

Online supplementary appendix for
“Sectoral Trade Effects of Heterogeneous Environmental Provisions in Trade
Agreements: Exploring the Margins”

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Note: The material contained herein is supplementary to the article named in the title

Appendix A – Classification of countries and territories based on income level.....	2
Appendix B – Summary statistics.....	3
Appendix C – Categorization of environmental provisions	4
Appendix D – 2-digit HS sector grouping	9
Appendix E – Robustness checks	10
Appendix F – Heterogenous effects of environmental provisions on export volumes.....	17
Appendix G – Effects of environmental provisions on export unit values.....	22

Appendix A – Classification of countries and territories based on income level

Table A1. List of high-income and low-income countries and territories

High-income				
Andorra	Cayman Islands	Guam	Netherlands Antilles	Singapore
Antigua and Barbuda	Croatia	Hong Kong	Netherlands	Slovakia
Aruba	Cyprus	Hungary	New Caledonia	Slovenia
Australia	Czech Republic	Iceland	New Zealand	South Korea
Austria	Denmark	Ireland	Northern Mariana Islands	Spain
Bahamas	Estonia	Israel	Norway	Sweden
Bahrain	Finland	Italy	Oman	Switzerland
Barbados	France	Japan	Poland	Trinidad and Tobago
Belgium	French Polynesia	Kuwait	Portugal	Turks and Caicos Islands
Bermuda	Germany	Luxembourg	Qatar	United Arab Emirates
Brunei	Greece	Macao	San Marino	United Kingdom
Canada	Greenland	Malta	Saudi Arabia	United States of America
Low-income				
Afghanistan	Costa Rica	Iraq	Namibia	South Africa
Albania	Côte d'Ivoire	Jamaica	Nauru	South Sudan
Algeria	Cuba	Jordan	Nepal	Sri Lanka
American Samoa	Curaçao	Kazakhstan	Nicaragua	Sudan
Angola	DR Congo	Kenya	Niger	Suriname
Argentina	Djibouti	Kiribati	Nigeria	Syria
Armenia	Dominica	Kyrgyzstan	North Korea	Tajikistan
Azerbaijan	Dominican Republic	Lao	North Macedonia	Tanzania
Bangladesh	Ecuador	Latvia	Pakistan	Thailand
Belarus	Egypt	Lebanon	Palau	Timor-Leste
Belize	El Salvador	Lesotho	Palestine	Togo
Benin	Equatorial Guinea	Liberia	Panama	Tonga
Bhutan	Eritrea	Libya	Papua New Guinea	Tunisia
Bolivia	Eswatini	Lithuania	Paraguay	Turkey
Bosnia and Herzegovina	Ethiopia	Madagascar	Peru	Turkmenistan
Botswana	Fiji	Malawi	Philippines	Tuvalu
Brazil	Gabon	Malaysia	Romania	Uganda
British Virgin Islands	Gambia	Maldives	Russia	Ukraine
Bulgaria	Georgia	Mali	Rwanda	Uruguay
Burkina Faso	Ghana	Marshall Islands	Saint Kitts and Nevis	Uzbekistan
Burundi	Gibraltar	Mauritania	Saint Lucia	Vanuatu
Cabo Verde	Grenada	Mauritius	Saint Vincent and Grenadines	Venezuela
Cambodia	Guatemala	Mayotte	Samoa	Viet Nam
Cameroon	Guinea	Mexico	Sao Tome and Principe	Yemen
Central African Republic	Guinea-Bissau	Micronesia	Senegal	Zambia
Chad	Guyana	Moldova	Serbia	Zimbabwe
Chile	Haiti	Mongolia	Seychelles	
China	Honduras	Montenegro	Sierra Leone	
Colombia	India	Morocco	Sint Maarten	
Comoros	Indonesia	Mozambique	Solomon Islands	
Congo	Iran	Myanmar	Somalia	

Appendix B – Summary statistics

Table B1. Descriptive statistics for selected variables

	N	Mean	Std. dev.	Min	Max
<i>All preferential trade agreements (PTAs)</i>					
Number by type of environmental provisions (EPs)					
All EPs	708	16.117	25.080	0	134
Defensive EPs	708	4.484	6.265	0	31
Offensive EPs	708	3.757	7.720	0	48
Trade-restrictive EPs	708	3.328	5.317	0	35
Liberal EPs	708	0.850	1.883	0	11
Depth (normalized)	708	1.569	1.045	0	3.593
Enforceability	708	1.947	1.998	0	5.750
<i>All Country Dyads</i>					
Export values (annual total, billion current US\$)	42,400,661	0.004	0.100	1×10^{-9}	85
Export volumes (annual total, million metric tons)	42,400,661	0.003	0.416	1×10^{-9}	720
Export margins					
Extensive	3,336,260	0.006	0.022	1.58×10^{-11}	0.696
Intensive	3,336,260	0.510	1.861	2.15×10^{-9}	344
PTA (Yes==1)	42,400,661	0.452	0.498	0	1
Number by type EPs					
All EPs	42,400,661	3.142	14.938	0	153
Defensive EPs	42,400,661	0.637	3.040	0	31
Offensive EPs	42,400,661	0.908	4.770	0	57
Trade-restrictive EPs	42,400,661	0.640	3.180	0	35
Liberal EPs	42,400,661	0.190	0.976	0	11
Depth (normalized)	42,400,661	0.063	0.421	0	3.593
Enforceability	42,400,661	0.095	0.624	0	5.250
Regulatory quality (normalized)	42,306,138	0.656	0.172	0	1

Appendix C – Categorization of environmental provisions

Table C1. Classification of environmental provisions

Environment provision	Classification 1			Classification 2		
	Defensive	Offensive	Neutral (i.e., neither defensive nor offensive)	Trade- restrictive	Liberal	Neutral (i.e., neither trade-restrictive nor liberal)
Preamble refers to the environment	0	0	1	0	0	1
Common but differentiated responsibilities principle	0	0	1	0	0	1
Prevention principle	0	0	1	0	0	1
Precautionary principle	1	0	0	1	0	0
Polluter pays principle	0	0	1	0	0	1
Damage should be rectified at source	0	0	1	0	0	1
Sovereignty over natural resources in general	1	0	0	0	0	1
Sovereignty over genetic resources	0	0	1	0	0	1
Sovereignty over hydrobiological and fishery resources	1	0	0	0	0	1
Sovereignty in determining the level of protection according to State priorities	1	0	0	0	0	1
Sovereignty in the enforcement of environmental measures	1	0	0	0	0	1
Sovereignty or independence of national tribunals in the application of environmental measures	1	0	0	0	0	1
Explicit mention of the illegality of extraterritorial enforcement activities	1	0	0	0	0	1
No right of action against opposing Party under own domestic law	1	0	0	0	0	1
Environmental protection as a precondition for trade or development	0	0	1	0	0	1
Reference to mutual supportiveness between environment and trade or development	0	0	1	0	0	1
Cost-benefit analysis with regard to environmental measures	0	0	1	0	0	1
Inappropriate to encourage trade by relaxing environmental measures	0	1	0	1	0	0
Inappropriate to encourage investment by relaxing environmental measures	0	1	0	1	0	0
Maintain existing level of environmental protection	0	1	0	0	0	1
Laws and regulations should provide for high levels of environmental protection	0	1	0	1	0	0
Commitment to enhance, strengthen or improve levels of environmental protection	0	1	0	1	0	0
Definition of environmental law, environmental governance, etc.	0	0	1	0	0	1
Inappropriate to set a high level of environmental protection for protectionist purposes	0	1	0	0	1	0
Scientific knowledge when designing environmental measures	0	1	0	0	1	0
Scientific knowledge when making environmental risk assessment	0	1	0	0	1	0
Public participation in the adoption of environmental measures	0	1	0	0	0	1
Public participation in environmental impact assessment	0	1	0	0	0	1
Publication of environmental laws, regulations and administrative rulings	0	1	0	0	0	1
Identification of measures, restrictions or prohibitions in terms of tariff	0	1	0	0	0	1
Commitment to monitor the state of the environment	0	1	0	0	0	1
Requirement to conduct environmental assessment	0	1	0	1	0	0
Commitment to invest in environmental research and science	0	0	1	0	0	1
Establishment or support of national standard bodies	0	0	1	0	0	1
General coherence between environmental and economic policies	0	0	1	0	0	1
Coherence with domestic trade or investment policies	0	0	1	0	0	1
Interaction between energy policies and the environment	0	0	1	1	0	0
Interaction between mining and the environment	0	0	1	1	0	0
Interaction between tourism and the environment	0	0	1	1	0	0
Interaction between gender policies and the environment	0	0	1	0	0	1
Interaction between social issues and the environment	0	0	1	0	0	1
Interaction between rural development and the environment	0	0	1	1	0	0
Interaction between urban development and the environment	0	0	1	1	0	0
Interaction between land-use planning and the environment	0	0	1	1	0	0
Interaction between construction activities and the environment	0	0	1	1	0	0
Interaction between agriculture and the environment	0	0	1	1	0	0
Interaction between indigenous communities or traditional knowledge and the environment	0	0	1	0	0	1
Interaction between human health and the environment	0	0	1	0	0	1
Interaction between industrial activities and the environment	0	0	1	1	0	0
Interaction between transport and the environment	0	0	1	1	0	0
Binding obligations to enforce environmental measures	0	0	1	0	0	1
Specific governmental action for enforcement	0	1	0	0	0	1
Private access to remedies, procedural guarantees and appropriate sanctions	0	1	0	0	0	1
Commitment to consider alleged violation brought by a citizen of any Party	0	1	0	0	0	1
Commitment to consider alleged violation brought by foreigners	0	1	0	0	0	1
Cooperation on enforcement	0	0	1	0	0	1
Factual report on enforcement	0	1	0	0	0	1
Environmental education or public awareness	0	1	0	0	0	1

Table C1 (continued)

Environment provision	Classification 1			Classification 2		
	Defensive	Offensive	Neutral (i.e., neither defensive nor offensive)	Trade- restrictive	Liberal	Neutral (i.e., neither trade-restrictive nor liberal)
Promotion of unspecified voluntary measures of environmental protection	0	0	1	0	1	0
Promotion of specific voluntary measures of environmental protection	0	0	1	0	1	0
Unspecified economic or market instruments meant to promote environmental protection	0	0	1	0	1	0
Specific economic or market instruments meant to promote environmental protection	0	0	1	0	1	0
Encourage production of environmental goods and services	0	0	1	0	1	0
Encouragement to trade or invest in environmental goods and services	0	0	1	0	1	0
Encouragement for specific goods and services	0	0	1	0	1	0
Conduct joint scientific research on the environment	0	0	1	0	0	1
Creation of joint research institutions on the environment	0	0	1	0	0	1
Joint environmental assessment and study or monitoring of environmental concern	0	0	1	0	0	1
Specific means to exchange information related to the environment	0	0	1	0	0	1
Early notification or exchange of information in case of natural disasters, environmental catastrophes or accidents	0	0	1	0	0	1
Provision of information when taking measures to protect the environment	0	0	1	0	0	1
Communication between customs authorities on offenses related to environmental protection	0	0	1	0	0	1
Harmonization of environmental measures	0	1	0	0	1	0
Alignment of a Party's environmental legislation to the other Party's	0	1	0	0	1	0
Avoid exceptional national environmental standards	0	1	0	0	1	0
Mutual recognition of national environmental measures	0	0	1	0	1	0
Harmonization not to be used as a false pretence to lower environmental protection	0	1	0	1	0	0
Possibility to opt out of harmonized environmental norms	1	0	0	0	0	1
Negotiations of environmental agreements	0	0	1	0	0	1
Prohibit the export to the other Party of environmentally harmful good whose use or import is prohibited within that Party's territory	0	0	1	1	0	0
Prohibit the import of environmentally harmful good from a Party where its use or export is prohibited by that Party	0	0	1	1	0	0
Vague commitments to cooperate on environmental matters	0	0	1	0	0	1
General exceptions for trade in goods - Necessary for the protection of life and health of fauna and flora	1	0	0	1	0	0
Conservation of natural resources as a general exception for trade in goods	1	0	0	1	0	0
Protection of the environment as a general exception for trade in goods	1	0	0	1	0	0
Right to conduct a risk assessment	1	0	0	0	0	1
Right to prepare, elaborate, adopt or apply technical barriers to trade measures related to the environment	1	0	0	0	0	1
Right to derogate from the regular adoption procedure of a technical barrier to trade measure in case of emergency	1	0	0	0	0	1
General trade related measure on investment	1	0	0	0	0	1
Specific trade related measure on establishment	1	0	0	0	0	1
Specific trade related measure on performance requirements	1	0	0	0	0	1
Specific trade related measure on expropriation	1	0	0	0	0	1
Foreign investment ban from specific sectors related to the environment	1	0	0	0	0	1
Right to maintain or adopt any measures in regards of investment in a specific sector	1	0	0	0	0	1
Exclusion of Investor-State dispute settlement	1	0	0	0	0	1
Exclusion of environmentally harmful inventions from patentability	1	0	0	1	0	0
Use of geographical indications to protect the environment	1	0	0	0	0	1
General exceptions on procurement and the environment	1	0	0	0	0	1
Technical specification or restriction in tender procedure	1	0	0	1	0	0
Exclusion of specific sectors from procurement liberalization	1	0	0	1	0	0
Cooperation on green public procurement	1	0	0	0	0	1
Exceptions allowing agricultural subsidies related to the environment	1	0	0	0	0	1
Other norms allowing subsidies related to the environment	1	0	0	0	0	1
Prevention of subsidies harmful to the environment	1	0	0	1	0	0
Safeguard measures on environmental grounds	1	0	0	0	0	1
Obligation to respect the environment in outward processing zones	1	0	0	0	0	1
Exception on services linked to life or health of fauna or flora	1	0	0	0	0	1
Exception on services linked to conservation of natural resources	1	0	0	0	0	1
Exception on services linked to protection of the environment	1	0	0	0	0	1

Table C1 (continued)

Environment provision	Classification 1			Classification 2		
	Defensive	Offensive	Neutral (i.e., neither defensive nor offensive)	Trade- restrictive	Liberal	Neutral (i.e., neither trade-restrictive nor liberal)
Norms on environmental services	1	0	0	0	0	1
Exclusion of environmental sectors from the liberalization of services	1	0	0	1	0	0
Right to maintain or adopt any measures in regards of a specific sector of services	1	0	0	0	0	1
SPS measures and the environment	1	0	0	0	0	1
Exception to the free movement of persons	1	0	0	0	0	1
Technical assistance, training or capacity building provided to another Party	0	0	1	0	0	1
Technical assistance, training or capacity-building provided to non-state actors	0	0	1	0	0	1
Technology transfer in the field of environment	0	0	1	0	0	1
Funding of capacity-building, training, technical assistance and technological transfer related to the environment	0	0	1	0	0	1
Funding of cooperation activities related to the environment	0	0	1	0	0	1
Funding provided to non-state actors	0	0	1	0	0	1
Emergency assistance in case of natural disaster	0	0	1	0	0	1
Capacity-building, training, technology transfer, technical, financial and emergency assistance to third countries	0	0	1	0	0	1
Exclusion of water from the agreement	0	1	0	1	0	0
Protection of coral reefs	0	1	0	0	0	1
Protection of seas and oceans	0	1	0	0	0	1
Management of transboundary waterways	0	1	0	0	0	1
Management of rivers, basins and lakes	0	1	0	0	0	1
Protection of coastal areas	0	1	0	0	0	1
Protection of aquifers, ground water and water table	0	1	0	0	0	1
Water efficiency	0	1	0	0	0	1
Protection of wetlands	0	1	0	0	0	1
Contaminated land	0	1	0	0	0	1
Sustainable trade in fishery products	0	1	0	0	0	1
Combat illegal fishing	0	1	0	1	0	0
Prevent pollution arising from fishing activities	0	1	0	0	0	1
Bycatch prevention	0	1	0	0	0	1
Prevent harmful subsidies related to fisheries	0	1	0	1	0	0
Conservation of forests	0	1	0	0	0	1
Sustainable trade in forestry products	0	1	0	0	0	1
Combat illegal exploitation of forests	0	1	0	1	0	0
Endangered species and their illegal trade	0	1	0	1	0	0
Protection of whales and seals	0	1	0	0	0	1
Protection of migratory species	0	1	0	0	0	1
Invasive or alien species	0	1	0	0	0	1
Protection of shared species	0	1	0	0	0	1
Disclosure of the source of genetic material	0	1	0	1	0	0
Prior informed consent from the appropriate authority when accessing genetic resources	0	1	0	1	0	0
Equitable sharing of benefits arising from use of genetic resources	0	1	0	1	0	0
Protected areas, parks and natural reserves	0	1	0	0	0	1
Promotion of renewable production of energy	0	1	0	0	0	1
Promotion of energy efficiency	0	1	0	0	0	1
Reduction of GHG emissions	0	1	0	0	0	1
Climate change adaptation	0	1	0	0	0	1
Cooperation on climate change	0	1	0	0	0	1
Harmonization of legislation related to climate change	0	1	0	0	0	1
Other norms on climate change	0	1	0	0	0	1
Ozone layer and CFC	0	1	0	0	0	1
Air pollution	0	1	0	0	0	1
Environmental standards on vehicle emissions	0	1	0	0	0	1
Soil erosion	0	1	0	0	0	1
Desertification, degradation, salinization and acidification	0	1	0	0	0	1
Biosafety, excluding GMOs	0	1	0	0	0	1
Disaster management or prevention - Oil spill	0	1	0	0	0	1
Domestic waste	0	1	0	0	0	1
Restrictions on export, import or transportation of hazardous waste	0	1	0	1	0	0
Other norms on hazardous waste	0	1	0	0	0	1
Pesticides, fertilizers, toxic or hazardous products and chemicals	0	1	0	0	0	1
Organic foods	0	1	0	0	0	1
Noise pollution	0	1	0	0	0	1
Scenery preservation	0	1	0	0	0	1
Establishment of a contact point on environmental matters	0	0	1	0	0	1
Public communication of actions undertaken pursuant to the agreement	0	0	1	0	0	1

Table C1 (continued)

Environment provision	Classification 1			Classification 2		
	Defensive	Offensive	Neutral (i.e., neither defensive nor offensive)	Trade- restrictive	Liberal	Neutral (i.e., neither trade-restrictive nor liberal)
Commitment to communicate the decisions or recommendations of joint institutions	0	0	1	0	0	1
Commitment to make available communications received from the public	0	0	1	0	0	1
Public sessions of joint institutions	0	0	1	0	0	1
Public participation in the implementation of the agreement	0	0	1	0	0	1
Direct contact between non-state actors of both Parties	0	0	1	0	0	1
Environmental impact assessment of the agreement	0	0	1	1	0	0
Establishment of an international secretariat to administer environmental norms of the treaty	0	0	1	0	0	1
Stakeholders international committee	0	0	1	0	0	1
Environmental experts as panellists or mediators for state-state dispute over failure to enforce environmental measures or provisions of the trade agreement	1	0	0	1	0	0
Environmental experts as panellists or mediators in state-state dispute over trade provisions of the trade agreement	1	0	0	1	0	0
Production of an environmental report in state-state dispute over failure to enforce environmental measures or provisions of the trade agreement	1	0	0	1	0	0
Production of an environmental report in state-state dispute over trade provisions of the trade agreement	1	0	0	1	0	0
Dispute Settlement Mechanism - Non-jurisdictional mechanism for failure to enforce environmental measures	0	1	0	0	0	1
Dispute Settlement Mechanism - Monetary enforcement assessments for failure to enforce environmental measures	0	1	0	0	0	1
Dispute Settlement Mechanism - Suspension of benefits in case of failure to enforce or to pay	0	1	0	0	0	1
Specific preliminary steps in a dispute settlement mechanism	0	0	1	0	0	1
Specific non-jurisdictional dispute settlement mechanism	0	0	1	0	0	1
General procedures in dispute settlement mechanism	0	1	0	0	0	1
General measures regarding suspension of benefits as a dispute settlement mechanism	0	1	0	0	0	1
Exclusion of multilateral environmental agreements dispute settlement mechanisms	0	0	1	0	1	0
Consent to use the dispute settlement mechanism of a multilateral environmental agreements	1	0	0	1	0	0
Panel shall consult or defer to any relevant entity the interpretation of a Party's obligation under a multilateral environmental agreement	1	0	0	1	0	0
Ratification of CITES	0	1	0	1	0	0
Ratification of the Montreal Protocol	0	1	0	1	0	0
Ratification of the Basel Convention	0	1	0	1	0	0
Ratification of the Rotterdam Convention	0	1	0	1	0	0
Ratification of Stockholm Convention	0	1	0	1	0	0
Ratification of the UNFCCC	0	1	0	0	0	1
Ratification of the Kyoto Protocol	0	1	0	1	0	0
Ratification of CBD	0	1	0	1	0	0
Ratification of Cartagena Protocol	0	1	0	1	0	0
Ratification of Nagoya Protocol	0	1	0	1	0	0
Implementation of the whole CITES	0	1	0	1	0	0
Implementation of a specific part of CITES	0	1	0	1	0	0
Implementation of the whole Montreal Protocol	0	1	0	1	0	0
Implementation of a specific part of the Montreal Protocol	0	1	0	1	0	0
Implementation of the whole Basel Convention	0	1	0	1	0	0
Implementation of a specific part of the Basel Convention	0	1	0	1	0	0
Implementation of the whole Marpol Convention	0	1	0	0	0	1
Implementation of the whole Rotterdam Convention	0	1	0	1	0	0
Implementation of a specific part of the Rotterdam Convention	0	1	0	1	0	0
Implementation of the whole Stockholm Convention	0	1	0	1	0	0
Implementation of a specific part of the Stockholm Convention	0	1	0	1	0	0
Implementation of the whole Ramsar Convention	0	1	0	0	0	1
Implementation of the whole CCAMLR	0	1	0	0	0	1
Implementation of the whole Whaling Convention	0	1	0	0	0	1
Implementation of the whole UNFCCC	0	1	0	0	0	1
Implementation of the whole Kyoto Protocol	0	1	0	1	0	0
Implementation of a specific part of the Kyoto Protocol	0	1	0	1	0	0
Implementation of the whole CBD	0	1	0	1	0	0
Implementation of a specific part of the CBD	0	1	0	1	0	0
Implementation of the whole Cartagena Protocol	0	1	0	1	0	0
Implementation of a specific part of the Cartagena Protocol	0	1	0	1	0	0
Implementation of the whole Nagoya Protocol	0	1	0	1	0	0
Implementation of a specific part of the Nagoya Protocol	0	1	0	1	0	0
Implementation Stockholm declaration (1972)	0	1	0	0	0	1

Table C1 (continued)

Environment provision	Classification 1			Classification 2		
	Defensive	Offensive	Neutral (i.e., neither defensive nor offensive)	Trade- restrictive	Liberal	Neutral (i.e., neither trade-restrictive nor liberal)
Implementation Rio declaration (1992)	0	1	0	0	0	1
Implementation Agenda 21 (1992)	0	1	0	0	0	1
Implementation Johannesburg declaration of 2002	0	1	0	0	0	1
Prevalence of CITES in case of inconsistency	1	0	0	1	0	0
Prevalence of the Montreal Protocol in case of inconsistency	1	0	0	1	0	0
Prevalence of the Basel Convention in case of inconsistency	1	0	0	1	0	0
Prevalence of the MARPOL Convention in case of inconsistency	1	0	0	0	0	1
Prevalence of the Rotterdam Convention in case of inconsistency	1	0	0	1	0	0
Prevalence of the Stockholm Convention in case of inconsistency	1	0	0	1	0	0
Prevalence of the Ramsar Convention in case of inconsistency	1	0	0	0	0	1
Prevalence of the CCAMLR in case of inconsistency	1	0	0	0	0	1
Prevalence of the International Convention for the Regulation of Whaling in case of inconsistency	1	0	0	0	0	1
Prevalence of the Kyoto Protocol in case of inconsistency	1	0	0	1	0	0
Prevalence of the CBD in case of inconsistency	1	0	0	1	0	0
Prevalence of the Cartagena Protocol in case of inconsistency	1	0	0	1	0	0
Prevalence of the Nagoya Protocol in case of inconsistency	1	0	0	1	0	0
Other references to the CITES	0	0	1	0	0	1
Other references to the Montreal Protocol	0	0	1	0	0	1
Other references to the Basel Convention	0	0	1	0	0	1
Other references to the MARPOL	0	0	1	0	0	1
Other references to the RAMSAR Convention	0	0	1	0	0	1
Other references to the CCAMLR	0	0	1	0	0	1
Other references to the Whaling Convention	0	0	1	0	0	1
Other references to the UNFCCC	0	0	1	0	0	1
Other references to the Kyoto Protocol	0	0	1	0	0	1
Other references to the CBD	0	0	1	0	0	1
Other references to the Nagoya Protocol	0	0	1	0	0	1
Other references to the Stockholm Declaration (1972)	0	0	1	0	0	1
Other references to the Rio Declaration (1992)	0	0	1	0	0	1
Other references to the Agenda 21 (1992)	0	0	1	0	0	1
Other references to the Johannesburg Declaration (2002)	0	0	1	0	0	1
References to the Johannesburg Plan of Implementation (2002)	0	0	1	0	0	1
References to the Rio+20 outcome document (2012)	0	0	1	0	0	1
References to the UNEP	0	0	1	0	0	1
References to the REDD programme	0	0	1	0	0	1
Any inconsistency between a trade agreement and any other agreement shall be resolved by consultation	0	0	1	0	0	1
Prevalence of the trade agreement in case of inconsistency with any other agreement	0	0	1	0	1	0
International standards are presumed to be in conformity with the trade agreement's obligations	1	0	0	0	1	0
International standards or risk assessments carried out by international organizations should be used or taken into account when designing environmental measures	0	1	0	0	1	0
Right to adopt stringer standards than international ones	1	0	0	0	0	1
Party should use methods of risk assessment developed by international organizations	0	1	0	0	1	0

Note: A value of 1 indicates “Yes” while a 0 value indicates “No”. Source: Authors’ elaborations based on data from TREND and a codebook developed by Morin et al. (2018) and adapted by Brandi et al. (2020). Both the data and codebook can be accessed at <https://www.chaire-epi.ulaval.ca/en/trend>

Appendix D – 2-digit HS sector grouping

Table D1: Classification of 2-digit HS chapters into twenty-one (21) sector groups

2-digit HS group	2-digit HS chapters included
Animals	HS01, HS02, HS03, HS04, HS05
Vegetables	HS06, HS07, HS08, HS09, HS10, HS11, HS12, HS13, HS14;
Fats	HS15
Prepared foods	HS16, HS17, HS18, HS19, HS20, HS21, HS22, HS23, HS24
Minerals	HS25, HS26, HS27
Chemicals	HS28, HS29, HS30, HS31, HS32, HS33, HS34, HS35, HS36, HS37, HS38
Plastics	HS39, HS40
Leather	HS41, HS42, HS43
Wood	HS44, HS45, HS46
Paper	HS47, HS48, HS49
Textile	HS50, HS51, HS52, HS53, HS54, HS55, HS56, HS57, HS58, HS59, HS60, HS61, HS62, HS63
Footwear	HS64, HS65, HS66, HS67
Stone cement	HS68, HS69, HS70
Precious	HS71
Metals	HS72, HS73, HS74, HS75, HS76, HS78, HS79, HS80, HS81, HS82, HS83
Machinery	HS84, HS85
Vehicles	HS86, HS87, HS88, HS89
Instruments	HS90, HS91, HS92
Arms	HS93
Miscellaneous	HS94, HS95, HS96
Art	HS97

Appendix E – Robustness checks

Table E1a: Heterogenous effects of environmental provisions on export values across different levels of enforcement mechanisms

	Specification 1		Specification 2		Specification 3	
	Coefficient (1)	SE (2)	Coefficient (3)	SE (4)	Coefficient (5)	SE (6)
EP _{ij,t}	0.0000	0.0001				
EP _{ij,t} × Enf _{ij,t}	-0.0002	0.0003				
Neutral_EP _{ij,t}			0.0003	0.0011	-0.0002	0.0014
Neutral_EP _{ij,t} × Enf _{ij,t}			0.0022	0.0017	-0.0009	0.0017
Defensive_EP _{ij,t}			0.0100***	0.0020		
Defensive_EP _{ij,t} × Enf _{ij,t}			-0.0078***	0.0025		
Offensive_EP _{ij,t}			-0.0065***	0.0014		
Offensive_EP _{ij,t} × Enf _{ij,t}			0.0017	0.0022		
Restrictive_EP _{ij,t}					0.0150***	0.0047
Restrictive_EP _{ij,t} × Enf _{ij,t}					-0.0084	0.0052
Liberal_EP _{ij,t}					-0.0516***	0.0108
Liberal_EP _{ij,t} × Enf _{ij,t}					0.0386***	0.0123
PTA _{ij,t}	0.0364***	0.0096	0.0302***	0.0097	0.0367***	0.0096
Depth _{ij,t}	-0.0081	0.0074	-0.0168**	0.0084	-0.0084	0.0087
Exporter-industry-year FE	Yes		Yes		Yes	
Importer- industry-year FE	Yes		Yes		Yes	
Exporter-importer-industry FE	Yes		Yes		Yes	
N	42,400,661		42,400,661		42,400,661	

Notes: PTA_{ij,t} is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t. PTA_{ij,t} = 1 if countries i and j signed a trade agreement in year t and PTA_{ij,t} = 0 otherwise. Enf_{ij,t} is a dummy variable that takes a value of 1 if exporting country i and importing country j signed a PTA that has strong enforcement mechanisms (i.e., an enforcement index value larger than the median enforcement index value of 2) in year t and a value of zero, otherwise. EP_{ij,t} is the total number of environmental provisions in the PTA. Neutral_EP_{ij,t}, Defensive_EP_{ij,t}, Offensive_EP_{ij,t}, Restrictive_EP_{ij,t}, and Liberal_EP_{ij,t} are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth_{ij,t} is the normalized depth index. The standard errors, clustered at the exporter-importer-year level, are presented in columns (2), (4) and (6). ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E1b: Heterogenous export volume effects of environmental provisions across different levels of enforcement mechanisms

	Specification 1		Specification 2		Specification 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
	(1)	(2)	(3)	(4)	(5)	(6)
EP _{ij,t}	0.0000	0.0003				
EP _{ij,t} × Enf _{ij,t}	0.0005	0.0006				
Neutral_EP _{ij,t}			-0.0001	0.0033	-0.0021	0.0038
Neutral_EP _{ij,t} × Enf _{ij,t}			0.0029	0.0046	0.0013	0.0042
Defensive_EP _{ij,t}			0.0170***	0.0048		
Defensive_EP _{ij,t} × Enf _{ij,t}			-0.0096	0.0066		
Offensive_EP _{ij,t}			-0.0107***	0.0039		
Offensive_EP _{ij,t} × Enf _{ij,t}			0.0052	0.0059		
Restrictive_EP _{ij,t}					0.0265**	0.0112
Restrictive_EP _{ij,t} × Enf _{ij,t}					-0.0140	0.0126
Liberal_EP _{ij,t}					-0.0650**	0.0255
Liberal_EP _{ij,t} × Enf _{ij,t}					0.0433	0.0273
PTA _{ij,t}	0.0472**	0.0196	0.0409**	0.0198	0.0471**	0.0198
Depth _{ij,t}	-0.0333**	0.0162	-0.0515***	0.0198	-0.0392**	0.0160
Exporter-industry-year FE	Yes		Yes		Yes	
Importer- industry-year FE	Yes		Yes		Yes	
Exporter-importer-industry FE	Yes		Yes		Yes	
N	42,400,661		42,400,661		42,400,661	

Notes: PTA_{ij,t} is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t. PTA_{ij,t} = 1 if countries i and j signed a trade agreement in year t and PTA_{ij,t} = 0 otherwise. Enf_{ij,t} is a dummy variable that takes a value of 1 if exporting country i and importing country j signed a PTA that has strong enforcement mechanisms (i.e., an enforcement index value larger than the median enforcement index value of 2) in year t and a value of zero, otherwise. EP_{ij,t} is the total number of environmental provisions in the PTA. Neutral_EP_{ij,t}, Defensive_EP_{ij,t}, Offensive_EP_{ij,t}, Restrictive_EP_{ij,t}, and Liberal_EP_{ij,t} are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth_{ij,t} is the normalized depth index. The standard errors, clustered at the exporter-importer-year level, are presented in columns (2), (4) and (6). ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E2: Effects of environmental provisions on export values and volumes (excluding exports between EU member countries)

<i>Dependent variable</i>	Specification 1		Specification 2		Specification 3	
	Values (1)	Volumes (2)	Values (3)	Volumes (4)	Values (5)	Volumes (6)
$EP_{ij,t}$	-0.0004*** (0.0001)	-0.0001 (0.0003)				
Neutral_ $EP_{ij,t}$			0.0004 (0.0015)	0.0028 (0.0033)	-0.0018** (0.0008)	-0.0030* (0.0016)
Defensive_ $EP_{ij,t}$			0.0067*** (0.0015)	0.0091*** (0.0033)		
Offensive_ $EP_{ij,t}$			-0.0056*** (0.0018)	-0.0091** (0.0041)		
Restrictive_ $EP_{ij,t}$					0.0123*** (0.0022)	0.0177*** (0.0057)
Liberal_ $EP_{ij,t}$					-0.0251*** (0.0059)	-0.0231* (0.0118)
$PTA_{ij,t}$	0.0390*** (0.0099)	0.0532*** (0.0203)	0.0341*** (0.0099)	0.0451** (0.0206)	0.0382*** (0.0099)	0.0530*** (0.0205)
$Depth_{ij,t}$	-0.0041 (0.0048)	-0.0206* (0.0117)	-0.0108* (0.0058)	-0.0336*** (0.0125)	-0.0046 (0.0048)	-0.0245** (0.0117)
Exporter-industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer- industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-importer-industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	36,388,318	36,388,318	36,388,318	36,388,318	36,388,318	36,388,318

Notes: The dependent variable in columns (1), (3), and (5) is the industry-level annual export values while in columns (2), (4), and (6) is the industry-level annual export volumes. $PTA_{ij,t}$ is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t . $PTA_{ij,t} = 1$ if countries i and j signed a trade agreement in year t and $PTA_{ij,t} = 0$ otherwise. $EP_{ij,t}$ is the total number of environmental provisions in the PTA. Neutral_ $EP_{ij,t}$, Defensive_ $EP_{ij,t}$, Offensive_ $EP_{ij,t}$, Restrictive_ $EP_{ij,t}$, and Liberal_ $EP_{ij,t}$ are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. $Depth_{ij,t}$ is the normalized depth index. Robust standard errors are in parentheses. The standard errors are clustered at the exporter-importer-year level. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E3: Estimates of effects of environmental provisions on export margins

<i>Dependent variable</i>	Specification 1		Specification 2		Specification 3	
	Number of products (1)	Average value per product (2)	Number of products (3)	Average value per product (4)	Number of products (5)	Average value per product (6)
$EP_{ij,t}$	-0.0005*** (0.0001)	0.0001 (0.0003)				
Neutral_EP $_{ij,t}$			-0.0025*** (0.0004)	0.0003 (0.0030)	-0.0004 (0.0003)	0.0009 (0.0017)
Defensive_EP $_{ij,t}$			-0.0010 (0.0007)	0.0102** (0.0045)		
Offensive_EP $_{ij,t}$			0.0026*** (0.0005)	-0.0058 (0.0037)		
Restrictive_EP $_{ij,t}$					0.0018** (0.0008)	0.0046 (0.0050)
Liberal_EP $_{ij,t}$					-0.0090*** (0.0025)	-0.0229 (0.0143)
PTA $_{ij,t}$	-0.0050 (0.0036)	-0.0608** (0.0244)	-0.0036 (0.0036)	-0.0668*** (0.0241)	-0.0050 (0.0036)	-0.0622** (0.0244)
Depth $_{ij,t}$	0.0179*** (0.0024)	0.0201 (0.0143)	0.0215*** (0.0023)	0.0113 (0.0150)	0.0197*** (0.0024)	0.0213 (0.0149)
Exporter-sector-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer-sector-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-importer-sector FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3,336,260	3,336,260	3,336,260	3,336,260	3,336,260	3,336,260

Notes: The dependent variable in columns (1), (3), and (5) is the number of products per HS2 sector while in columns (2), (4), and (6) is the average value per product. All models include a dummy variable ($PTA_{ij,t}$) that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t . $PTA_{ij,t} = 1$ if countries i and j signed a trade agreement in year t and $PTA_{ij,t} = 0$ otherwise. $EP_{ij,t}$ is the total number of environmental provisions in the PTA. Neutral_EP $_{ij,t}$, Defensive_EP $_{ij,t}$, Offensive_EP $_{ij,t}$, Restrictive_EP $_{ij,t}$, and Liberal_EP $_{ij,t}$ are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth $_{ij,t}$ is the normalized depth index and measures depth of the PTA. Robust standard errors, are clustered at the exporter-importer-year level, are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) are included but not reported. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E4a: Heterogenous effects of PTAs with environmental provisions on export values and volumes

Dependent variable	Specification 1		Specification 2		Specification 3	
	Values (1)	Volumes (2)	Values (3)	Volumes (4)	Values (5)	Volumes (6)
PTA _{ij,t}	0.0256*** (0.0088)	0.0319* (0.0186)				
PTAWoEP _{ij,t}			0.0246*** (0.0091)	0.0331* (0.0192)	0.0098 (0.0153)	0.0331* (0.0192)
PTAWEP _{ij,t}			0.0284*** (0.0098)	0.0280 (0.0224)		
PTAWEP_Weak _{ij,t}					0.0232 (0.0809)	0.1539 (0.2233)
PTAWEP_Strong _{ij,t}					0.0009 (0.0812)	0.1117 (0.2242)
Exporter-industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer-industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-importer-industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	42,400,661	42,400,661	42,400,661	42,400,661	42,400,661	42,400,661

Notes: The dependent variable in columns (1), (3) and (5) is industry-level annual bilateral export values while in columns (2), (4) and (6) is industry-level annual bilateral export volumes. PTA_{ij,t} is a dummy variable that captures the presence or absence of a PTA between exporting country i and importing country j in year t. PTA_{ij,t} = 1 if countries i and j signed a trade agreement in year t and PTA_{ij,t} = 0 otherwise. PTAWoEP_{ij,t} = 1 if and only if countries i and j did not sign any PTA that contains environmental provisions in year t and PTAWoEP_{ij,t} = 0 otherwise. PTAWEP_{ij,t} = 1 if countries i and j signed any PTA that included environmental provisions in year t and PTAWEP_{ij,t} = 0 otherwise. PTAWEP_Weak_{ij,t} = 1 if countries i and j signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value no greater than 2 and PTAWEP_Weak_{ij,t} = 0 otherwise. PTAWEP_Strong_{ij,t} = 1 if countries i and j signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value greater than 2 and PTAWEP_Strong_{ij,t} = 0 otherwise. Robust standard errors are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. Standard errors are clustered at the exporter-importer-year level. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E4b: Heterogenous effects of PTAs with environmental provisions on export values and volumes

<i>Dependent variable</i>	Specification 4	
	Export values (1)	Export volumes (2)
PTAWoEP_NN _{ij,t}	0.0217* (0.0111)	-0.0134 (0.0330)
PTAWEP_NN _{ij,t}	0.0188* (0.0110)	-0.0361 (0.0347)
PTAWoEP_NS _{ij,t}	0.0495** (0.0203)	0.1852*** (0.0392)
PTAWEP_NS _{ij,t}	0.0154 (0.0209)	0.1732*** (0.0418)
PTAWoEP_SN _{ij,t}	-0.0003 (0.0238)	-0.0413 (0.0340)
PTAWEP_SN _{ij,t}	0.0200 (0.0266)	-0.0374 (0.0421)
PTAWoEP_SS _{ij,t}	0.0486*** (0.0186)	0.0613 (0.0389)
PTAWEP_SS _{ij,t}	0.1325*** (0.0278)	0.1599*** (0.0487)
Exporter-industry-year FE	Yes	Yes
Importer-industry-year FE	Yes	Yes
Exporter-importer-industry FE	Yes	Yes
N	42,400,661	42,400,661

Notes: The dependent variable is the industry-level annual bilateral export values and export volumes in columns (1) and (2), respectively. N and S represent developed and developing countries, respectively. PTAWoEP_NN_{ij,t} = 1 if and only if both the exporter and importer are high-income countries and they did not sign any PTA that contains environmental provisions year t and PTAWoEP_NN_{ij,t} = 0 otherwise. PTAWEP_NN_{ij,t} = 1 if both the exporter and importer are high-income countries and they signed a PTA that contains environmental provisions year t and PTAWEP_NN_{ij,t} = 0 otherwise. PTAWoEP_NS_{ij,t} = 1 if the exporter is a high-income country and importer is a low-income country and they did not sign any PTA that contains environmental provisions in year t and PTAWEP_NS_{ij,t} = 0 otherwise. PTAWEP_NS_{ij,t} = 1 if the exporter is a high-income country and importer is a low-income country and they signed a PTA that contains environmental provisions in year t and PTAWEP_NS_{ij,t} = 0 otherwise. PTAWoEP_SN_{ij,t} = 1 if the exporter is a low-income country and importer is a high-income country and they did not sign any PTA that contains environmental provisions in year t and PTAWEP_SN_{ij,t} = 0 otherwise. PTAWEP_SN_{ij,t} = 1 if the exporter is a low-income country and importer is a high-income country and they signed a PTA that contains environmental provisions in year t and PTAWEP_SN_{ij,t} = 0 otherwise. PTAWoEP_SS_{ij,t} = 1 if and only if both the exporter and importer are low-income countries and they did not sign any PTA that contains environmental provisions year t and PTAWoEP_SS_{ij,t} = 0 otherwise. PTAWEP_SS_{ij,t} = 1 if both the exporter and importer are low-income countries and they signed a PTA that contains environmental provisions year t and PTAWEP_SS_{ij,t} = 0 otherwise. Standard errors, clustered at the exporter-importer-year level, are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. Both models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table E4c: Heterogenous effects of PTAs with environmental provisions across development status of the trading partners and strength of enforcement mechanisms

<i>Dependent variable</i>	Specification 5	
	Export values (1)	Export volumes (2)
PTAWoEP_NN _{ij,t}	0.0075 (0.0077)	-0.0054 (0.0233)
PTAWEP_Weak_NN _{ij,t}	-39.23 (59.45)	2.091 (24.92)
PTAWEP_Strong_NN _{ij,t}	-39.25 (59.45)	2.012 (24.92)
PTAWoEP_NS _{ij,t}	0.0324** (0.0163)	0.1282*** (0.0332)
PTAWEP_Weak_NS _{ij,t}	-0.5730*** (0.2002)	0.2274 (0.2755)
PTAWEP_Strong_NS _{ij,t}	-0.6127*** (0.2014)	0.2782 (0.2783)
PTAWoEP_SN _{ij,t}	-0.0130 (0.0179)	-0.0432 (0.0284)
PTAWEP_Weak_SN _{ij,t}	-0.4997 (0.3664)	0.0380 (0.4609)
PTAWEP_Strong_SN _{ij,t}	-0.5089 (0.3670)	-0.0270 (0.4629)
PTAWoEP_SS _{ij,t}	-0.0336* (0.0175)	-0.0093 (0.0338)
PTAWEP_Weak_SS _{ij,t}	0.1403*** (0.0523)	0.1973 (0.2887)
PTAWEP_Strong_SS _{ij,t}	0.0956* (0.0575)	0.1820 (0.2912)
Exporter-industry-year FE	Yes	Yes
Importer-industry-year FE	Yes	Yes
Exporter-importer-industry FE	Yes	Yes
N	42,400,661	42,400,661

Notes: In columns (1) and (2), the dependent variable is the industry-level annual bilateral export values and export volumes, respectively. N and S represent developed and developing countries, respectively. PTAWoEP_NN_{ij,t} = 1 if and only if both the exporter and importer are high-income countries and they did not sign any PTA that contains environmental provisions year t and PTAWoEP_NN_{ij,t} = 0 otherwise. PTAWEP_Weak_NN_{ij,t} = 1 if both the exporter and the importer are high-income countries that signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value no greater than 2 and PTAWEP_Weak_NN_{ij,t} = 0 otherwise. PTAWEP_Strong_NN_{ij,t} = 1 if both the exporter and the importer are high-income countries that signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value greater than 2 and PTAWEP_Strong_NN_{ij,t} = 0 otherwise. PTAWoEP_NS_{ij,t} = 1 if the exporter is a high-income country and importer is a low-income country and they did not sign any PTA that contains environmental provisions in year t and PTAWoEP_NS_{ij,t} = 0 otherwise. PTAWEP_Weak_NS_{ij,t} = 1 if the exporter is a high-income country and importer is a low-income country and they signed a PTA that contains environmental provisions in year t and the PTA has an enforcement index value no greater than 2 and PTAWEP_Weak_NS_{ij,t} = 0 otherwise. PTAWEP_Strong_NS_{ij,t} = 1 if the exporter is a high-income country and importer is a low-income country and they signed a PTA that contains environmental provisions in year t and the PTA has an enforcement index value greater than 2 and PTAWEP_Strong_NS_{ij,t} = 0 otherwise. PTAWoEP_SN_{ij,t} = 1 if the exporter is a low-income country and importer is a high-income country and they did not sign any PTA that contains environmental provisions in year t and PTAWoEP_SN_{ij,t} = 0 otherwise. PTAWEP_Weak_SN_{ij,t} = 1 if the exporter is a low-income country and importer is a high-income country and they signed a PTA that contains environmental provisions in year t and the PTA has an enforcement index value no greater than 2 and PTAWEP_Weak_SN_{ij,t} = 0 otherwise. PTAWEP_Strong_SN_{ij,t} = 1 if the exporter is a low-income country and importer is a high-income country and they signed a PTA that contains environmental provisions in year t and the PTA has an enforcement index value greater than 2 and PTAWEP_Strong_SN_{ij,t} = 0 otherwise. PTAWoEP_SS_{ij,t} = 1 if and only if both the exporting country i and importing country j are low-income countries and they did not sign any PTA that contains environmental provisions year t and PTAWoEP_SS_{ij,t} = 0 otherwise. PTAWEP_Weak_SS_{ij,t} = 1 if both the exporter and the importer are low-income countries that signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value no greater than 2 and PTAWEP_Weak_SS_{ij,t} = 0 otherwise. PTAWEP_Strong_SS_{ij,t} = 1 if both the exporter and the importer are low-income countries that signed any PTA that included environmental provisions in year t and the PTA has an enforcement index value greater than 2 and PTAWEP_Strong_SS_{ij,t} = 0 otherwise. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. Standard errors, clustered at the exporter-importer-year level, are in parenthesis. Both models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Appendix F – Heterogenous effects of environmental provisions on export volumes

F1 – Sector-specific effects of environmental provisions on export volumes

Environmental provisions may affect a country's export performance by affecting the quantities of exported products, the export prices or both. Moreover, different products are likely to be affected differently depending on the directions and magnitudes of the demand and supply effects that might be induced. Therefore, we assess how heterogeneity of environmental provisions in PTAs affects 2-digit HS sectoral export volumes. Consistent with our findings on export values, the results in column (1) of Table F1a show that environmental provisions are associated with significant increases in export volumes in sectors such as chemicals, textile, footwear, metals and machinery while export volumes are significantly reduced in the wood sector. We observe that defensive environmental provisions have more heterogenous effects across agri-food and extractive sectors: they are associated with increases in export volumes in some sectors (e.g., animals, fats, minerals, plastics, paper, textile, stone cement and metals) and decreases in export volumes in vegetables, prepared foods, and wood sectors (Table F1a, column (5)). We further find that offensive environmental provisions are generally associated with decreases in export volumes particularly in sectors such as animals, plastics, leather, paper, textile, stone cement, machinery and vehicles (column (7)).

In Table F1b, column (3) we observe that trade-restrictive environmental provisions are associated with increases in export volumes in several agri-food and extractive sectors. Export volumes in sectors such as minerals, plastics, paper, textile, stone cement, metals, and machinery are significantly positively affected by trade-restrictive environmental provisions. Moreover, trade-restrictive environmental provisions are associated with reductions in export volumes in vegetable and prepared foods sectors. We further find that liberal environmental provisions are associated with reduced export volumes in the animals, mineral, plastics, stone cement, metals and vehicles sectors (Table F1b, column (5)). Overall, our results presented in Tables F1a and F1b support our main conclusions.

F2 – Effects of environmental provisions on export volumes: different levels of exporters' incomes and regulatory quality

We further examine whether the different types of environmental provisions included in PTAs affect export volumes differently depending on the exporting country's income level and regulatory quality. The results are presented in Tables F2a and F2b. The coefficients on all the interaction terms in both Tables F2a and F2b are neither statistically or economically significant. Nevertheless, these results support our main conclusions that income and quality of regulation moderate the trade effects of environmental provisions and that developing exporting countries are likely to gain or lose more from the inclusion of environmental provisions in PTAs than developed exporting countries.

Table F1a: Sector-specific effects of defensive and offensive environmental provisions on export volumes

2-digit HS group	EP _{ij,t}		Neutral_EP _{ij,t}		Defensive_EP _{ij,t}		Offensive_EP _{ij,t}		N
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Animals	0.0007*	0.0004	0.0102***	0.0030	0.0117***	0.0044	-0.0173***	0.0040	865,791
Vegetables	0.0003	0.0007	0.0057	0.0049	-0.0230***	0.0066	0.0068	0.0068	1,935,085
Fats	-0.0003	0.0011	-0.0047	0.0062	0.0200**	0.0098	-0.0065	0.0087	348,697
Prepared foods	-0.0001	0.0003	0.0079***	0.0024	-0.0110**	0.0044	-0.0034	0.0032	2,067,097
Minerals	-0.0001	0.0005	0.0010	0.0040	0.0143***	0.0045	-0.0095*	0.0050	878,902
Chemicals	0.0006**	0.0003	0.0031	0.0021	0.0038	0.0031	-0.0045	0.0028	5,030,791
Plastics	0.0003	0.0002	0.0004	0.0018	0.0105***	0.0036	-0.0062***	0.0023	2,257,644
Leather	-0.0006	0.0007	0.0151***	0.0051	-0.0087	0.0077	-0.0156**	0.0066	522,977
Wood	-0.0019***	0.0006	0.0071	0.0048	-0.0183**	0.0084	-0.0036	0.0060	872,579
Paper	0.0006*	0.0003	0.0022	0.0025	0.0127***	0.0039	-0.0084**	0.0034	1,618,924
Textile	0.0016***	0.0003	0.0007	0.0019	0.0153***	0.0032	-0.0055**	0.0027	5,271,774
Footwear	0.0039***	0.0009	0.0127**	0.0061	-0.0046	0.0091	-0.0021	0.0068	782,580
Stone cement	0.0001	0.0003	0.0069***	0.0023	0.0089**	0.0038	-0.0140***	0.0029	1,731,542
Precious	0.0014	0.0011	0.0144	0.0090	0.0155	0.0142	-0.0224*	0.0118	293,063
Metals	0.0017***	0.0003	0.0010	0.0027	0.0088**	0.0037	-0.0015	0.0034	5,028,544
Machinery	0.0004**	0.0002	0.0039***	0.0013	0.0028	0.0024	-0.0055***	0.0017	7,713,111
Vehicles	-0.0006*	0.0003	0.0038	0.0035	0.0065	0.0047	-0.0102**	0.0047	1,089,668
Instruments	0.0001	0.0004	-0.0009	0.0027	-0.0032	0.0048	0.0031	0.0037	2,278,597
Arms	-0.0020**	0.0009	-0.0062	0.008	-0.0246**	0.0118	0.0163	0.0105	104,547
Miscellaneous	0.0005	0.0004	0.0043	0.0031	-0.0017	0.0055	-0.0027	0.0040	1,579,322
Art	0.0026**	0.0012	-0.0258***	0.0076	0.0147	0.013	0.0307***	0.0097	129,426

Notes: The dependent variable is sectoral-level annual bilateral export volumes. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML). ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. Neutral_EP_{ij,t}, Defensive_EP_{ij,t}, and Offensive_EP_{ij,t} are, respectively, the numbers of neutral, defensive and offensive environmental provisions included in a PTA. EP_{ij,t} is the total number of all environmental provisions in a PTA. SE are robust standard errors—clustered at the exporter-importer-year level. All other controls are included but not reported for brevity. Animals comprises HS:01, HS:02, HS:03, HS:04, HS:05; Vegetables comprises HS:06, HS:07, HS:08, HS:09, HS:10, HS:11, HS:12, HS:13, HS:14; Fats comprises HS:15; Prepared foods comprises HS:16, HS:17, HS:18, HS:19, HS:20, HS:21, HS:22, HS:23, HS:24; Minerals comprises HS:25, HS:26, HS:27; Chemicals comprises HS:28, HS:29, HS:30, HS:31, HS:32, HS:33, HS:34, HS:35, HS:36, HS:37, HS:38; Plastics comprises HS:39, HS:40; Leather comprises HS:41, HS:42, HS:43; Wood comprises HS:44, HS:45, HS:46; Paper comprises HS:47, HS:48, HS:49; Textile comprises HS:50, HS:51, HS:52, HS:53, HS:54, HS:55, HS:56, HS:57, HS:58, HS:59, HS:60, HS:61, HS:62, HS:63; Footwear comprises HS:64, HS:65, HS:66, HS:67; Stone cement comprises HS:68, HS:69, HS:70; Precious comprises HS:71; Metals comprises HS:72, HS:73, HS:74, HS:75, HS:76, HS:78, HS:79, HS:80, HS:81, HS:82, HS:83; Machinery comprises HS:84, HS:85; Vehicles comprises HS:86, HS:87, HS:88, HS:89; Instruments comprises HS:90, HS:91, HS:92; Arms comprises HS:93; Miscellaneous comprises HS:94, HS:95, HS:96; and Art comprises HS:97.

Table F1b: Sector-specific effects of trade-restrictive and liberal environmental provisions on export volumes

2-digit HS group	Neutral_EP _{ij,t}		Restrictive_EP _{ij,t}		Liberal_EP _{ij,t}		N
	Coefficient	SE	Coefficient	SE	Coefficient	SE	
	(1)	(2)	(3)	(4)	(5)	(6)	
Animals	0.0025	0.0019	0.0092	0.0066	-0.0470***	0.0150	865,791
Vegetables	0.0064*	0.0037	-0.0366***	0.011	0.0515	0.0334	1,935,085
Fats	-0.0027	0.0050	0.0138	0.0136	-0.0178	0.0395	348,697
Prepared foods	0.0055***	0.0017	-0.0126**	0.0056	-0.0231	0.0183	2,067,097
Minerals	-0.0035	0.0022	0.0222***	0.0075	-0.0316**	0.0150	878,902
Chemicals	0.0006	0.0016	0.0024	0.0050	-0.0059	0.0122	5,030,791
Plastics	-0.0038**	0.0016	0.0251***	0.0052	-0.0359***	0.0112	2,257,644
Leather	0.0060	0.0042	-0.0180	0.0116	-0.0187	0.0365	522,977
Wood	0.0037	0.0036	-0.0161	0.0120	-0.0193	0.0280	872,579
Paper	-0.0036*	0.0019	0.0177***	0.0062	-0.0087	0.0151	1,618,924
Textile	-0.0044***	0.0015	0.0167***	0.0057	0.0199*	0.012	5,271,774
Footwear	0.0038	0.0042	-0.0099	0.0168	0.0522	0.0371	782,580
Stone cement	-0.0019	0.0018	0.0142**	0.0058	-0.0252**	0.0126	1,731,542
Precious	-0.0026	0.0068	0.0415*	0.0228	-0.0893*	0.0519	293,063
Metals	-0.0048***	0.0018	0.0259***	0.0061	-0.0039	0.0148	5,028,544
Machinery	0.0005	0.0010	0.0086***	0.0032	-0.0286***	0.0081	7,713,111
Vehicles	0.0012	0.0027	0.0079	0.0091	-0.0498**	0.0204	1,089,668
Instruments	0.0004	0.0022	0.0084	0.0074	-0.0327*	0.0195	2,278,597
Arms	0.0089	0.0062	-0.0369*	0.0193	-0.0134	0.0385	104,547
Miscellaneous	-0.0001	0.0024	-0.0069	0.0087	0.0346*	0.0197	1,579,322
Art	0.0054	0.0056	0.0182	0.0198	-0.0873*	0.0524	129,426

Notes: The dependent variable is sectoral-level annual bilateral export volumes and the model is estimated using Poisson Pseudo Maximum Likelihood (PPML). ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercept and fixed effects (FE) included but not reported for brevity. Neutral_EP_{ij,t}, Restrictive_EP_{ij,t} and Liberal_EP_{ij,t} are, respectively, the numbers of neutral, trade-restrictive and liberal environmental provisions included in a PTA. SE are robust standard errors—clustered at the exporter-importer-year level. All other controls are included but not reported for brevity. Animals comprises HS:01, HS:02, HS:03, HS:04, HS:05; Vegetables comprises HS:06, HS:07, HS:08, HS:09, HS:10, HS:11, HS:12, HS:13, HS:14; Fats comprises HS:15; Prepared foods comprises HS:16, HS:17, HS:18, HS:19, HS:20, HS:21, HS:22, HS:23, HS:24; Minerals comprises HS:25, HS:26, HS:27; Chemicals comprises HS:28, HS:29, HS:30, HS:31, HS:32, HS:33, HS:34, HS:35, HS:36, HS:37, HS:38; Plastics comprises HS:39, HS:40; Leather comprises HS:41, HS:42, HS:43; Wood comprises HS:44, HS:45, HS:46; Paper comprises HS:47, HS:48, HS:49; Textile comprises HS:50, HS:51, HS:52, HS:53, HS:54, HS:55, HS:56, HS:57, HS:58, HS:59, HS:60, HS:61, HS:62, HS:63; Footwear comprises HS:64, HS:65, HS:66, HS:67; Stone cement comprises HS:68, HS:69, HS:70; Precious comprises HS:71; Metals comprises HS:72, HS:73, HS:74, HS:75, HS:76, HS:78, HS:79, HS:80, HS:81, HS:82, HS:83; Machinery comprises HS:84, HS:85; Vehicles comprises HS:86, HS:87, HS:88, HS:89; Instruments comprises HS:90, HS:91, HS:92; Arms comprises HS:93; Miscellaneous comprises HS:94, HS:95, HS:96; and Art comprises HS:9.

Table F2a: Export volume effects of environmental provisions across different levels of exporters' incomes

	Specification 1		Specification 2		Specification 3	
	Coefficient (1)	SE (2)	Coefficient (3)	SE (4)	Coefficient (5)	SE (6)
EP _{ij,t}	0.0008	0.0005				
EP _{ij,t} × Dev _i	-0.0008	0.0006				
Neutral_EP _{ij,t}			-0.0008	0.0046	-0.0024	0.0028
Neutral_EP _{ij,t} × Dev _i			0.0041	0.0050	0.0023	0.0031
Defensive_EP _{ij,t}			0.0153***	0.0051		
Defensive_EP _{ij,t} × Dev _i			-0.0110*	0.0062		
Offensive_EP _{ij,t}			-0.0062	0.0059		
Offensive_EP _{ij,t} × Dev _i			-0.0005	0.0063		
Restrictive_EP _{ij,t}					0.0230***	0.0078
Restrictive_EP _{ij,t} × Dev _i					-0.0184*	0.0101
Liberal_EP _{ij,t}					-0.0377*	0.0198
Liberal_EP _{ij,t} × Dev _i					0.0236	0.0225
PTA _{ij,t}	0.0083	0.0263	0.0032	0.0264	0.0068	0.0264
PTA _{ij,t} × Dev _i	0.0773**	0.0378	0.0781**	0.0380	0.0784**	0.0379
Depth _{ij,t}	-0.0275	0.0185	-0.0335*	0.0195	-0.0320*	0.0183
Depth _{ij,t} × Dev _i	-0.0038	0.0215	-0.0062	0.0222	0.0010	0.0216
Exporter-industry-year FE	Yes		Yes		Yes	
Importer- industry-year FE	Yes		Yes		Yes	
Exporter-importer-industry FE	Yes		Yes		Yes	
N	42,358,224		42,358,224		42,358,224	

Notes: The dependent variable in columns (1), (3), and (5) is the industry-level annual export volumes. PTA_{ij,t} is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country *i* and importing country *j* in year *t*. PTA_{ij,t} = 1 if countries *i* and *j* signed a trade agreement in year *t* and PTA_{ij,t} = 0 otherwise. Dev_i is a dummy variable that takes a value of 1 if an exporting country was classified as 'high-income or developed' in the 2008 World Development Indicators of the World Bank and a value of zero, otherwise. EP_{ij,t} is the total number of environmental provisions in the PTA. Neutral_EP_{ij,t}, Defensive_EP_{ij,t}, Offensive_EP_{ij,t}, Restrictive_EP_{ij,t}, and Liberal_EP_{ij,t} are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth_{ij,t} is the normalized depth index. Robust standard errors are in parentheses. The standard errors are clustered at the exporter-importer-year level. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Table F2b: Export volume effects of environmental provisions across different levels of regulatory quality

	Specification 1		Specification 2		Specification 3	
	Coefficient (1)	SE (2)	Coefficient (3)	SE (4)	Coefficient (5)	SE (6)
$EP_{ij,t}$	0.0036***	0.0013				
$EP_{ij,t} \times Reg_i$	-0.0044**	0.0017				
Neutral_ $EP_{ij,t}$			0.0085	0.0099	0.0018	0.0069
Neutral_ $EP_{ij,t} \times Reg_i$			-0.0085	0.0134	-0.0044	0.0094
Defensive_ $EP_{ij,t}$			0.0305**	0.0126		
Defensive_ $EP_{ij,t} \times Reg_i$			-0.0327*	0.0178		
Offensive_ $EP_{ij,t}$			-0.0200	0.0138		
Offensive_ $EP_{ij,t} \times Reg_i$			0.0192	0.0183		
Restrictive_ $EP_{ij,t}$					0.0344	0.0226
Restrictive_ $EP_{ij,t} \times Reg_i$					-0.0293	0.0326
Liberal_ $EP_{ij,t}$					-0.0854*	0.0469
Liberal_ $EP_{ij,t} \times Reg_i$					0.0870	0.0627
$PTA_{ij,t}$	-0.2780***	0.0682	-0.2929***	0.0689	-0.2789***	0.0687
$PTA_{ij,t} \times Reg_i$	0.5237***	0.1058	0.5387***	0.1072	0.5259***	0.1068
Depth_ $_{ij,t}$	-0.0464	0.0456	-0.0699	0.0502	-0.0482	0.0447
Depth_ $_{ij,t} \times Reg_i$	0.0125	0.0624	0.0334	0.0674	0.0124	0.0621
Exporter-industry-year FE	Yes		Yes		Yes	
Importer- industry-year FE	Yes		Yes		Yes	
Exporter-importer-industry FE	Yes		Yes		Yes	
N	42,306,138		42,306,138		42,306,138	

Notes: The dependent variable in columns (1), (3), and (5) is the industry-level annual export volumes. $PTA_{ij,t}$ is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t . $PTA_{ij,t} = 1$ if countries i and j signed a trade agreement in year t and $PTA_{ij,t} = 0$ otherwise. Reg_i captures quality of governance (i.e., regulatory quality) in the exporting country and its value ranges from 0 to 1. A value of 0 indicates weak governance while 1 indicates strong governance. $EP_{ij,t}$ is the total number of environmental provisions in the PTA. Neutral_ $EP_{ij,t}$, Defensive_ $EP_{ij,t}$, Offensive_ $EP_{ij,t}$, Restrictive_ $EP_{ij,t}$, and Liberal_ $EP_{ij,t}$ are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth_ $_{ij,t}$ is the normalized depth index. Robust standard errors are in parentheses. The standard errors are clustered at the exporter-importer-year level. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).

Appendix G – Effects of environmental provisions on export unit values

The total export value per country is comprises both price and quantity elements. Given that our baseline results (Table 1) show that environmental provisions in PTAs are associated with small reductions and increments in export values and export volumes, respectively, we assess how environmental provisions affect export prices (i.e., free-on-board export unit values) to gain further insights on the negative export value effect of environmental provisions. The results are presented in Table G1. The results presented in column 1 of Table G1 show that environmental provisions are associated with significant reductions in export unit values. Moreover, different types of environmental provisions affect export unit prices differently (columns (2) and (3)). Taken together with our baseline results in Table 1, our results presented in Table G1 show that the observed small reduction (column (1), Table 1) in trade is a result of countries exporting larger quantities (column (2), Table 1) at lower prices (column (1), Table G1).

Table G1: Effects of environmental provisions on export unit values

	Specification 1 (1)	Specification 2 (2)	Specification 3 (3)
$EP_{ij,t}$	-0.0009** (0.0004)		
Neutral_EP $_{ij,t}$		-0.0025 (0.0023)	-0.0051*** (0.0018)
Defensive_EP $_{ij,t}$		0.0034 (0.0032)	
Offensive_EP $_{ij,t}$		-0.0009 (0.0029)	
Restrictive_EP $_{ij,t}$			0.0084* (0.0049)
Liberal_EP $_{ij,t}$			0.0154 (0.0147)
PTA $_{ij,t}$	-0.0063 (0.0233)	-0.0072 (0.0238)	-0.0045 (0.0237)
Depth $_{ij,t}$	0.0417*** (0.0115)	0.0358*** (0.0096)	0.0352*** (0.0113)
Exporter-product-year FE	Yes	Yes	Yes
Importer-product-year FE	Yes	Yes	Yes
Exporter-importer-product FE	Yes	Yes	Yes
N	41,590,414	41,590,414	41,590,414

Notes: The dependent variable in all specifications is the six-digit HS product-level annual export unit values. PTA $_{ij,t}$ is a dummy variable that indicates the presence or absence of a preferential trade agreement (PTA) between exporting country i and importing country j in year t . PTA $_{ij,t} = 1$ if countries i and j signed a trade agreement in year t and PTA $_{ij,t} = 0$ otherwise. EP $_{ij,t}$ is the total number of environmental provisions in the PTA. Neutral_EP $_{ij,t}$, Defensive_EP $_{ij,t}$, Offensive_EP $_{ij,t}$, Restrictive_EP $_{ij,t}$, and Liberal_EP $_{ij,t}$ are, respectively, the numbers of neutral, defensive, offensive, trade-restrictive, and liberal environmental provisions included in the PTA. Depth $_{ij,t}$ is the normalized depth index. Robust standard errors are in parentheses. The standard errors are clustered at the exporter-importer-year level. ***, **, and * denote significance at 1%, 5%, and 10% respectively. Intercepts and fixed effects (FE) included but not reported for brevity. All models are estimated using Poisson Pseudo Maximum Likelihood (PPML).