibility among PTA members. We calculate an indicator based on the International Environmental Agreements (IEA) database (Mitchell, 2017) and measure environmental credibility by the share of MEAs the country has ratified up to the year of the PTA signature, assuming the country that performs best in terms of MEA ratification is also the one bringing environmental norms to the table in trade negotiations. In most cases, the most powerful country in economic terms is also the environmental leader; that is, there is a substantial overlap between the two definitions of the innovating country. In 22.4% of the PTAs, we select different countries as innovators depending on the definition we choose. In the case of the China–Switzerland PTA signed in 2013, for example, the first assumption leads us to attribute all new provisions introduced to efforts of China, the more powerful partner in economic terms. Based on this assumption, we tested H1a and H1b using the country characteristics of China. The alternative assumption suggests that legal innovations were the result of Switzerland's entrepreneurship, as Switzerland is the most environmentally credible partner of the China–Switzerland PTA. For this reason, H1a and H1b were tested again with the country characteristics of Switzerland. We acknowledge the disadvantages of making strong assumption about the innovating country in a PTA. Against this background, using different definitions of the innovating country also serves as a means to test how sensitive our results are to these different assumptions.

To test for the determinants of diffusion outcomes and identify which of the innovating country's characteristics are associated with higher adoption in other agreements (H1a and H1b), we use our measures of economic power and environmental credibility as explanatory variables. The EU is treated as one country, since it operates as a single actor in trade negotiations. Exceptions are the European integration treaties in which the interests of each Member State come into play separately, so we consider the country level more appropriate.

To circumvent the problem of finding the one innovator for a given innovative agreement, we use PTA averages of GDP and environmental credibility. However, these averages would mask the outstanding characteristics of individual countries that H1a and H2b predict to contribute to kick-starting diffusion processes. As an additional check to unpack the power dynamics, we thus investigate whether the involvement of an EU country or the USA in the innovating PTA has an impact on the frequency of a provision's diffusion.

As discussed in Section 3, we also hypothesise that the characteristics of the innovating agreement play a role in the diffusion of provisions. We therefore include the number of Member States to test H2a and a dummy for intercontinental agreements to test H2b. This information is based on the DESTA data set provided by Dür et al. (2014).

Since there is significant heterogeneity across environmental provisions, we control for the objective of different types of environmental provisions. While some provisions are clearly related to environmental governance and are deprived of trade implications, others focus more clearly on trade governance or on the coherence across different policy realms. To control for these different objectives, we sort all environmental provisions of the TREND database into eight dimensions according to their main objective, namely promoting environmental protection (i.e., general principles related to environmental protection, obligations for the sustainable use and conservation of natural resources, and clauses on very specific environmental issue areas), ensuring policy coherence between environmental regulation and other policy areas, promoting development-related aspects (i.e., establishing means to support capacity building, technology transfers, disaster relief, etc.), reinforcing MEAs, safeguarding regulatory space for environmental measures, levelling the playing field between countries

(e.g., by harmonising their environmental standards), and implementing and enforcing environmental provisions (see Appendix A for details).

We also control for the nature of the innovative provision by taking the specificity of provisions into account. We expect that provisions that are more specific will diffuse less often. One reason is that some specific provisions (such as environmental exceptions for services, public procurement and intellectual property rights) will only show up in future agreements if these areas are covered in the agreements in the first place. Another reason is that specific environmental issues, such as forestry, fisheries, desertification, nuclear accidents and oil spills, may only be of interest to a few countries. We use a dummy variable with a value of 1 when the environmental provision deals with a specific issue or relates to a specific PTA chapter that is not prevalent in all PTAs, and a value of 0 otherwise. Table 1 provides descriptive statistics for the dependent, explanatory and control variables.

5 | EMPIRICAL ANALYSIS: DETERMINANTS OF DIFFUSION OUTCOMES

Table 2 presents the average marginal effects from the negative binomial models for total diffusion counts. We report the results for different definitions of the innovating country, economic power and environmental credibility.

The first variables address characteristics of the innovating country. Contrary to H1a, higher economic power of the innovating country does not translate into stronger diffusion for any of the specifications. Likewise, the involvement of the EU or the USA does not result in a higher frequency of diffusion. These results go against the expectation, widely shared in the literature, that power is an important factor for explaining diffusion. However, these results do not rule out that bargaining power does play an important role during the negotiation process. It may be the case that environmental provisions are included in a PTA in the first place due to the insistence of a powerful country. What our results suggest is that the bargaining power of the innovating country does not play a significant role for the diffusion of these provisions in subsequent agreements.

Our results on the innovating country's environmental credibility are more in line with our expectations (H1b). The positive and significant marginal effect in column (1) indicates that higher environmental credibility of the innovator can translate into better diffusion outcomes. When we assume that the innovator of a new environmental provision is the most powerful country among the PTA members, provisions are more frequently adopted if those countries are more environmentally credible and potentially less suspect to green protectionism. However, the positive effect of environmental credibility of the innovator is not consistent across the different specifications. When we define the innovating country based on environmental credibility or GDP per capita or when using PTA averages, none of the country characteristics seem to matter for explaining diffusion outcomes. We therefore conclude that neither economic power nor environmental credibility is a good predictor of explaining the varying frequency of provisions.

Regarding characteristics of the innovating agreement, the sign of the marginal effect on the number of member states contradicts H2a: it suggests that the more Member States involved in the innovating agreement, the less often the environmental provisions diffuse. However, PTAs with a large number of members are frequently intercontinental ones; that is, it is possible that the dummy indicating intercontinental agreements picks up the positive effects that we expected from the number of Member States. Moreover, the size of the average marginal effect is negligible; one additional party to

TABLE 2 Total diffusion (negative binomial regression, average marginal effects)

	(1)	(2)	(3)	(4)	(5)	(6)
Definition of innovating country based on	Economic power (GDP/world GDP)	Economic power (GDPpc)	Environmental credibility	PTA average	n.a.	n.a.
Economic power (GDP/world GDP)	−40.16**		−15.00			
	(15.82)		(10.87)			
Economic power (GDP/world GDP)		2.74e-05				
		(0.000132)				
Economic power (GDP, PTA average)				1.089		
				(1.004)		
Environmental credibility	64.52***	7.464	25.90	−8.013		
	(21.58)	(22.42)	(17.40)	(31.48)		
EU country involved					−1.234	
					(4.315)	
US involved						−0.744
						(3.839)
Intercontinental agreement	18.15***	19.18***	19.83***	18.32***	20.45***	20.26***
	(4.311)	(4.328)	(4.280)	(4.510)	(4.519)	(4.605)
Number of member states	−0.188**	−0.254***	−0.254***	−0.210***	−0.253***	−0.265***
	(0.0753)	(0.0708)	(0.0726)	(0.0757)	(0.0856)	(0.0756)
Enforcement	−2.749	−3.431	−2.613	−2.523	−3.705	−3.431
	(4.509)	(4.383)	(4.587)	(4.355)	(4.417)	(4.622)
Development	9.871	7.128	8.511	7.007	6.566	6.258
	(6.744)	(6.490)	(6.549)	(6.587)	(6.212)	(6.188)
Environmental protection	6.789*	6.568	6.637*	6.577*	6.578*	6.325
	(3.789)	(4.032)	(3.763)	(3.656)	(3.901)	(3.960)
Level playing field	5.516	3.241	3.849	3.920	3.118	2.988
	(6.168)	(5.849)	(6.002)	(5.725)	(5.744)	(5.795)
Policy coherence	12.87**	14.40**	14.63**	14.96**	13.96**	13.84**
	(5.529)	(6.011)	(5.900)	(5.928)	(5.764)	(5.897)
Implementation	7.343	6.408	6.710	4.387	5.918	5.779
	(5.690)	(5.690)	(5.522)	(5.219)	(5.391)	(5.326)
Regulatory space	24.81***	30.06***	25.26***	28.83***	29.96***	30.38***
	(7.010)	(8.055)	(6.997)	(7.239)	(7.642)	(7.720)
Issue-specific	−11.34**	−11.89**	−11.12**	−11.76**	−12.55**	−12.65**
	(5.019)	(5.159)	(5.119)	(4.930)	(4.952)	(4.924)
Squared correlation coefficient	0.4356	0.4034	0.4043	0.3978	0.4283	0.4273
Observations	256	255	256	251	259	259

Note: Robust standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.

TABLE 3 External diffusion (negative binomial regression, average marginal effects)

Definition of innovating country based on	(7) Economic power (GDP/ world GDP)	(8) Economic power (GDPpc)	(9) Environmental credibility	(10) PTA average	(11) n.a.	(12) n.a.
Economic power (GDP/world GDP)	−47.93***		−24.97***			
	(14.21)		(9.306)			
Economic power (GDPpc)		2.19e-05				
		(0.000114)				
Economic power (GDP, PTA average)				0.411		
				(0.803)		
Environmental credibility	31.79*	−23.10	−1.719	−44.98*		
	(16.80)	(18.30)	(13.13)	(23.55)		
EU country involved					−4.896	
					(3.122)	
US involved						−4.940
						(3.155)
Intercontinental agreement	11.36***	11.71***	12.45***	10.52***	11.92***	11.40***
	(3.437)	(3.545)	(3.496)	(3.722)	(3.617)	(3.657)
Number of member states	−0.112*	−0.172***	−0.161***	−0.217***	−0.130*	−0.184***
	(0.0626)	(0.0619)	(0.0614)	(0.0746)	(0.0675)	(0.0666)
Enforcement	−1.593	−3.150	−1.914	−2.603	−3.269	−2.322
	(3.058)	(2.881)	(3.081)	(2.866)	(2.796)	(3.060)
Development	9.295*	6.666	7.996*	6.358	6.914*	5.564
	(4.785)	(4.371)	(4.480)	(4.660)	(4.189)	(4.008)
Environmental protection	7.773**	7.483**	7.695**	7.065**	7.504**	6.713**
	(3.029)	(3.238)	(3.041)	(2.922)	(2.962)	(3.043)
Level playing field	4.617	2.510	3.343	3.338	3.570	3.502
	(4.433)	(3.939)	(4.108)	(4.103)	(3.805)	(4.262)
Policy coherence	9.368**	10.32**	10.55**	9.609**	10.95**	10.32**
	(4.448)	(4.799)	(4.786)	(4.745)	(4.965)	(4.988)
Implementation	7.240*	5.465	6.326*	3.301	6.592*	5.706
	(3.993)	(3.882)	(3.825)	(3.536)	(3.916)	(3.692)
Regulatory space	22.43***	26.12***	22.77***	29.57***	26.77***	30.39***
	(5.816)	(6.938)	(5.919)	(7.359)	(6.408)	(7.235)
Issue-specific	−10.34***	−11.28***	−10.56***	−10.46***	−10.61***	−11.40***
	(4.010)	(3.913)	(3.953)	(3.849)	(3.491)	(3.950)
Squared correlation coefficient	0.4017	0.3432	0.3448	0.3454	0.3818	0.3754
Observations	255	254	255	250	258	258

Note: Standard errors in parentheses.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

the agreement introducing the provision correlates with diffusion to about 0.2 fewer agreements; that is, a reduction of five parties would be needed for diffusion to one additional PTA.

Importantly, we find that provisions introduced in an intercontinental agreement diffuse significantly more often. This is in line with our expectation that when diverse partners are involved in the introduction of a new provision, this consensus makes it more likely to be widely accepted by those involved, and by external countries in later agreements (H2b). According to our calculation of average marginal effects, provisions introduced by intercontinental agreements diffuse an additional 18–20 times in the case of total diffusion, and an additional 11–13 times in the case of external diffusion.

Moreover, we find that innovative provisions that deal with countries' regulatory spaces diffuse significantly more often than provisions belonging to the base category (references to MEAs). This finding is statistically significant at the 1% level and robust across all model specifications. It indicates that several countries have an interest in explicitly safeguarding their right to regulate in environmental matters and protecting themselves from trade disputes in this area. We also find that provisions that are strictly on environmental protection as well as those on policy coherence diffuse more often and, in the case of external diffusion, so do provisions on development and implementation (see Appendix A for a description of these categories of environmental provisions).

Interestingly, provisions that aim at levelling the playing field do not diffuse significantly more often across all specifications. These provisions include obligations to harmonise and not lower environmental standards. Insofar as these types of provisions represent the specific offensive interests of economically powerful countries, they might not be designed in ways that are appealing to a broad range of countries.

As expected, provisions that deal with specific issues diffuse significantly less often than general ones. On average, they diffuse to 10–11 fewer agreements than more general provisions. Less specific provisions might not only speak to a broader set of actors, but also imply reduced risks, in the sense that the more precise the rules are, the more parties have their hands tied.

The vast majority of our results are valid irrespective of the type of diffusion (see Table 3). In particular, our results indicating that provisions diffuse more often when the innovating PTA is intercontinental hold both for total diffusion (counting all occurrences of the provisions including for PTAs where the same members are involved as in the innovating PTA) and for external diffusion (counting only occurrences in third countries not involved in the innovating PTA). This suggests that in both cases, similar mechanisms are at work for kick-starting diffusion processes.

Overall, the empirical findings suggest that institutional factors play a more important role for the diffusion of environmental provisions in PTAs than agency factors. In particular, provisions that are first designed in an interregional context, and with a focus on regulatory space or policy coherence, tend to be more "successful" in their diffusion. We conclude that the institutional characteristics of the base agreement and the type of provision introduced matter more than the characteristics of the countries who are introducing new provisions.

6 | EMPIRICAL ANALYSIS: SENSITIVITY CHECKS

6.1 | Exclusion of intra-EU treaties from the sample

One may argue that intra-EU trade agreements are not true international treaties but rather European ones comparable with national law. In that sense, they influence EU PTAs in the same way as national law influences the PTAs of other countries. Therefore, as a further robustness check, we exclude all

intra-EU treaties (signed after the 1957 Treaty of Rome) from the diffusion counts (Appendix B, Tables B1 and B2). The results are very robust to this alternative specification.

6.2 | Controlling for the signature period

The negative binomial models presented in Table 2 implicitly consider the impact of time by including the number of PTAs signed after a provision's first introduction as an exposure variable. In addition, we create a categorical variable indicating the period during which the innovating PTA was signed. The results suggest that environmental provisions introduced by PTAs signed between 1981 and 1990, between 1991 and 1995 and since 1995 all diffuse significantly less often compared with provisions introduced before 1980 (see Appendix B, Tables B4 and B5). This means that even when controlling for diffusion opportunities through the subsequent number of PTAs as an exposure variable, "old" provisions diffuse more often. It seems these provisions have achieved a certain status that causes them to be replicated in a large number of PTAs. The conclusions with regard to our main hypotheses remain the same: the results are robust to the inclusion of period indicators.

6.3 | Different model specifications

As can be seen in Figure 2, the dependent variables are skewed to the right. For external diffusion in particular, there seems to be a large number of zero observations. In fact, roughly 19% of environmental provisions in our data set do not diffuse at all. Since the negative binomial is not designed to handle mass points at zero, we consider the zero-inflated negative binomial as a robustness check. The zero-inflated model assumes that there are "excess zeroes" that originate from a process that is distinct from the process explaining the number of times diffusion occurs. More precisely, a binary process defines whether a provision diffuses or not, while a separate, count process defines the number of times diffusion occurs. We assume that the most sensible argument for non-diffusion is a lack of opportunity to do so. We approximate this lack of opportunity by the number of (external) PTAs signed after the first introduction of the environmental provision and feed this into the binary part of the zero-inflated negative binomial model. We report the results in Appendix B, Tables B5 and B6, respectively. The results are very similar, suggesting that the results are quite robust regarding model specification and that there is no reason to believe that the zero-inflated models are more suitable to describe the underlying process.

7 | CONCLUSION

This paper investigates the drivers of diffusion outcomes for PTAs' environmental provisions and identifies a number of factors related to the conditions of emergence that kick-start successful diffusion processes. Environmental provisions diffuse significantly more often when they are introduced through intercontinental agreements. It seems that when more diverse country partners are involved in the introduction of a new provision, this consensus makes it more likely for the provision to be widely accepted in the future and to pollinate external countries across regions. Overall, our findings indicate that institutional factors matter more for the diffusion of environmental provisions in PTAs than agency factors: the type of PTA and the type or provision in question are more relevant for explaining diffusion than who is inserting a new provision.

Against this background, this paper contributes to three streams of literature. First, it adds to the policy diffusion literature by investigating the conditions that kick-start diffusion. To the best of our

knowledge, this paper provides the first statistical analysis of the conditions for successful diffusion outcomes at the provision level in a population of international treaties. Second, this paper contributes to the literature on trade and the environment interactions by providing a highly fine-grained empirical analysis of when different types of environmental provisions diffuse successfully across trade agreements. Third, this paper speaks to the treaty design literature by pointing to the fact that key sources of influence for treaty designers are credible foreign countries and intercontinental agreements.

Our findings of diffusion outcomes can be explained by various channels, and these possible channels should be at the heart of further research on the process of diffusion. At the same time, assessing our findings from the perspective of the literature on diffusion mechanisms provides some preliminary insights. Provisions introduced by powerful countries do not diffuse more often than others. Using the terminology of the policy diffusion literature, our results do not provide empirical support for explanations based on coercion or competition. Instead, our results are consistent with explanations based on learning. Our findings that environmental provisions introduced in intercontinental agreements are more frequently adopted suggest that countries are learning incrementally from the international environment, thus complementing the existing empirical evidence from Gilardi (2013, p. 466) that "tends to support the idea that policy makers are more likely to adopt a policy if it was successful elsewhere, which suggests that they learn from the experience of others." Thus, it might be the case that the competition among various models of PTAs (at the meso-level), which drives the proliferation of PTAs in general (at the macro-level), is itself fuelled by learning processes (at the micro-level). The model that is the most likely to prevail might be the one that appears as the most appropriate to the greatest number of countries, based on lessons from intercontinental agreements.

For future research, we envision investigations on the details of the pertinent mechanisms of diffusion and, more specifically, the process of diffusion across PTAs. In particular, future research could analyse in depth the different driving forces that may explain the adoption of certain provisions or classes of provisions. Complementing our statistical analysis with qualitative methods will help us to shed more light on the relevant mechanisms and the causal processes that fuel diffusion and to investigate more deeply why some provisions diffuse while others do not. Moreover, since most of our hypotheses about diffusion are general in nature, they may be used in studies analysing the drivers and the effects of diffusion of other types of provisions as well, including in other large sets of international treaties, such as provisions found in bilateral investment treaties, double taxation agreements or regional fisheries management agreements.

ORCID

Jean-Frédéric Morin 🔴 https://orcid.org/0000-0003-1053-5597

REFERENCES

Allee, T., & Elsig, M. (2016). Are the contents of international treaties copied-and-pasted? Evidence from preferential trade agreements (World Trade Institute Working Paper No 8). Retrieved from https://www.wti.org/research/publications/998/are-the-contents-of-international-treaties-copied-and-pasted-unique-evidence-from-preferential-trade-agreements/ [Accessed 23 April 2019].

Alschner, W., Seiermann, J., & Skougarevskiy, D. (2017). Text-as-data analysis of preferential trade agreements: mapping the PTA landscape (UNCTAD Research Paper, No. UNCTAD/SER.RP/2017/5). Retrieved from https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationxml:id=1838 [Accessed 23 April 2019]

Baccini, L., & Dür, A. (2012). The new regionalism and policy interdependence. *British Journal of Political Science*, *42*(1), 57–79. https://doi.org/10.1017/S0007123411000238

Baccini, L., Dür, A., & Elsig, M. (2015). The politics of trade agreement design: Revisiting the depth-flexibility nexus. *International Studies Quarterly*, *59*(4), 765–775. https://doi.org/10.1111/isqu.12188

Baccini, L., Dür, A., & Haftel, Y. Z.(2015). Imitation and innovation in international governance: The diffusion of trade agreement design. In A. Dür, & M. Elsig(Eds.), *Trade cooperation: The purpose, design and effects of preferential trade agreements*(pp. 167 – 194). Cambridge, UK: Cambridge University Press.

Baghdadi, L., Martinez-Zarzoso, I., & Zitouna, H. (2013). Are RTA agreements with environmental provisions reducing emissions? *Journal of International Economics*, *90*(2), 378–390. https://doi.org/10.1016/j.jinteco.2013.04.001

Baldwin, R., & Jaimovich, D. (2012). Are free trade agreements contagious? *Journal of International Economics*, *88*(1), 1–16. https://doi.org/10.1016/j.jinteco.2012.03.009

Bastiaens, I., & Postnikov, E. (2017). Greening up: The effects of environmental standards in EU and US trade agreements. *Environmental Politics*, *26*(5), 847–869. https://doi.org/10.1080/09644016.2017.1338213

Bearce, D. H., Eldredge, C. D., & Jolliff, B. J. (2016). Does institutional design matter? A study of trade effectiveness and PTA flexibility/rigidity. *International Studies Quarterly*, *60*(2), 307–316. https://doi.org/10.1093/isq/sqw008

Biermann, F., Pattberg, P., van Asselt, H., & Zelli, F. (2009). The fragmentation of global governance architectures: A framework for analysis. *Global Environmental Politics*, *9*(4), 14–40. https://doi.org/10.1162/glep.2009.9.4.14

Braun, D., & Gilardi, F. (2006). Taking 'Galton's problem' seriously: Towards a theory of policy diffusion. *Journal of Theoretical Politics*, *18*(3), 298–322. https://doi.org/10.1177/0951629806064351

Büthe, T., & Milner, H. (2014). Foreign direct investment and institutional diversity in trade agreements: Credibility, commitment, and economic flows in the developing world, 1971–2007. *World Politics*, *66*(1), 88–122. https://doi.org/10.1017/S0043887113000336

Cao, X. (2010). Networks as channels of policy diffusion: Explaining worldwide changes in capital taxation, 1998–2006. *International Studies Quarterly*, *54*(3), 823–854. https://doi.org/10.1111/j.1468-2478.2010.00611.x

Chen, M. X., & Joshi, S. (2010). Third-country effects on the formation of free trade agreements. *Journal of International Economics*, *82*(2), 238–248. https://doi.org/10.1016/j.jinteco.2010.06.003

DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*(2), 147–160. https://doi.org/10.2307/2095101

Dobbin, F., Simmons, B., & Garrett, G. (2007). The global diffusion of public policies: Social construction, coercion, competition, or learning? *Annual Review of Sociology*, *33*, 449–472. https://doi.org/10.1146/annurev.soc.33.090106.142507

Dür, A., Baccini, L., & Elsig, M. (2014). The design of international trade agreements: Introducing a new dataset. *Review of International Organizations*, *9*(3), 353–375. https://doi.org/10.1007/s11558-013-9179-8

Egger, P., Jessberger, C., & Larch, M. (2013). Impacts of trade and the environment on clustered multilateral environmental agreements. *The World Economy*, *36*(3), 331–348. https://doi.org/10.1111/twec.12054

Egger, P., & Larch, M. (2008). Interdependent preferential trade agreement memberships: An empirical analysis. *Journal of International Economics*, *76*(2), 384–399. https://doi.org/10.1016/j.jinteco.2008.08.003

Elkins, Z., & Simmons, B. (2005). On waves, clusters and diffusion: A conceptual framework. *The Annals of the American Academy of Political and Social Science*, *598*(1), 33–51. https://doi.org/10.1177/0002716204272516

Fay, D. L., & Wenger, J. B. (2016). The political structure of policy diffusion. *Policy Studies Journal*, *44*(3), 349–365. https://doi.org/10.1111/psj.12122

Finnemore, M., & Sikkink, K. (1998). International norm dynamics and political change. *International Organization*, *52*(4), 887–917. https://doi.org/10.1162/002081898550789

Gilardi, F. (2010). Who learns from what in policy diffusion processes? *American Journal of Political Science*, *54*(3), 650–666. https://doi.org/10.1111/(ISSN)1540-5907

Gilardi, F. (2013). Transnational diffusion: Norms, ideas, and policies. In W. Carlsnaes, T. Risse, & B. Simmons (Eds.), *Handbook of international relations* (pp. 453–477). London, UK: Sage. https://doi.org/10.4135/9781446247587

Graham, E. R., Shipan, C., & Volden, C. (2013). The diffusion of policy diffusion research in political science. *British Journal of Political Science*, *43*(3), 673–701. https://doi.org/10.1017/S0007123412000415

Hafner-Burton, E. M. (2009). *Forced to be good: Why trade agreements boost human rights*. Ithaca, NY: Cornell University Press.

Hauer, G., & Runge, C. F. (1999). Trade-environment linkages in the resolution of transboundary externalities. *The World Economy*, *22*(1), 25–39. https://doi.org/10.1111/1467-9701.00191

Hollway, J., & Koskinen, J. (2015). Multilevel bilateralism and multilateralism: States' bilateral and multilateral fisheries treaties and their secretariats. In E. Lazega, & T. Snijders (Eds.), *Multilevel network analysis for the social sciences – Theory, methods and applications*. Berlin, Germany: Springer.

Holzinger, K., & Knill, C. (2005). Causes and conditions of cross-national policy convergence. *Journal of European Public Policy*, *12*(5), 775–796. https://doi.org/10.1080/13501760500161357

Horn, H., Mavroidis, P. C., & Sapir, A. (2010). Beyond the WTO? An anatomy of EU and US preferential trade agreements. *World Economy*, *33*(11), 1565–1588. https://doi.org/10.1111/j.1467-9701.2010.01273.x

Ikenberry, J., & Kupchan, C. (1990). Socialization and hegemonic power. *International Organization*, *44*(3), 283–315. https://doi.org/10.1017/S002081830003530X

Jinnah, S., & Morgera, E. (2013). Environmental provisions in American and EU free trade agreements: A preliminary comparison and research agenda. *Review of European Community and International Environmental Law*, *22*(3), 324–339. https://doi.org/10.1111/reel.12042

Jinnah, S., & Lindsay, A. (2016). Diffusion through issue linkage: Environmental norms in US trade agreements. *Global Environmental Politics*, *16*(3), 41–61. https://doi.org/10.1162/GLEP_a_00365

Johnson, T. (2015). Information revelation and structural supremacy: The World Trade Organization's incorporation of environmental policy. *Review of International Organizations*, *10*(2), 207–229. https://doi.org/10.1007/s11558-015-9215-y

Kelemen, R. D., & Sibbitt, E. C. (2004). The globalization of American law. *International Organization*, *58*(4), 103–136.

Keohane, R. O., & Victor, D. G. (2011). The regime complex for climate change. *Perspectives on Politics*, *9*(1), 7–23. https://doi.org/10.1017/S1537592710004068

Kim, S. Y., & Manger, M. S. (2016). Hubs of governance: Path-dependence and higher-order effects of trade agreement formation. *Political Science Research and Methods*, *5*(3), 467–488.

Kohl, T., Brakman, S., & Garretsen, H. (2016). Do trade agreements stimulate international trade differently? Evidence from 296 trade agreements. *The World Economy*, *39*(1), 97–131. https://doi.org/10.1111/twec.12272

Lechner, L. (2016). The domestic battle over the design of non-trade issues in preferential trade agreements. *Review of International Political Economy*, *23*(5), 840–871. https://doi.org/10.1080/09692290.2016.1231130

Levi-Faur, D. (2002). Herding towards a new convention. On herds, shepherds and lost sheep in the liberalization of the telecommunications and electricity industries. Paper presented at the workshop 'Theories of Regulation', Nuffield College, University of Oxford.

Makse, T., & Volden, C. (2011). The role of policy attributes in the diffusion of innovations. *The Journal of Politics*, *73*(1), 108–124. https://doi.org/10.1017/S0022381610000903

Martin, C. W. (2010). Interdependence and political ideology: The conditional diffusion of cigarette taxation in US states. *World Political Science*, *6*(1), 1–25. https://doi.org/10.2202/1935-6226.1087

Martinez-Zarzoso, I. (2018). Assessing the effectiveness of environmental provisions in regional trade agreements (OECD Trade and Environment Working Papers, 2018/02). Retrieved from https://www.oecd-ilibrary.org/environment/assessing-the-effectiveness-of-environmental-provisions-in-regional-trade-agreements_5ffc615c-en [Accessed 23 April 2019].

Melser, D., & Robertson, P. E. (2005). Eco-labelling and the trade-environment debate. *The World Economy*, *28*(1), 49–62. https://doi.org/10.1111/j.1467-9701.2005.00674.x

Meseguer, C. (2006). Rational learning and bounded learning in the diffusion of policy innovations. *Rationality and Society*, *18*(1), 35–66. https://doi.org/10.1177/1043463106060152.

Meseguer, C., & Gilardi, F. (2009). What is new in the study of policy diffusion? *Review of International Political Economy*, *16*(3), 527–543. https://doi.org/10.1080/09692290802409236

Milewicz, K., Hollway, J., Peacock, C., & Snidal, D. (2016). Beyond trade. The expanding scope of the nontrade agenda in trade agreements. *Journal of Conflict Resolution*, *62*(4), 743–773.

Miller, J. M. (2003). A typology of legal transplants: Using sociology, legal history and Argentine examples to explain the transplant process. *American Journal of Comparative Law*, *51*(4), 839–885. https://doi.org/10.2307/3649131

Mitchell, R. (2017). International environmental agreements database project. Retrieved from http://iea.uoregon.edu/

Morin, J.-F., Brandi, C., & Berger, A. (2019, forthcoming). The multilateralization of PTAs' environmental clauses: Scenarios for the future? In M. Elsig, M. Hahn, & G. Spilker (Eds.), *The shifting landscape of global trade governance: World trade forum*. Cambridge, UK: Cambridge University Press.

Morin, J.-F., Dür, A., & Lechner, L. (2018). Mapping the trade and environment nexus: Insights from a new data set. *Global Environmental Politics*, *18*(1), 122–139. https://doi.org/10.1162/GLEP_a_00447

Morin, J.-F., & Gauthier-Nadeau, R. (2017). Environmental gems in trade agreements: Little-known clauses for progressive trade agreements (CIGI Papers 148). Retrieved from https://www.cigionline.org/publications/environmental-gems-trade-agreements-little-known-clauses-progressive-trade-agreements [Accessed 23 April 2019].

Morin, J.-F., Pauwelyn, J., & Hollway, J.(2017). The trade regime as a complex adaptive system: Exploration and exploitation of environmental norms in trade agreements. *Journal of International Economic Law*, *20*(2), 365 – 390. https://doi.org/10.1093/jiel/jgx013

Morin, J.-F., & Rochette, M. (2017). Transatlantic convergence of preferential trade agreements environmental clauses. *Business and Politics*, *19*(4), 621–658. https://doi.org/10.1017/bap.2017.23

Neumayer, E., & Plümper, T. (2012). Conditional spatial policy dependence: Theory and model specification. *Comparative Political Studies*, *45*(7), 819–849. https://doi.org/10.1177/0010414011429066

Oberthür, S., & Gehring, T. (2006). Institutional interaction in global environmental governance: The case of the Cartagena Protocol and the World Trade Organization. *Global Environmental Politics*, *6*(2), 1–31. https://doi.org/10.1162/glep.2006.6.2.1

OECD (Organisation for Economic Co-operation and Development) (2007). *Environment and regional trade agreements*. Paris, France: OECD.

Pelc, K. J. (2016). *Making and bending international rules: The design of exceptions and escape clauses in trade law*. Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/CBO9781316543795

Poulsen, L. N. (2014). Bounded rationality and the diffusion of modern investment treaties. *International Studies Quarterly*, *58*(1), 1–14. https://doi.org/10.1111/isqu.12051

Raustiala, K., & Victor, D. G. (2004). The regime complex for plant genetic resources. *International Organization*, *58*, 277–309.

Shipan, C. R., & Volden, C. (2008). The mechanisms of policy diffusion. *American Journal of Political Science*, *52*(4), 840–857. https://doi.org/10.1111/j.1540-5907.2008.00346.x

Simmons, B. A., Dobbin, F., & Garrett, G. (Eds.) (2008). *The global diffusion of markets and democracy*. Cambridge, UK: Cambridge University Press.

Simmons, B. A., & Elkins, Z. (2004). The globalization of liberalization: Policy diffusion in the international political economy. *American Political Science Review*, *98*(1), 171–189. https://doi.org/10.1017/S0003055404001078

Stone, J.(2018). EU to refuse to sign trade deals with countries that don't ratify Paris climate change accord. *Independent*. Retrieved from https://www.independent.co.uk/news/world/europe/eu-trade-deal-paris-climate-change-accord-agreement-cecilia-malmstr-m-a8206806.html [Accessed 12 February 2018].

Tews, K., Busch, P.-O., & Jörgens, H. (2003). The diffusion of new environmental policy instruments. *European Journal of Political Research*, *42*(4), 569–600. https://doi.org/10.1111/1475-6765.00096

Tobin, J., & Busch, M. (2010). A BIT is better than a lot: Bilateral investment treaties and preferential trade agreements. *World Politics*, *62*(1), 1–42. https://doi.org/10.1017/S0043887109990190

Weyland, K. (2005). Theories of policy diffusion lessons from Latin American pension reform. *World Politics*, *57*(2), 262–295. https://doi.org/10.1353/wp.2005.0019

World Bank (2016). World development indicators. Retrieved from http://data.worldbank.org/data-catalog/world-development-indicators

Zelli, F., Gupta, A., & van Asselt, H. (2013). Institutional interactions at the crossroads of trade and environment: The dominance of liberal environmentalism? *Global Governance*, *19*(1), 105–118. https://doi.org/10.1163/19426720-01901009

APPENDIX A

Types of environmental provisions in trade agreements

The environmental provisions can be sorted into eight different categories according to their main *objective*:

1. The category *environmental protection* collects all provisions that can be clearly assigned an environmental protection purpose. It includes general principles related to environmental protection, obligations on the sustainable use and conservation of natural resources, and clauses on very specific environmental issue areas.

2. The category *regulatory space* incorporates provisions that more or less explicitly deal with preserving countries' regulatory spaces related to the environment. It includes general and more specific exceptions to liberalisation commitments, exclusions of specific issue areas, and the sovereign right to adopt environmental measures ("right to regulate").

3. The *level playing field* category covers provisions that help to establish a level playing field between the parties. These provisions implicitly address the fear that lower environmental standards in other countries create a comparative advantage and encourage trade and investment flows to their detriment. They include obligations to harmonise and not lower environmental standards as well as requirements to base environmental measures on scientific facts and not use them for green protectionism.

4. The category *policy coherence* deals with coherence between environmental regulation and other policy areas. More precisely, these provisions specify the relationship between the environment and trade and investment rules as well as the interaction between the environment and more specific issue areas, such as transport, tourism or social issues.

5. Provisions in the *development* category take into account the role of economic development. They include provisions acknowledging different development levels of the parties and establishing means to support capacity building, technology transfers, disaster relief, etc. Moreover, this category covers provisions that protect the interests of developing countries, for example, their sovereignty over genetic resources.

6. The category *multilateral environmental agreements* refers to provisions that make reference to international agreements that address rather specific environmental issues. The provisions in this category may oblige the parties to ratify or implement a certain MEA, and they include specifications on whether the MEA prevails over the trade agreement at hand.

7. The category *implementation* incorporates provisions that specify how the agreement, and more precisely its environmental content, will be implemented. It includes cooperation on establishing institutions for implementation, as well as procedures ensuring public participation and transparency.

8. The *enforcement* category covers provisions that regulate the enforcement of environmental regulations stipulated in the trade agreement as well as domestic environmental measures.

APPENDIX

Sensitivity analysis

Average marginal effects from the negative binomial regression excluding intra-EU PTAs, that is, amendments or accession agreement of the European Community (Tables B1 and B2).

Average marginal effects from the negative binomial regression taking the period of signature into account (Tables B3 and B4).

Average marginal effects from the zero-inflated negative binomial regression (Tables B5 and B6).

TABLE B1 Total diffusion, excluding intra-EU agreements (negative binomial regression, average marginal effects)

Definition of innovating country based on	(13) Economic power (GDP/world GDP)	(14) Economic power (GDPpc)	(15) Environmental credibility	(16) PTA average	(17) n.a.	(18) n.a.
Economic power (GDP/world GDP)	−39.20**		−13.67			
	(15.58)		(10.68)			
Economic power (GDPpc)		3.26e-05				
		(0.000131)				
Economic power (GDP, PTA average)				1.169		
				(0.982)		
Environmental credibility	64.73***	4.769	22.30	−10.30		
	(21.51)	(22.07)	(17.43)	(30.96)		
EU country involved					−2.263	
					(4.302)	
US involved						−0.346
						(3.798)
Intercontinental agreement	18.22***	19.27***	19.84***	18.21***	20.63***	20.44***
	(4.243)	(4.254)	(4.213)	(4.446)	(4.460)	(4.554)
Number of member states	−0.184**	−0.249***	−0.249***	−0.205***	−0.239***	−0.261***
	(0.0738)	(0.0692)	(0.0714)	(0.0741)	(0.0840)	(0.0742)
Enforcement	−4.189	−4.761	−4.122	−3.851	−5.152	−4.950
	(4.063)	(3.968)	(4.105)	(3.930)	(3.963)	(4.166)
Development	9.635	6.848	7.992	6.982	6.311	5.926
	(6.769)	(6.493)	(6.537)	(6.595)	(6.220)	(6.221)
Environmental protection	6.356*	6.221	6.221*	6.324*	6.263	5.953
	(3.723)	(4.006)	(3.689)	(3.611)	(3.836)	(3.895)
Level playing field	5.159	2.842	3.387	3.637	2.914	2.641
	(6.171)	(5.846)	(5.965)	(5.747)	(5.748)	(5.795)
Policy coherence	11.85**	13.28**	13.39**	13.94**	12.79**	12.84**
	(5.526)	(5.987)	(5.855)	(5.927)	(5.719)	(5.901)
Implementation	7.468	6.456	6.641	4.576	6.050	5.893
	(5.697)	(5.633)	(5.462)	(5.192)	(5.391)	(5.321)
Regulatory space	24.83***	30.02***	25.74***	29.02***	29.89***	30.41***
	(7.073)	(8.122)	(7.131)	(7.319)	(7.668)	(7.791)
Issue-specific	−10.83**	−11.48**	−10.78**	−11.31**	−12.06**	−12.14**
	(5.006)	(5.153)	(5.080)	(4.931)	(4.923)	(4.909)
Squared correlation coefficient	0.4318	0.3976	0.4013	0.3946	0.4296	0.4267
Observations	255	254	255	250	258	258

Note: Robust standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.

TABLE B2 External diffusion, excluding intra-EU agreements (negative binomial regression, average marginal effects)

Definition of innovating country based on	(19) Economic power (GDP/ world GDP)	(20) Economic power (GDPpc)	(21) Environmental credibility	(22) PTA average	(23) n.a.	(24) n.a.
Economic power (GDP/world GDP)	−46.81***		−24.49***			
	(14.01)		(9.127)			
Economic power (GDPpc)		3.09e-05				
		(0.000112)				
Economic power (GDP, PTA average)				0.591		
				(0.789)		
Environmental credibility	30.31*	−23.75	−2.223	−48.70**		
	(16.53)	(18.08)	(13.04)	(23.25)		
EU country involved					−4.749	
					(3.073)	
US involved						−5.094
						(3.151)
Intercontinental agreement	11.53***	11.79***	12.56***	10.38***	12.01***	11.54***
	(3.410)	(3.484)	(3.465)	(3.675)	(3.577)	(3.627)
Number of member states	−0.109*	−0.166***	−0.157***	−0.209***	−0.126*	−0.180***
	(0.0618)	(0.0603)	(0.0607)	(0.0728)	(0.0662)	(0.0656)
Enforcement	−2.841	−4.113	−3.105	−3.645	−4.171	−3.498
	(2.698)	(2.596)	(2.729)	(2.539)	(2.548)	(2.711)
Development	9.072*	6.627	7.829*	6.290	6.819*	5.440
	(4.738)	(4.327)	(4.440)	(4.665)	(4.142)	(3.995)
Environmental protection	7.753***	7.548**	7.662**	7.156**	7.469**	6.708**
	(3.009)	(3.211)	(3.011)	(2.897)	(2.925)	(3.027)
Level playing field	4.566	2.536	3.359	3.510	3.559	3.532
	(4.429)	(3.906)	(4.109)	(4.132)	(3.780)	(4.293)
Policy coherence	9.093**	10.06**	10.21**	9.425**	10.62**	9.996**
	(4.371)	(4.714)	(4.695)	(4.715)	(4.879)	(4.908)
Implementation	7.277*	5.653	6.397*	3.548	6.675*	5.787
	(3.975)	(3.860)	(3.803)	(3.537)	(3.898)	(3.681)
Regulatory space	22.48***	25.94***	22.86***	29.47***	26.68***	30.41***
	(5.777)	(6.839)	(5.906)	(7.225)	(6.338)	(7.192)
Issue-specific	−10.12**	−11.03***	−10.34***	−10.23***	−10.33***	−11.19***
	(3.968)	(3.866)	(3.913)	(3.825)	(3.446)	(3.923)
Squared correlation coefficient	0.3956	0.3431	0.3467	0.3467	0.3847	0.3793
Observations	255	254	255	250	258	258

Note: Robust standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.

TABLE B3　Total diffusion including period indicators (negative binomial regression, average marginal effects)

Definition of innovating country based on	(25) Economic power (GDP/ world GDP)	(26) Economic power (GDPpc)	(27) Environmental credibility	(28) PTA average	(29) n.a.	(30) n.a.
Economic power (GDP/ world GDP)	−42.22**		−7.160			
	(18.23)		(11.51)			
Economic power (GDPpc)		0.000232				
		(0.000155)				
Economic power (GDP, PTA average)				0.771		
				(1.037)		
Environmental credibility	76.59***	−6.387	28.40*	26.00		
	(27.85)	(25.09)	(17.14)	(33.63)		
EU country involved					−2.168	
					(4.449)	
US involved						−0.374
						(4.134)
Intercontinental agreement	17.51***	18.73***	18.89***	18.22***	19.89***	19.73***
	(4.410)	(4.450)	(4.256)	(4.519)	(4.618)	(4.698)
Number of member states	−0.202**	−0.265***	−0.265***	−0.191**	−0.255***	−0.272***
	(0.0863)	(0.0766)	(0.0805)	(0.0813)	(0.0901)	(0.0856)
Enforcement	−0.975	−0.482	−0.815	−0.918	−1.709	−1.404
	(4.958)	(4.777)	(4.942)	(4.627)	(4.910)	(5.122)
Development	9.223	7.582	7.193	7.126	5.205	4.975
	(6.768)	(6.194)	(6.261)	(6.211)	(6.104)	(6.064)
Environmental protection	8.135**	9.123**	7.730**	7.846**	7.774*	7.585*
	(4.097)	(4.166)	(3.896)	(3.724)	(4.078)	(4.214)
Level playing field	9.004	6.552	6.671	6.622	6.488	6.318
	(6.983)	(6.536)	(6.530)	(6.189)	(6.594)	(6.625)
Policy coherence	15.03**	18.08**	16.75**	17.74***	15.77**	15.99**
	(6.377)	(7.062)	(6.777)	(6.832)	(6.616)	(6.720)
Implementation	2.844	3.379	2.760	1.820	2.025	2.139
	(4.784)	(4.705)	(4.682)	(4.500)	(4.718)	(4.690)
Regulatory space	25.48***	28.97***	26.91***	27.73***	29.42***	29.92***
	(7.166)	(7.409)	(7.525)	(6.900)	(7.552)	(7.666)
Issue-specific	−10.23**	−9.783*	−9.780*	−10.02**	−11.11**	−11.24**
	(5.036)	(5.140)	(5.072)	(4.775)	(4.984)	(4.929)
1981–90	−22.07***	−25.24***	−20.62***	−21.49***	−20.57***	−20.52***
	(5.336)	(6.280)	(5.259)	(5.703)	(5.136)	(5.074)
1991–95	−18.38***	−21.48***	−17.27***	−18.52***	−17.26***	−16.62***
	(5.871)	(6.030)	(5.410)	(6.123)	(5.167)	(5.263)
>1996	−15.58***	−20.17***	−14.11***	−16.03***	−14.43***	−13.72***
	(5.700)	(6.947)	(5.418)	(6.048)	(5.402)	(5.319)

(Continues)

TABLE B3 (Continued)

	(25)	(26)	(27)	(28)	(29)	(30)
Definition of innovating country based on	Economic power (GDP/world GDP)	Economic power (GDPpc)	Environmental credibility	PTA average	n.a.	n.a.
Squared correlation coefficient	0.4997	0.4776	0.4979	0.4894	0.4762	0.4720
Observations	256	255	256	251	259	259

Note: Robust standard errors in parentheses.
***p < 0.01.
**p < 0.05.
*p < 0.1.

TABLE B4 External diffusion including period indicators (negative binomial regression, average marginal effects)

	(31)	(32)	(33)	(34)	(35)	(36)
Definition of innovating country based on	Economic power (GDP/world GDP)	Economic power (GDPpc)	Environmental credibility	PTA average	n.a.	n.a.
Economic power (GDP/world GDP)	−47.36***		−20.06**			
	(16.58)		(9.914)			
Economic power (GDPpc)		0.000156				
		(0.000134)				
Economic power (GDP, PTA average)				0.275		
				(0.774)		
Environmental credibility	35.38*	−32.87	0.0922	−26.73		
	(19.58)	(21.12)	(12.89)	(23.96)		
EU country involved					−5.731*	
					(3.230)	
US involved						−4.538
						(3.307)
Intercontinental agreement	10.49***	10.58***	11.07***	9.343**	10.12***	9.984***
	(3.811)	(3.756)	(3.700)	(3.755)	(3.707)	(3.807)
Number of member states	−0.0983	−0.163**	−0.150**	−0.178**	−0.111	−0.157**
	(0.0689)	(0.0658)	(0.0667)	(0.0780)	(0.0715)	(0.0726)
Enforcement	−0.490	−1.549	−0.961	−1.690	−2.296	−1.152
	(3.323)	(3.119)	(3.280)	(2.963)	(3.040)	(3.307)
Development	8.458*	6.743	6.732	5.861	5.769	4.696
	(4.671)	(4.453)	(4.198)	(4.210)	(4.226)	(3.753)
Environmental protection	8.566***	8.900***	8.206***	7.760***	8.235***	7.624**
	(3.136)	(3.380)	(3.066)	(2.919)	(3.071)	(3.121)
Level playing field	7.079	4.334	5.206	5.153	5.442	5.976
	(5.123)	(4.575)	(4.717)	(4.641)	(4.652)	(5.067)
Policy coherence	10.29**	11.22**	11.01**	10.02**	10.09**	10.68**
	(4.956)	(5.390)	(5.258)	(4.922)	(5.124)	(5.147)

(Continues)

TABLE B4 (Continued)

Definition of innovating country based on	(31) Economic power (GDP/world GDP)	(32) Economic power (GDPpc)	(33) Environmental credibility	(34) PTA average	(35) n.a.	(36) n.a.
Implementation	4.234	3.008	3.516	1.856	3.122	3.359
	(3.224)	(3.090)	(3.116)	(2.974)	(3.120)	(3.114)
Regulatory space	22.76***	24.84***	23.85***	28.25***	26.16***	29.46***
	(5.932)	(6.207)	(6.322)	(6.941)	(6.380)	(7.171)
Issue-specific	−9.501**	−9.501**	−9.552**	−9.463**	−9.427***	−10.43***
	(3.933)	(3.819)	(3.888)	(3.697)	(3.488)	(3.825)
1981–90	−13.90***	−16.07***	−12.41***	−11.40***	−12.75***	−13.02***
	(3.938)	(5.447)	(3.955)	(4.211)	(4.080)	(3.658)
1991–95	−10.62**	−15.25***	−10.82***	−9.856**	−13.32***	−10.09**
	(4.346)	(4.863)	(3.938)	(4.351)	(3.770)	(4.042)
>1996	−8.617**	−13.82**	−8.235**	−6.800	−9.819**	−6.896*
	(4.200)	(5.747)	(3.924)	(4.359)	(4.150)	(4.111)
Squared correlation coefficient	0.4943	0.4397	0.4726	0.4492	0.4894	0.4761
Observations	255	254	255	250	258	258

Note: Robust standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.

TABLE B5 Total diffusion (zero-inflated negative binomial regression, average marginal effects)

Definition of in-novating country based on	(37) Economic power (GDP/world GDP)	(38) Economic power (GDPpc)	(39) Environmental credibility	(40) PTA average	(41) n.a.	(42) n.a.
Economic power (GDP/world GDP)	−39.11**		−14.58			
	(15.85)		(10.88)			
Economic power (GDPpc)		2.60e-05				
		(0.000133)				
Economic power (GDP, PTA average)				1.051		
				(1.004)		
Environmental credibility	62.84***	6.454	24.52	−6.716		
	(21.68)	(22.70)	(17.65)	(31.83)		
EU country involved					−1.204	
					(4.363)	
US involved						−0.641
						(3.865)
Intercontinental agreement	18.75***	20.00***	20.51***	19.23***	21.24***	21.07***
	(4.436)	(4.448)	(4.386)	(4.641)	(4.608)	(4.704)
Number of member states	−0.197**	−0.264***	−0.262***	−0.220***	−0.264***	−0.275***
	(0.0765)	(0.0719)	(0.0735)	(0.0769)	(0.0867)	(0.0767)
Enforcement	−2.867	−3.523	−2.742	−2.615	−3.811	−3.561
	(4.522)	(4.428)	(4.604)	(4.390)	(4.443)	(4.641)
Development	9.551	6.855	8.194	6.751	6.307	6.024
	(6.733)	(6.522)	(6.562)	(6.584)	(6.203)	(6.182)
Environmental protection	6.901*	6.724*	6.761*	6.710*	6.732*	6.485
	(3.808)	(4.059)	(3.780)	(3.677)	(3.930)	(3.995)
Level playing field	5.307	3.086	3.667	3.821	2.980	2.857
	(6.172)	(5.884)	(6.007)	(5.760)	(5.748)	(5.796)
Policy coherence	12.82**	14.25**	14.48**	14.87**	13.84**	13.74**
	(5.533)	(6.009)	(5.890)	(5.935)	(5.766)	(5.906)
Implementation	7.166	6.248	6.531	4.294	5.798	5.681
	(5.673)	(5.717)	(5.513)	(5.250)	(5.389)	(5.323)
Regulatory space	25.25***	30.57***	25.80***	29.34***	30.43***	30.83***
	(7.135)	(8.160)	(7.122)	(7.363)	(7.739)	(7.815)
Issue-specific	−11.42**	−11.97**	−11.21**	−11.75**	−12.57**	−12.65**
	(5.062)	(5.236)	(5.175)	(5.002)	(5.010)	(4.971)
Squared correlation coefficient	0.4326	0.4038	0.4060	0.3994	0.4295	0.4282
Observations	256	255	256	251	259	259

Note: Standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.

TABLE B6 External diffusion (zero-inflated negative binomial regression, average marginal effects)

Definition of innovating country based on	(43) Economic power (GDP/ world GDP)	(44) Economic power (GDPpc)	(45) Environmental credibility	(46) PTA average	(47) n.a.	(48) n.a.
Economic power (GDP/ world GDP)	−41.31***		−22.19**			
	(13.62)		(9.330)			
Economic power (GDPpc)		4.09e-05				
		(0.000111)				
Economic power (GDP, PTA average)				0.733		
				(0.816)		
Environmental credibility	25.89	−28.76	−4.404	−41.17*		
	(15.84)	(19.07)	(13.12)	(23.33)		
EU country involved					−4.436	
					(3.225)	
US involved						−4.138
						(3.330)
Intercontinental agreement	13.32***	14.00***	14.46***	12.08***	13.72***	13.46***
	(3.416)	(3.551)	(3.512)	(3.707)	(3.588)	(3.667)
Number of member states	−0.144**	−0.198***	−0.188***	−0.220***	−0.158**	−0.208***
	(0.0632)	(0.0632)	(0.0628)	(0.0735)	(0.0690)	(0.0676)
Enforcement	−2.597	−4.283	−2.978	−3.446	−4.337	−3.457
	(3.210)	(3.160)	(3.279)	(3.020)	(3.083)	(3.305)
Development	7.873*	5.378	6.642	5.354	5.501	4.510
	(4.698)	(4.509)	(4.526)	(4.654)	(4.291)	(4.109)
Environmental protection	6.797**	6.563*	6.648**	6.087**	6.262**	5.692*
	(3.098)	(3.468)	(3.143)	(2.984)	(3.151)	(3.145)
Level playing field	3.784	1.762	2.631	2.872	2.795	2.870
	(4.517)	(4.213)	(4.283)	(4.274)	(4.079)	(4.462)
Policy coherence	8.712*	9.054*	9.510*	9.162*	9.787*	9.353*
	(4.580)	(4.868)	(4.855)	(4.955)	(5.086)	(5.112)
Implementation	5.932	4.129	5.050	2.596	5.213	4.610
	(4.011)	(4.096)	(3.935)	(3.692)	(4.062)	(3.890)
Regulatory space	24.32***	27.32***	24.94***	30.43***	27.98***	31.32***
	(6.209)	(7.284)	(6.286)	(7.420)	(6.763)	(7.517)
Issue-specific	−10.49***	−11.69***	−10.77***	−10.44***	−10.65***	−11.33***
	(4.053)	(4.065)	(4.025)	(3.934)	(3.592)	(3.990)
Squared correlation coefficient	0.3816	0.3318	0.3437	0.3455	0.3770	0.3718
Observations	255	254	255	250	258	258

Note: Standard errors in parentheses.

***$p < 0.01$.

**$p < 0.05$.

*$p < 0.1$.