Appendix

Sectors, Pollution, and Trade: How Industrial Interests Shape Domestic Positions on Global Climate Agreements

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Figure A.1: *Sectors' Pollution, Trade and Expectations for Climate Cooperation*

Trade Openness Levels \ Emissions Levels	High	Low
Low	abatement (-) but no market threat (+)	no abatement (+) but no market advantage (-)
High	abatement (-) and market threat (-)	no abatement (+) and market advantage (+)

The figure illustrates the hypothetical impact of climate cooperation for sectors that vary by emission levels and trade openness. The negative sign (-) indicates an expected decrease in interest in climate cooperation (i.e. higher expected costs). The positive sign (+) indicates an expected increase in interest in climate cooperation (i.e. higher expected benefits).

A Formal Derivation of Sectoral Effects on States' Positions on Global Climate Cooperation

Here I formalize the theoretical considerations raised in the paper. Pollution abatement and trade openness at the sector level are the key focal parameters, though other factors may influence sentiments towards climate cooperation. A simple expression of a business utility for climate cooperation that accounts for these factors follows the equation:

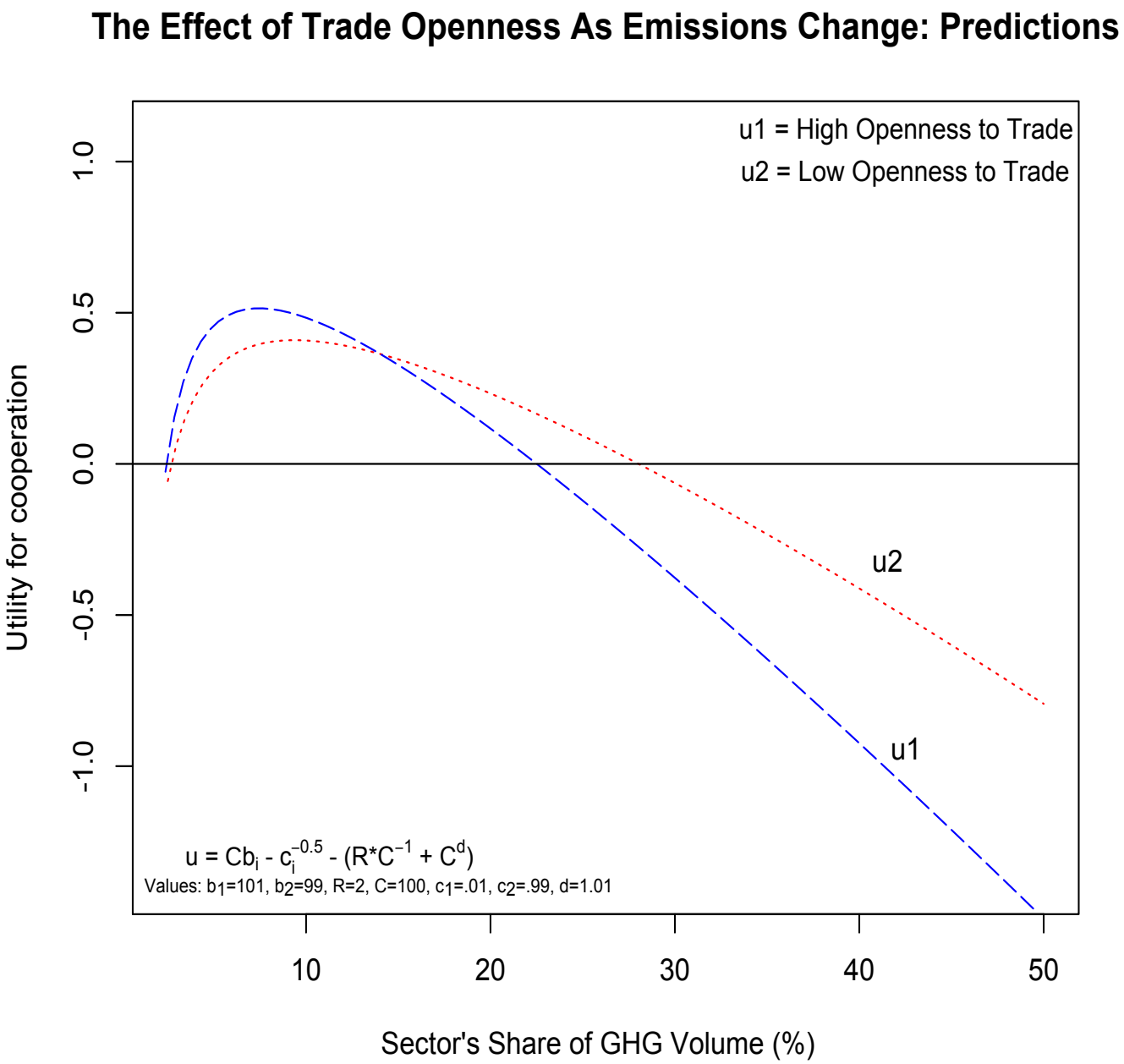
$$u_i = Cb_i + c_i^{-\lambda} - (RC^{-1} + C^{d_i})$$

Here b represents the benefits that business i accrues from supporting climate change action, which includes any potential gains from market regulation. By contrast, c represents the material costs of climate cooperation, which include emission abatement. C constitutes the aggregate size of all domestic economic actors in an economic sector, R denotes some fixed endowment allocated to shape the climate regulation (e.g. lobbying resources), while d represents individual business constraints determined by the specificity of the business (e.g. individual size). The benefits are positively increasing in the aggregate size of all involved economic actors, C. Furthermore, the material cost parameter is weighted by λ, which denotes how much rivalry there is among the economic actors as a value between 0 and 1.

The utility is concave and decreasing in the size of the sector. Translated in emission terms, the higher the amount of sectoral emissions, the smaller is a business support for international climate cooperation. However, the utility function should vary on the level of trade openness of each sector. Accordingly, it is reasonable to expect that the values of b and c for a trade open sector should be different from those of a trade closed one. Computing the equation for different values of these parameters leads to the equilibria depicted in Figure A.2, where the respective utility of two different types of businesses are plotted as a function of increasing sectoral emissions. Here positive utility values correspond to support for global climate cooperation. The point at which the curves drop below the zero line represents the threshold at which businesses stop supporting international climate policy. Accordingly, as a sector's emissions are low, businesses that are open to trade should be more supportive of international climate cooperation than businesses that are closed to trade. By contrast, as a sector's emissions increase, businesses that are open to trade should become more quickly opposed to cooperation.

The equilibria shown in Figure A.2 illustrate that, conditional on increasing sectoral levels of greenhouse gases emissions, the more open to international trade is a sector, the less its firms will support global climate cooperation. However, firms have incentives to aggregate their preference at the sectoral level and lobby the government towards their favorite international climate policy. Following this assumption, sectoral emissions and trade openness may influence the way a national government position itself on issues of international climate cooperation. More specifically, a national government should be motivated to support international climate cooperation while trying to obtain political success at home. Thus, governments should have the interest to take positions that maximize national welfare and minimize domestic adjustment costs. The government should benefit from the social payoff of protecting the environment, while the main cost is cleaning up the economy. The level of support for global climate cooperation that a government is willing to tolerate should ultimately vary as a function of the economic capacity to mitigate emissions while staying resilient to threats to international trade. So, keeping specific national characteristics such as geographical vulnerability and political institutions constant, the industries' openness to international trade should affect a government's utility to attain global climate cooperation, precisely because of the earlier discussion. It should then be clear that the configuration of a government utility function pressed by high and low trade openness sectors takes the same shape of the curves in Figure A.2.

Figure A.2: *Expected Positions on Global Climate Cooperation*



The figure illustrates the utility for global climate cooperation as the size of GHG levels increase. The bottom equation reports the value of the parameters illustrated in the two figures. The dotted and dashed lines show, respectively, the utilities with low and high openness to trade.

Business-Level Data and Robustness Checks

This Section of the Appendix reports additional information and alternative tests and analyses related to the business-level data presented in the paper.

Data Notes

The business submissions can be retrieved here: `https://unfccc.int/process-and-meetings/parties-non-party-stakeholders/non-party-stakeholders/submissions-and-statements`.

Data on the GHG emissions of the sector of each business group is extracted from IPCC documents, which report emissions by six main industrial categories. These are: Energy (1), Industrial Processes and Solvents (2), Agriculture (3), Waste, including water treatment and disposal (4), Land use Change and Forestry (5), and Others (6). The Energy sector is further broken down into the following 'subsectors': Electricity and Heat (1.A1); Manufacturing and Construction (1.A2); Extraction and Mining (1.A1C, 1.A5), Transportation (1.A3); Fuel Combustion at the Source (Commercial and Residential) (1.A4) Fugitive Emissions (1.B). I selected the emission values of each IPCC sector to best match the ISIC categories.

To substantiate these figures for years not covered by the GHG Emission Profiles and for sectors that are not explicitly accounted for in the Emission Profiles (e.g. the emissions the IPCC classifies under 'Others'), I resorted to figures available in other official national reports. Specifically, I used figures from the Australian Department of the Environment for Australia's manufacture, the World Resource Institute for Japan' manufacture, the Energy Research Center for South Africa's retail, and the Environmental Protection Agency for the United States' retail.

Data on the sectors' trade values is from the GTAP Database. GTAP includes bilateral and cumulative trade figures from the WTO Trade Policy Reviews, the OECD, and the USDA country studies of Producer Subsidy Equivalents. While Purdue University released its GTAP 8 Database in 2012, its access is proprietary. Consequently, I rely on the 2008 referenced data (which is open-access), assuming that the values of exports and imports did not significantly change in following years. Also note that the GTAP trade values are in domestic prices, which means that they account for potential distortions determined by domestic tariffs or subsidies. I preferred this measure compared to world prices, precisely because my theory deems sectoral competition important.

Regarding the GDP denominator, the sectors' value added to GDP comes from the World Development Indicators, but I also consulted Eurostat for European countries and other national economic agencies, specifically the Economic Analysis Unit of the Republic of South Africa, India's Department of Industrial Policy and Promotion, Australia's Department of Industry, as well as statistics from the Ministry of Economy, Trade and Industry of Japan and the Department of Commerce of the United States. The total annual GDP is in constant 2007 USD and is also sourced from the World Development Indicators. Note that the sample includes some EU-level associations; for these, I computed the figures based on EU GDP.

Model Fit

The model fit scores for a range of different topics estimated in the business texts are reported in Figure A.3. I also report a few illustrative excerpts associated with the topic I expect to decrease most as sectoral pollution and trade exposure increase (Topic 3) in Figure A.4.

Robustness tests

I report a number of robustness tests. Despite the limitations of the business submissions data, the topic models above are robust to a number of sensitivity analyses. To begin, one may worry

about the trends in the other topics and, specifically, how the covariates influence the prominence of the clusters of words underlying Topic 2 and 4. The Appendix reports the effects of the covariates on both topics in the Appendix (see Figure A.5 and Figure A.6). The main inference from these analyses is that the prevalence of these two topics (especially Topic 4) vary much less as a joint function of sectoral GHG and trade openness compared to Topic 1 and 3. The absence of a substantive effect of industries' pollution intensity and trade openness for Topic 2 and 4 is therefore evidence in support of the relevance of these factors for political positions on climate policy, given that Topic 2 and 4 have a less clear connection with preferences for global climate cooperation and policy distribution.

It is also reasonable to ask if this sector-level analysis of business associations' positions may omit relevant sectoral characteristics that may confound the effects of GHG emissions and trade openness. One most evident confounders may be the size of a sector: larger sectors may be more likely to trade, and they may have specific preferences for (or against) climate regulations. To address this question, in additional analyses I employed an additional covariate - namely the number of employees per sector, which I collected from a number of different sources (mainly UN Data and Eurostat databases, but also nation-specific statistical bureaus). Figure A.8 below shows the most probable words from a four-topic STM analysis of the business association documents that includes the number of employees per sector. The words are very similarly clustered as the original analysis suggested. Also, the figure shows that the number of employees has some effects on the prevalence of the Topics 2 and 4 (see bottom of Figure A.8), but not Topics 1 and 3 which I identified as the more politically relevant themes along the lines of GHG emissions and trade values. Figure A.9 below further illustrates the STM model that controls for number of employees. The estimation plots demonstrate that controlling for the size of the sector does not significantly change the findings inferred from the original analyses: a high level of GHG emissions coinciding with high levels of trade induces a higher density of vague words and lower quantities of risk- and action-related words.

Another reasonable concern regarding the main results is the standardization of the GHG emissions. While I opted for the 'leanest' variable of GHG volumes, this may be misleading because it is not standardized. For example, a more nuanced measure of pollution intensity may weigh GHG emissions by unit of output. Following this intuition, in the Appendix I also present the effects generated with this alternative variable. Specifically, I constructed a 'VA-weighted' GHG pollution intensity measure, which is calculated as each industry's value of GHG emissions over the industry's value added to GDP. The results are overall consistent with – if not stronger than – the original results. In Figure A.10 below I show that the VA-weighted GHG variable does little to the proportion of topics estimated with the STM. However, the interaction with trade openness is significant and in the direction predicted by the original analyses.

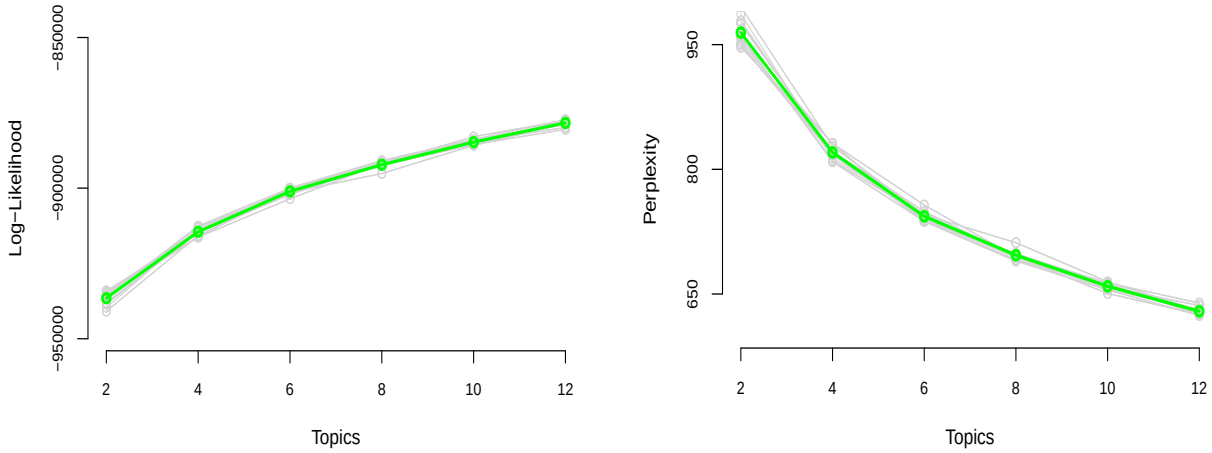
Because most firms in this sample are European so in highly open economies, it is also possible that the comparison of sectors' trade openness relative to sectors in the same country may not be very relevant, as most sectors are on average relatively open. To address this question, I constructed an alternative measure of trade exposure for the purpose of robustness testing. I call this 'relative trade exposure' to distinguish it from the original (country-specific) trade openness variables. For each industry in each focal country I first identified other countries' sectoral import and export value. Unfortunately for the transport and mining sectors my sample includes only businesses from the UK, so I did not match these and I left the relative trade exposure measure of these firms' associations missing. Then I calculated the ratio of the focal country's sectoral trade value (import plus export) divided by the matched countries' sectoral trade value. I then rerun the STM analyses with this variable.

The results from these additional analyses have to be interpreted weary of the fact that using these trade indicators the vague/non-vague topics switch (see also Figure A.11 where Topic 1 is the more 'risk-specific' one while Topic 3 is the more generic one). That said, Figure A.12

below shows that trade-exposed associations in high-GHG sectors are more likely to diffuse the debate on climate cooperation, as the prevalence of Topic 1 decreases and Topic 3 increases. While these effects are slightly 'flatter' than in the STM estimations with trade openness, the direction of the results is consistent with the main findings of the paper.

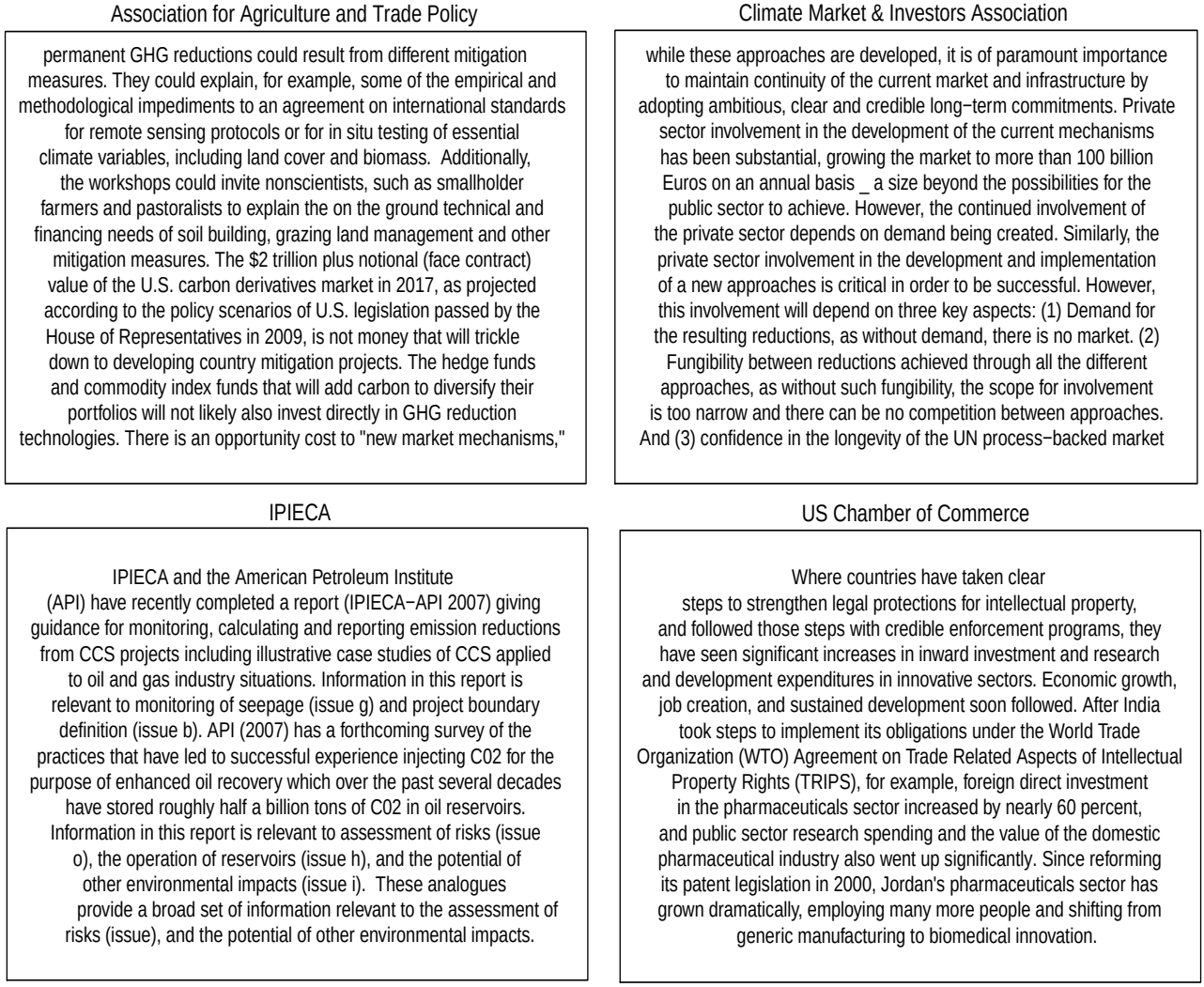
Additional results in the Appendix also illustrate that these findings hold for a ten-topic model, where businesses in high-emission and high-trade openness sectors favor more vague topics, while parties that are highly open to trade but generate low emissions prefer topics that more assertively tackle international climate regulations (see Figure A.13 for the list of key terms per topic and Figure A.14 for the relevant estimation plots). In these models, topics pivoted on terms that I associate to a more pro-active cooperative business, such as 'risk' and 'costs', diffuse as GHG and trade intensity increase, precisely as my theory expected. Finally, while the inference in this part of the paper has been centered on results from topic models, this methodological approach does not seem to drive the central extrapolations, as the distinction between these types of preferences emerge also scaling the texts with other computational text methods. In fact, the suggested division of types of business associations is identified using the Wordfish scaling algorithm presented in Slapin & Proksch (2008). See Figure A.15.

Figure A.3: *Model Fit Metrics*



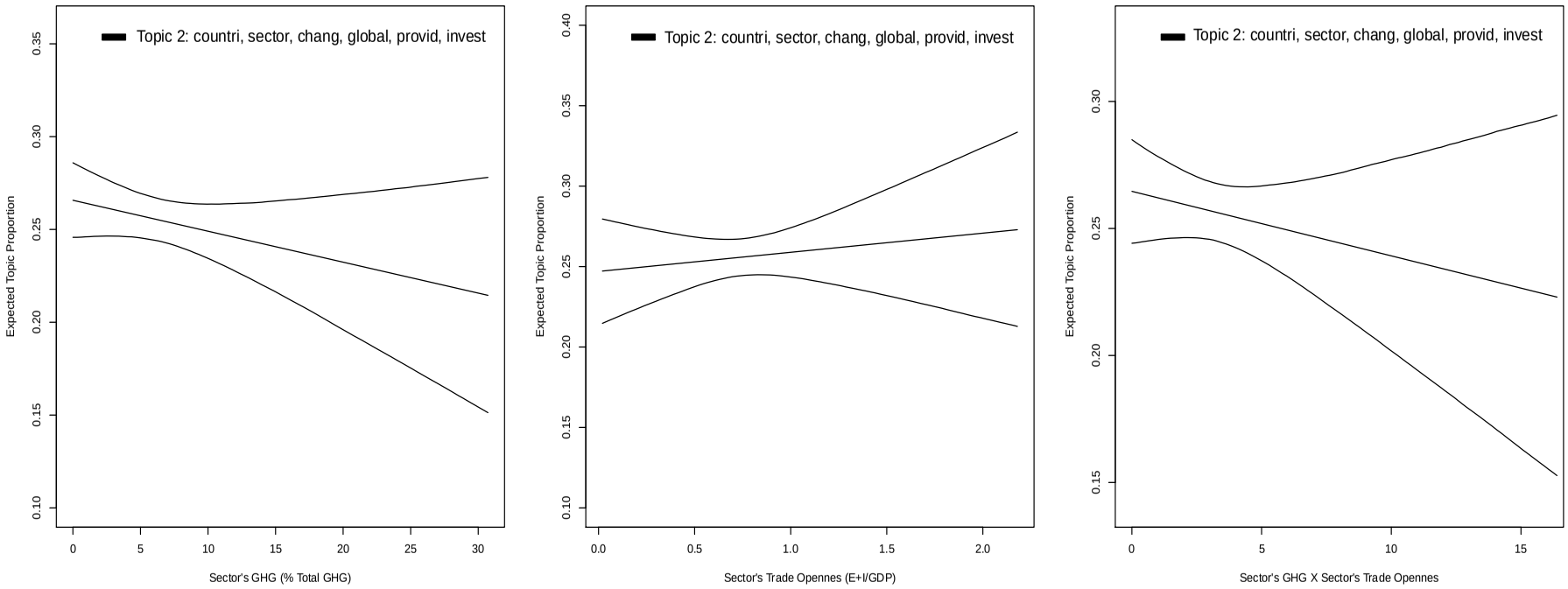
The figure illustrates model fit scores calculated using 20 LDA models of the business submissions with a number of topics set from 2 through 12 (different initializations were implemented to ensure that the analysis is not driven by the starting parameters).

Figure A.4: *Four-Topic Model: Excerpts associated with Topic 3*



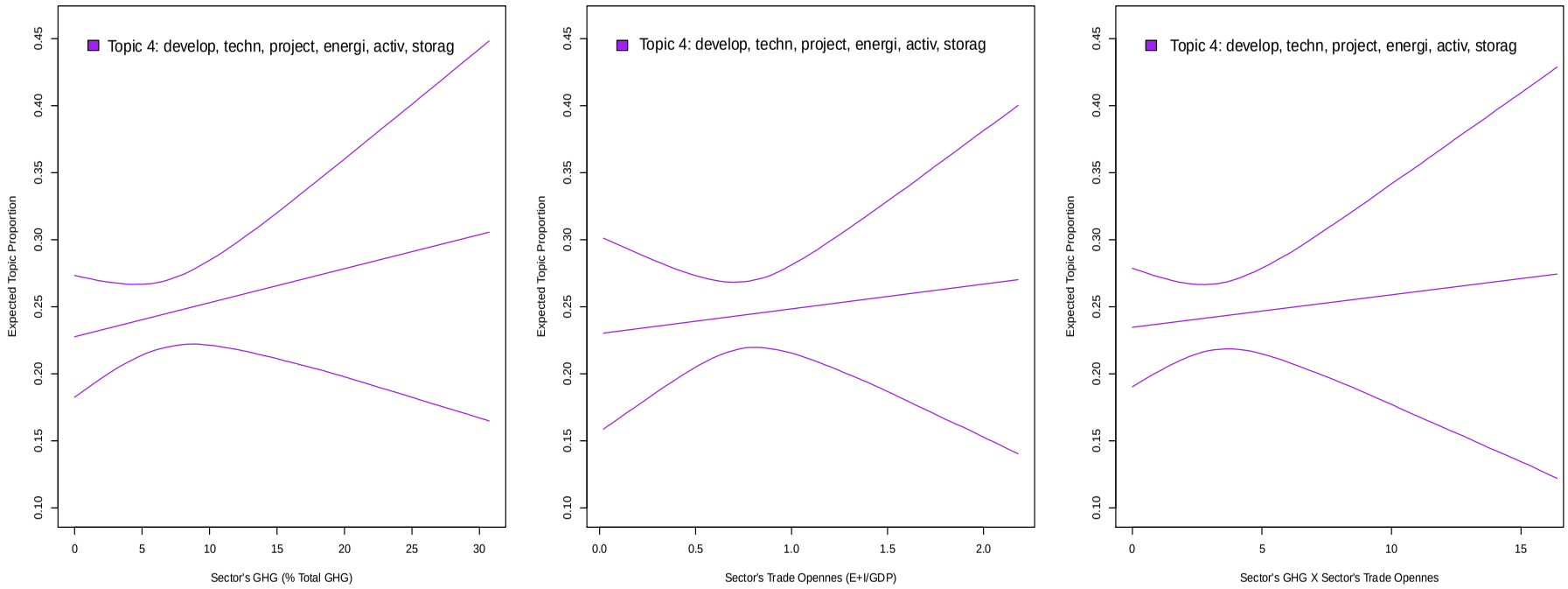
This figure shows excerpts from documents highly associated with Topic 3 in the four-topic model.

Figure A.5: *The Effect of Pollution and Trade Openness on Business Submissions at the UNFCCC (Four-Topic STM)*: Topic 2



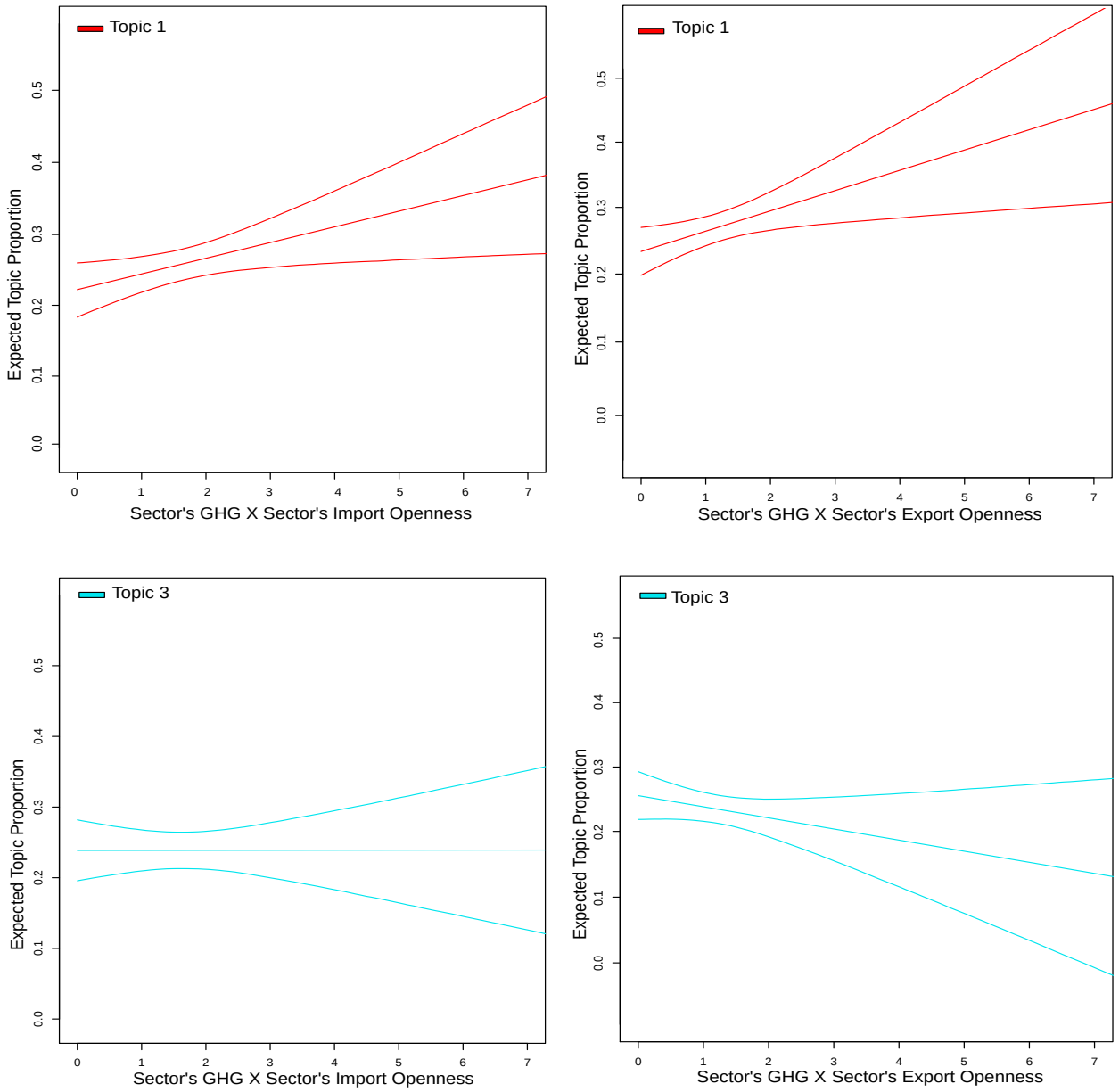
This figure illustrates the statistical influence of the covariates on the topical content of the business texts. The estimation is based on a STM specified with four topics. The central line corresponds to the estimated coefficient for Topic 2, while the external lines correspond to the 90% confidence interval.

Figure A.6: *The Effect of Pollution and Trade Openness on Business Submissions at the UNFCCC (Four-Topic STM)*: Topic 4



This figure illustrates the statistical influence of the covariates on the topical content of the business texts. The estimation is based on a STM specified with four topics. The central line corresponds to the estimated coefficient for Topic 4, while the external lines correspond to the 90% confidence interval.

Figure A.7: *The Effect of Sectoral Considerations on Business Submissions by Export and Import (Linear Estimation)*



The plots report the linear effect of the interaction of sectors' GHG emissions and their import (left) and export (right) values on the topical content of the business texts. The results are based on a STM specified with four topics. Topic 1 is interpreted as the more vague topic, while Topic 3 corresponds to more involved words.

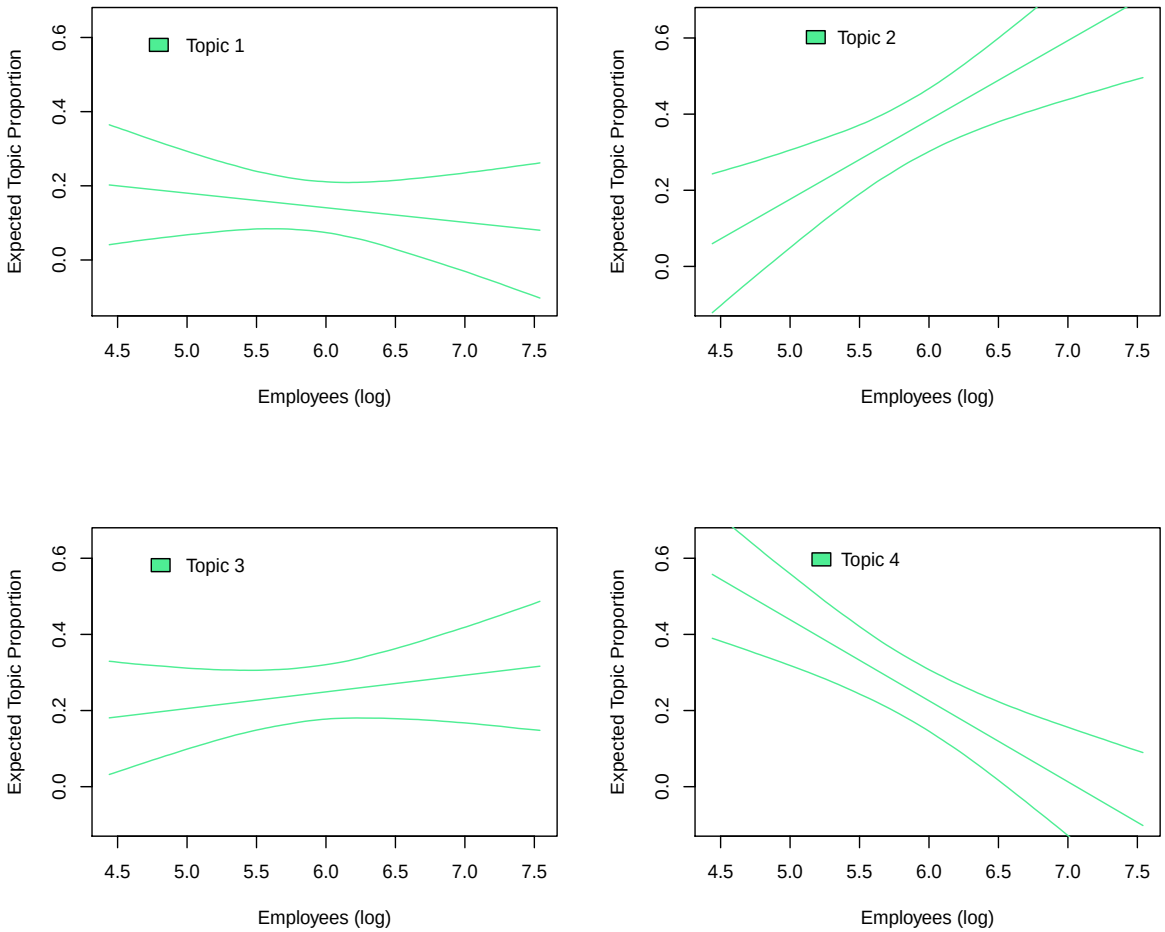
Figure A.8: *Four-Topic Model Controlling for Sector Size - Most Probable Words and Effect of Number of Employees*

Topic 1:
agricultur, carbon, chang, organ, adapt, mitig, system, farm, impact

Topic 2:
develop, technolog, sector, countri, invest, market, energi, privat, carbon

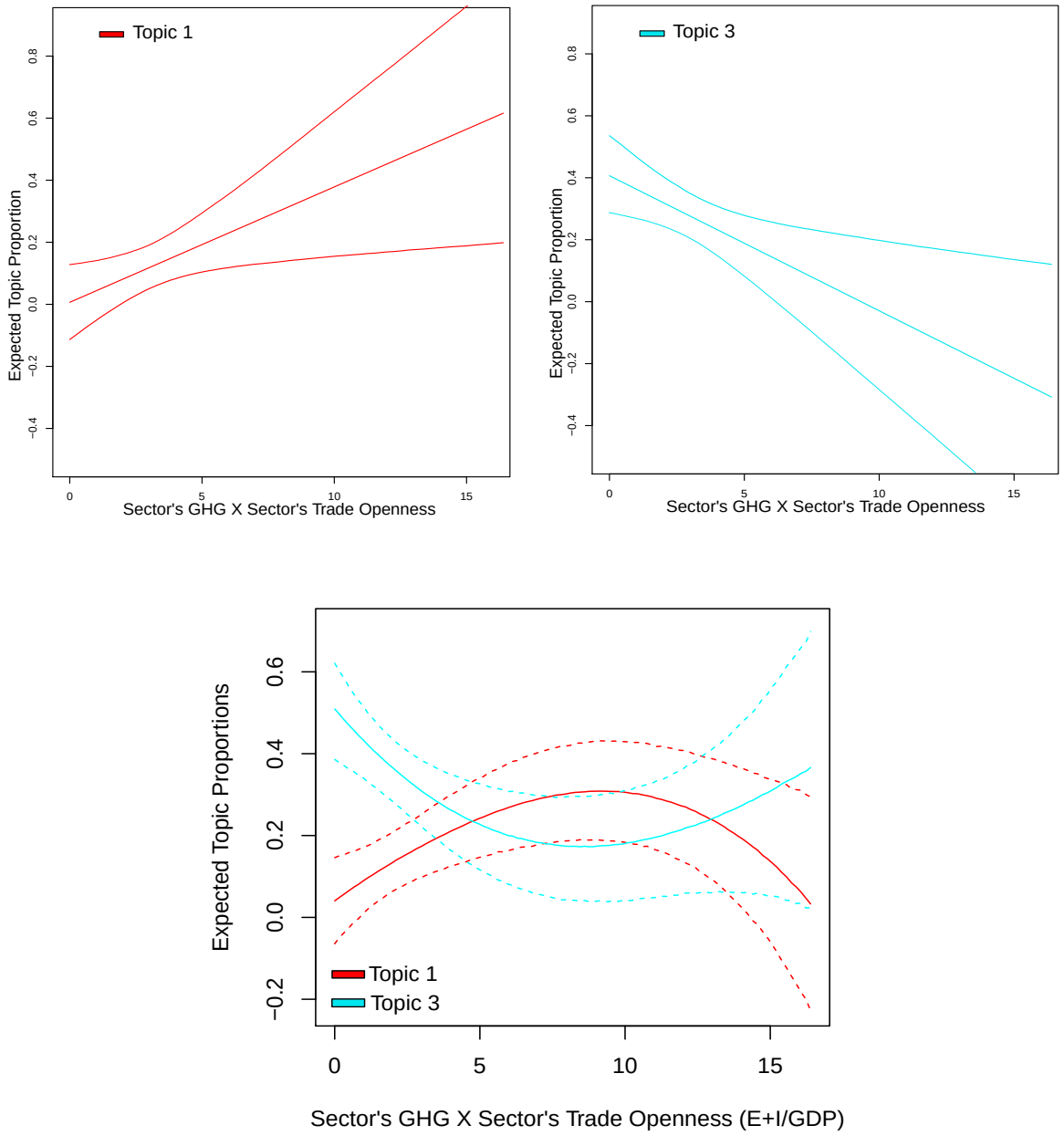
Topic 3:
market, develop, approach, risk, mechan, insur, countri, loss, cost

Topic 4:
project, storag, develop, countri, issu, activ, carbon, monitor, requir



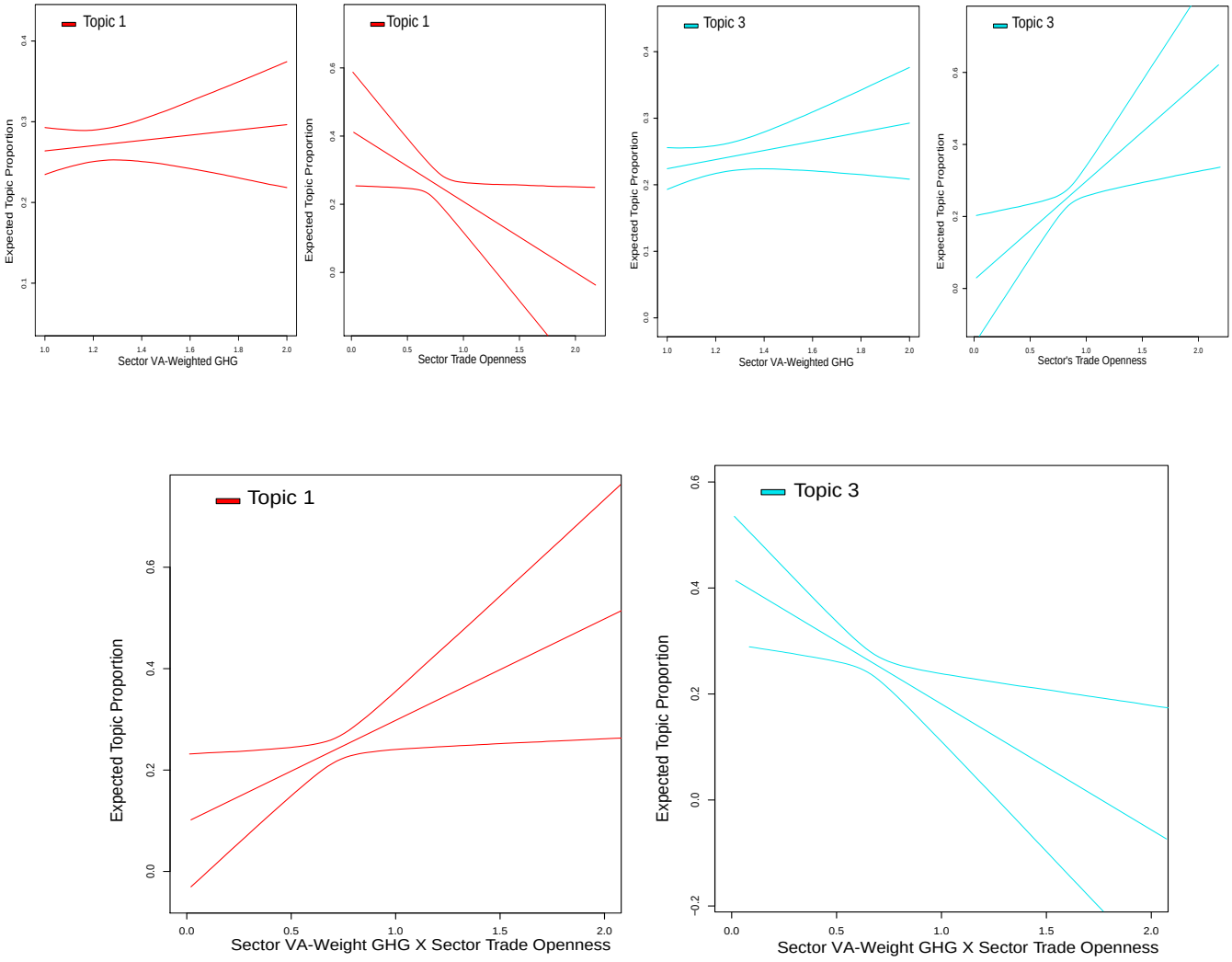
The top figure shows the 8 most probable words of a four-topic model of the business submissions to the UNFCCC, while the bottom figure shows the effect of employees (logged) on each of the four estimated topics. Note that the list of most probable words in this model is very similar to the list of most probable words from the original model in Figure 2.

Figure A.9: *The Effect of Sectoral Considerations on Business Submissions Controlling for Sectoral Size (Employees)*



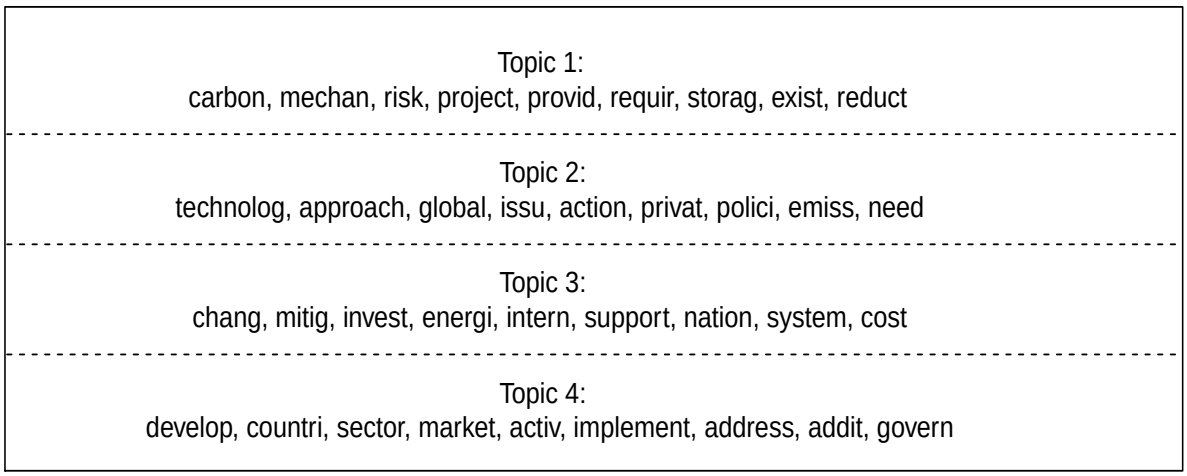
The plots report the linear (top graphs) and nonlinear (bottom graph) effects of the interaction of sectors' GHG emissions and their import (left) and export (right) values on the topical content of the business texts. The results are based on a STM specified with four topics. As for the analysis in the main text, Topic 1 is interpreted as the more vague topic, while Topic 3 corresponds to more involved words.

Figure A.10: *The Effect of Sectoral Considerations on Business Submissions - Value Added-Weighted GHG Emissions*



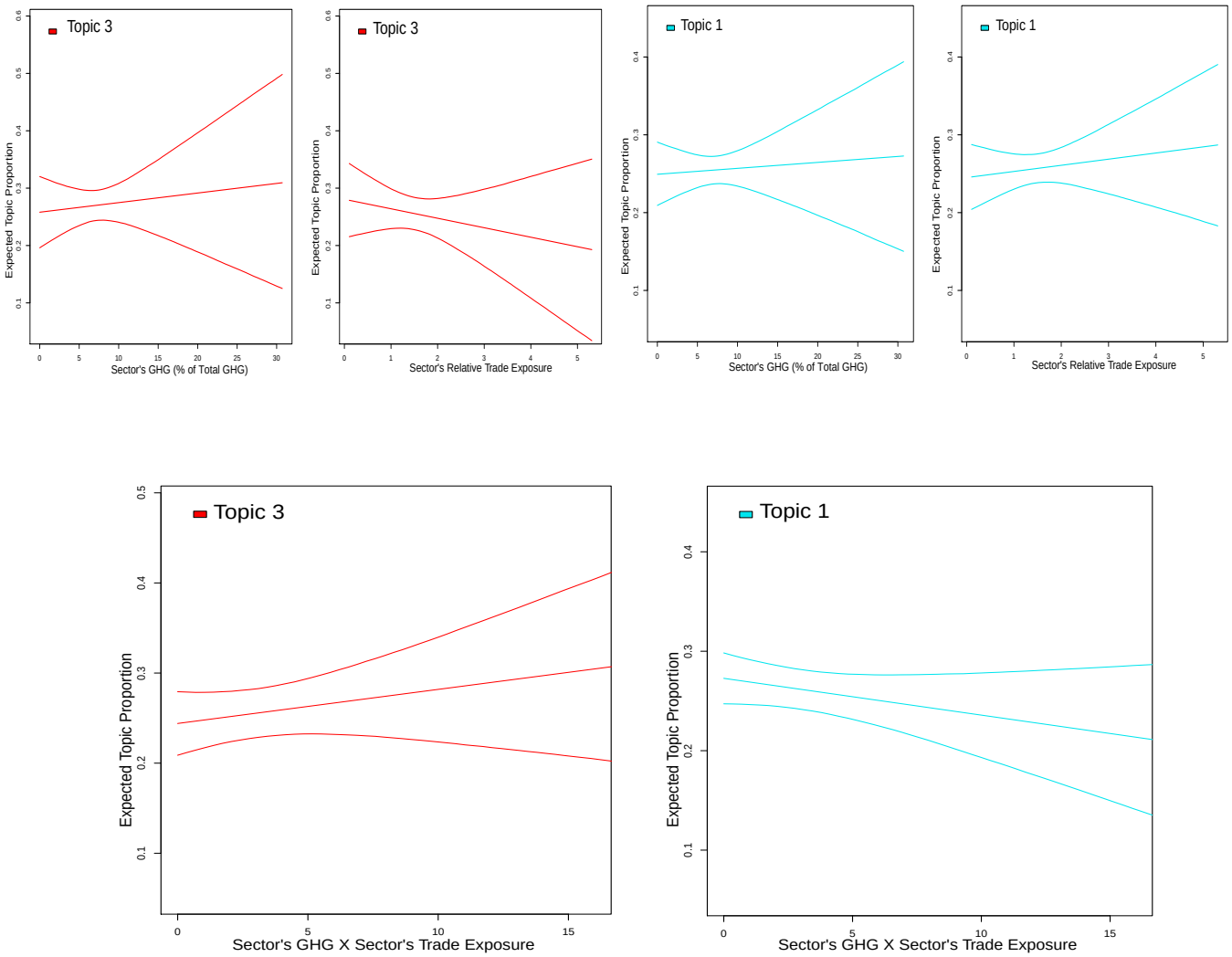
The top plots report the effects of the sectoral value-added weighted GHG emissions and trade openness variables (see main text for how the value-added weighted GHG emissions was computed) on Topic 1 and Topic 3, respectively. The bottom plots report their interaction effect on the topical content of Topic 1 and Topic 3. As for the analysis in the main text, Topic 3 is interpreted as the more vague topic, while Topic 1 corresponds to the more action-involved topic.

Figure A.11: *Four-Topic Model - Most Probable Words for Model with Relative Trade Exposure*



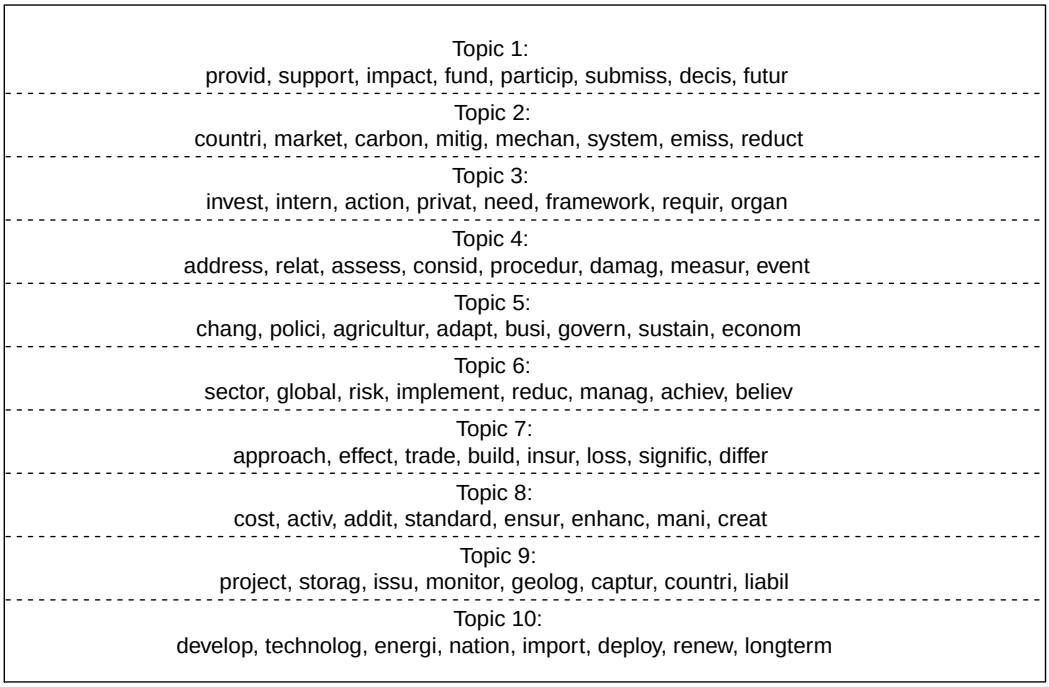
The figure shows the 8 most probable words of a four-topic model with a 'relative' (between-countries) trade exposure measure instead of the original (country-specific) indicator of trade openness.

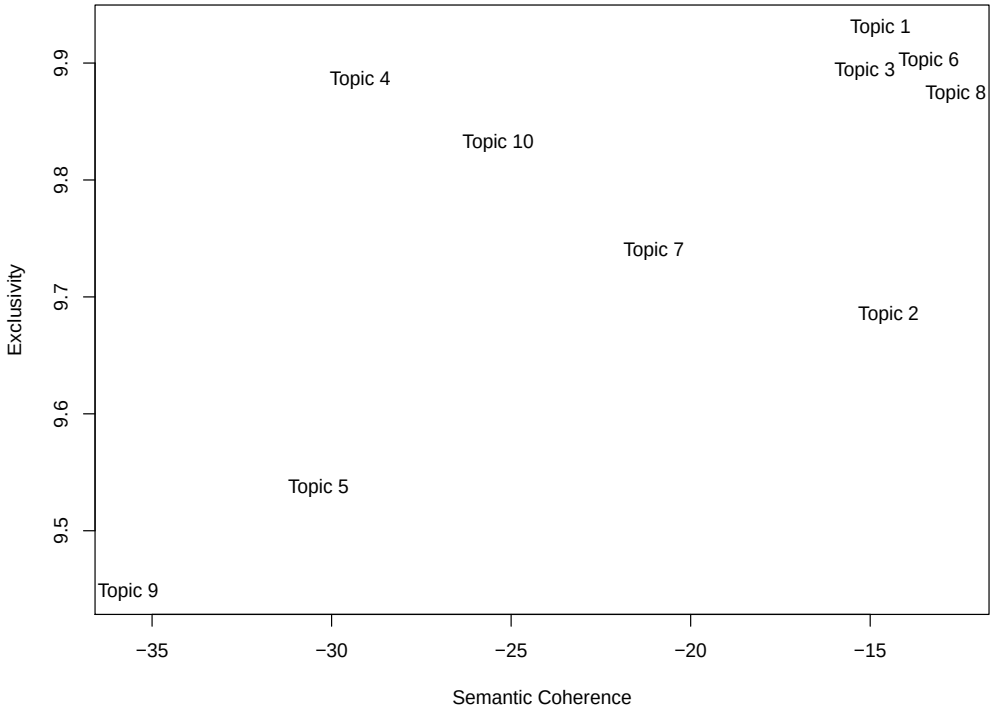
Figure A.12: *The Effect of Sectoral Considerations on Business Submissions - Trade Exposure*



The top plots report the effects of the sectoral GHG emissions and relative trade exposure variables on Topic 1 and Topic 3, respectively. The bottom plots report their interaction effect on Topic 1 and Topic 3. The exploration of the main words of each topic (Figure A.11) suggests that Topic 1 clusters more action-specific words while Topic 3 clusters more vague words; consequently Topic 3 is interpreted as the more vague topic, while Topic 1 corresponds to the more action-involved topic.

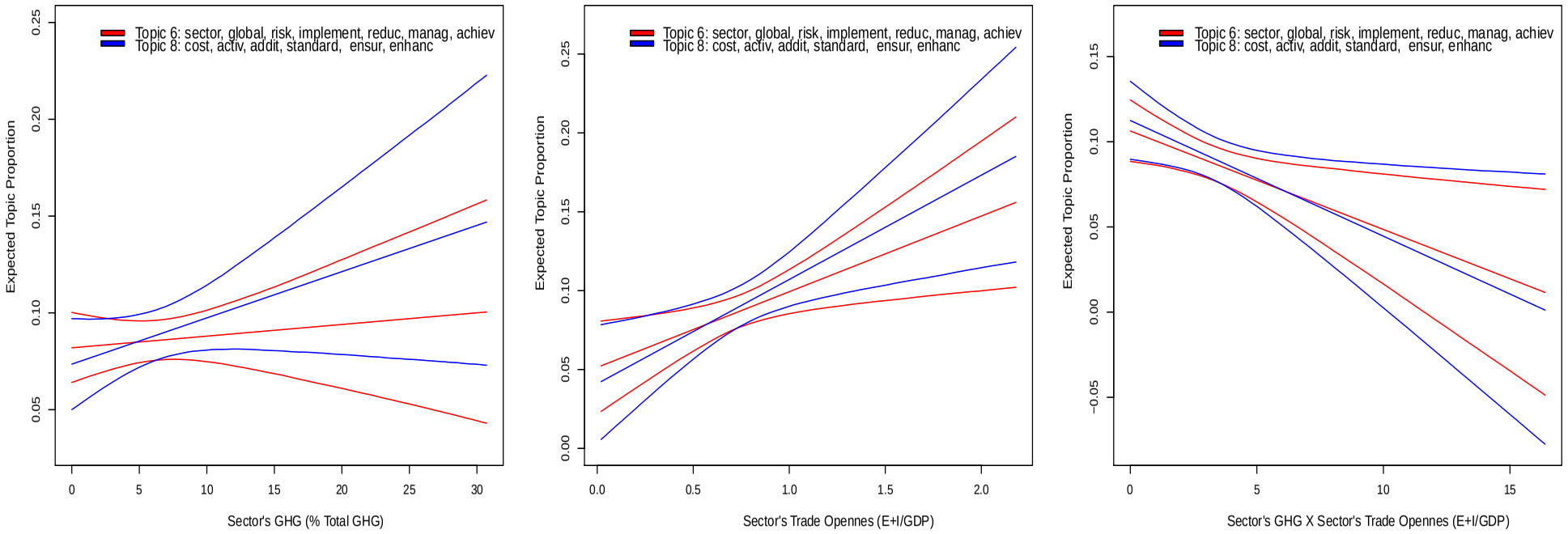
Figure A.13: *Ten-Topic Model - Most Probable Words and Quality Scores*





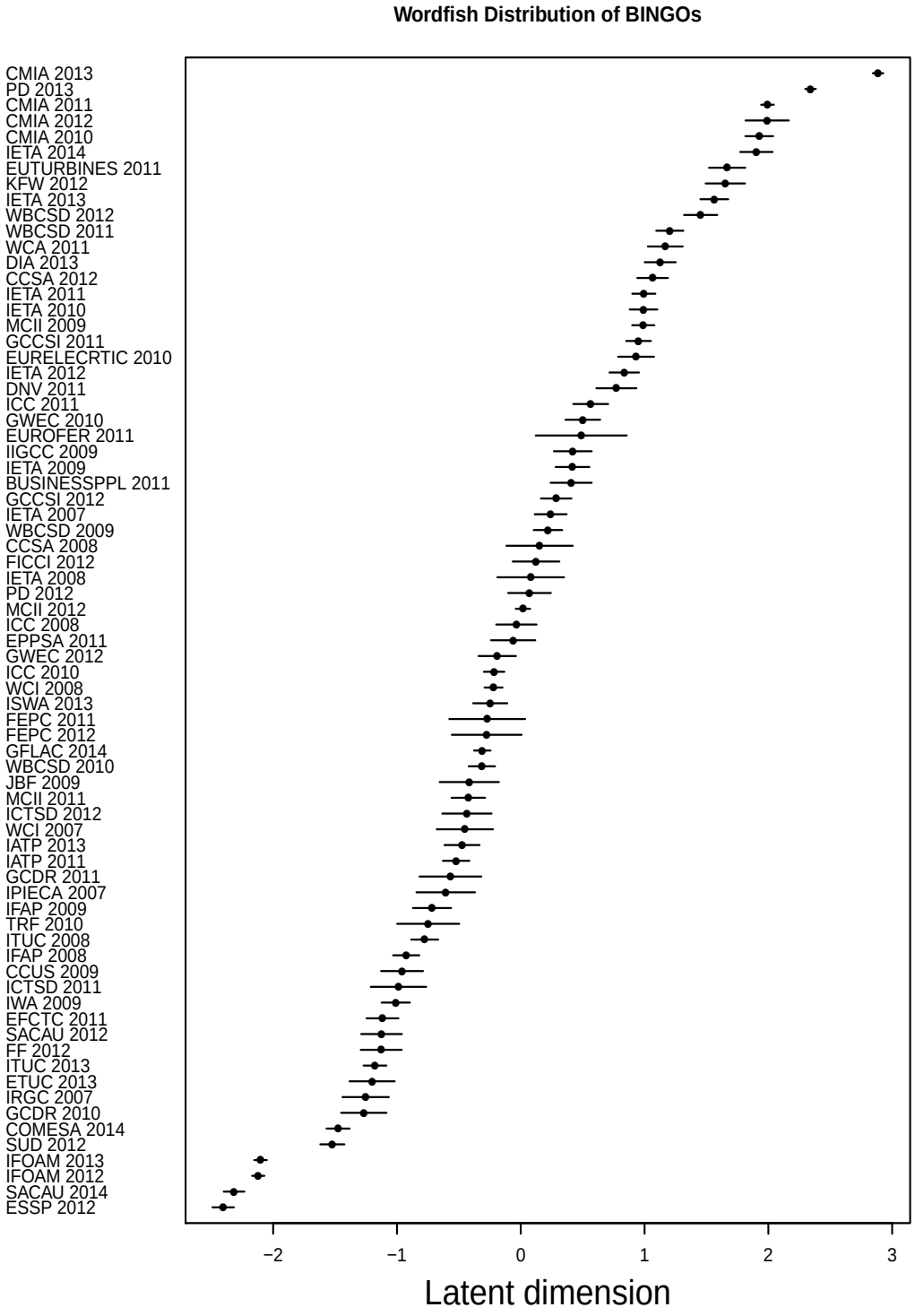
The top figure shows the 8 most probable words of a ten-topic model of the business submissions to the UNFCCC, while the bottom figure reveals that Topic 6 and 8 are more semantically coherent and exclusive than Topic 9.

Figure A.14: *The Effect of Pollution and Trade Openness on Business Submissions at the UNFCCC (Ten-Topic STM)*



This figure illustrates the statistical influence of the covariates on the topical content of the business texts. The estimation is based on a STM specified with ten topics. Each central lines corresponds to the estimated coefficient, while the external lines correspond to the 90% confidence interval. Topic 6 and 8 from topic model are identified in Figure A.13.

Figure A.15: *Wordfish Analysis of Business Submissions to the UNFCCC*



This figure illustrates the scaling of the 73 business association texts using the Wordfish algorithm. Anchor texts for the Wordfish estimation are the 2009 submission by IFAP and the 2012 submission by IETA.

Country-Level Data and Robustness Checks

This Section of the Appendix reports additional information and alternative tests and analyses related to the country-level data presented in the paper.

Data Notes

The data collection of the national positions is summarized in the main text. The dataset focuses on two periods of the negotiations for practical and substantive reasons. Practically, I exploit the fact that most National Communications were submitted around these two times of the negotiations. Substantively, these periods separate the 2005 enforcement of the Kyoto Protocol and are considered different eras in the history of the international climate regime. The NCs included in the database belong to both developed (Annex I) and developing countries (Non Annex I). These are the NC3 and NC5 for the Annex I countries, and NC1 and NC2 for the Non–Annex I countries. The criteria used to identify and scale the issue spaces, in addition to coding reliability and imputation techniques, are described in Genovese (2014).

In this Appendix I summarize the issue coded in the country-level dataset in Table B.1. I list the countries covered by the data by period under analysis in Figure B.1. Moreover, I show the correlation between the issue specific positions coded for the countries in the dataset (Figure B.3), as well as descriptives of the outcome of interest (the factorized latent positions on climate cooperation) and the explanatory variables (by sector, country and period).

The cross-national data on sectors' GHG emissions comes from the GHG Emission Profiles of the UNFCCC. Additionally, the trade data at the sectoral level comes from the GTAP database. The GTAP 6 Database is updated to the year 2002, while the GTAP 7 Database is updated to 2008. The two databases provide data for 87 and 113 countries, respectively. For the few countries that are not reported, I perform a five–dataset multiple linear imputation.

Robustness Tests

I engage with a number of robustness tests to evaluate the sensitivity of the main country-level findings reported in the paper. To start, it is worth asking whether the set of controls introduced in the model may be endogenous to the main variables and may bias the results. I find the results remain substantively unvaried if I drop all covariates (Figure B.9 below). Similarly, the results do not seem to be an artifact of the robust standard errors (see Figure B.10 below). The results are also not sensitive to the continuous factorized score as outcome: additional regressions that employ a Wordfish estimation of government positions produce results that are qualitatively similar to the main results (Figure B.11).

On a more substantive level, I explore whether the coefficients change if I run the regressions only on the subsample of democracies, which presumably are more sensitive to principal-agent dynamics with industrial actors. In this regard, I find that the coefficients are a little more substantive but generally as significant as in the original estimation (Figure B.12). Similarly, I investigate whether the joint effect on which this paper is centered is interlinked to the domestic institutional variable. To explore this, in alternate models I added an interaction of democratic regime with, on the one hand, GHG emissions and, on the other hand, trade openness. The results from these analyses show a null effect of the interaction of GHG and trade openness, respectively, with the regime dummy (see Table B.4). This may be possibly due to the fact that some autocracies mimic democracies at climate negotiations (e.g. Singapore), but also partly to the fact that the sample is not quite split between democracies and autocracies so some subtle differences may be washed out by the statistics. More importantly, the interaction between GHG and trade openness for each sector remains intact across the estimations, hence further yielding validity to the importance of the political economy narrative of emissions and trade.

I also investigate whether there are relevant differential effects across developed and developing countries. This is especially important if one suspects domestic regulatory contexts in these different types of countries to trump the joint effects of sectors' GHG emissions and trade. I tested this alternate theory by running my statistical models of governments' positions at the UNFCCC with an Annex I dummy variable (Table B.5) and also by splitting the sample by annex (Table B.6). The general finding here is that there is no strong evidence that sectors in these two groups of countries put different types of pressure on their governments. While the results for the Annex I subsample are feeble, the statistical weakness may be due to sample size. More importantly, the interaction terms are all in the same (negative) direction. This indicates that my theory is not strictly contingent on domestic policy contexts – or that there are no deep enough differences among domestic regulatory contexts that affect this general trend in my data.

As per my measurement of GHG emissions in the first empirical study, I used a relatively raw indicator of GHG volume, but I acknowledge that the literature uses a range of measures of pollution intensity, some of which weigh the size of the pollution source (e.g. large versus small firms). Consequently, I also generated additional measures based on a standardization of the GHG measure by (a) employees and (b) value added (VA). I retrieved the World Bank's numbers of employees as percentage of total employees and value added as percent of GDP. The World Bank reports these figures for the agriculture and industry sector (which the World Bank defines as mining, manufacturing and construction). Consequently for these analyses I aggregate mining and manufacture into one 'industry' category. I use the mean of the employees and VA figures for 2001-04 and 2008-11 to reflect the two periods of my country analysis, respectively. I then standardized the original GHG emission variable (for agriculture and 'industry') by employees and VA. Table B.7 and Table B.8 in the Appendix show the two respective sets of results for VA-weighted GHG emissions and employee-weighted GHG emissions. The estimates confirm the findings from the main text that industries' trade expansion and high pollution together correlate with less supportive positions for international climate cooperation. I also investigate whether the story underlying the sensitivity of exporting sectors is one about exports alone or productivity (as in, more exports relative to imports, so exports minus imports). I explore this additional hypothesis with regressions reported in Table B.9 below. The results indicate that, for at least agriculture and mining, this could be a story of productivity as the net export variable has negative and statistically significant coefficients, though in a similar magnitude of the unconditional export variable.

Moreover, because the debate on climate change is multifaceted, I assess if the detected mechanism is traceable to more fine-grained issues and whether the model fit improves if the issue under consideration captures more vested interests in one sector compared to another. To test this, I estimated my main linear model for national positions on two UNFCCC issues: domestic funding of adaptation projects, and the eligibility of nuclear energy for mitigation purposes. The direction of the interaction effects in these models is negative like in the aggregate position models (see Table B.10 and Figure B.13 below). However, the interaction in the adaptation funding model is only significant for agriculture, while in the nuclear energy model the interaction is only significant for mining. This is what one would expect given that adaptation funding is an issue more relevant to the agricultural sector and especially farmers that argue for more international aid for adaptation. Inversely, the interaction between pollution and trade openness in mining fits better the positions on nuclear energy, possibly because mining companies are concerned with the decrease in demand for petroleum-based goods and fuel production, while agriculture has small stakes in this issue. In sum, these results shed further light on the relation between sectoral concerns and government's positions at the UNFCCC, which appear to be driven by a combination of pollution-related costs and expectations of market reform and trade regulation.

Finally, one may wonder how the results in the empirical study of country positions connect to the first empirical study on businesses. While the two empirical exercises provide support to the sectoral analysis embodied in the theoretical argument of the paper, is it true that sectoral

considerations affect firms, and that their preferences are aggregated by governments into one unique country position? To start answering this question, I experimented with a prediction of document-level scores for the business association texts that I then matched to their respective countries' UNFCCC positions. I first ran the STM of the statements for the subsample of firms in countries that were both in analysis (1) and analysis (2). These are mostly European countries, although I keep the few developing countries for more statistical power. I computed the prevalence of 4 topic scores using a lasso-based STM estimator integrated in the STM algorithm, which allows me to predict document-level topic predominance. With reference to the words previously identified as discriminatory across the business texts, the most crucial topics here are Topic 1 (more vague) and 2 (more action-specific). I then correlated the prevalence of each of the four estimated topics with the country-level main dimension scores. Based on the results reported in Table B.11 below, I find that documents where I estimated a high density of Topic 2 (the more action-specific one) based on the model of joint GHG and trade openness are positively and significantly correlated with a positive national position on global climate cooperation (as measured by the factor loading). Vice versa, documents where I estimated a high density of Topic 1 (the vaguer one) is negatively associated with more cooperative national positions. This evidence is constrained to a very narrow sample (N=59) and is subject to a number of data fitness assumptions, nevertheless it is in the direction of the link between the sectoral motivations affecting firms and the aggregated government. In other words, this result provides some initial support to the proposition of this paper that sectoral considerations drive firm lobbying which then affects governments' attitude on international climate politics.

Table B.1: *UNFCCC Issues Coded in the Dataset*

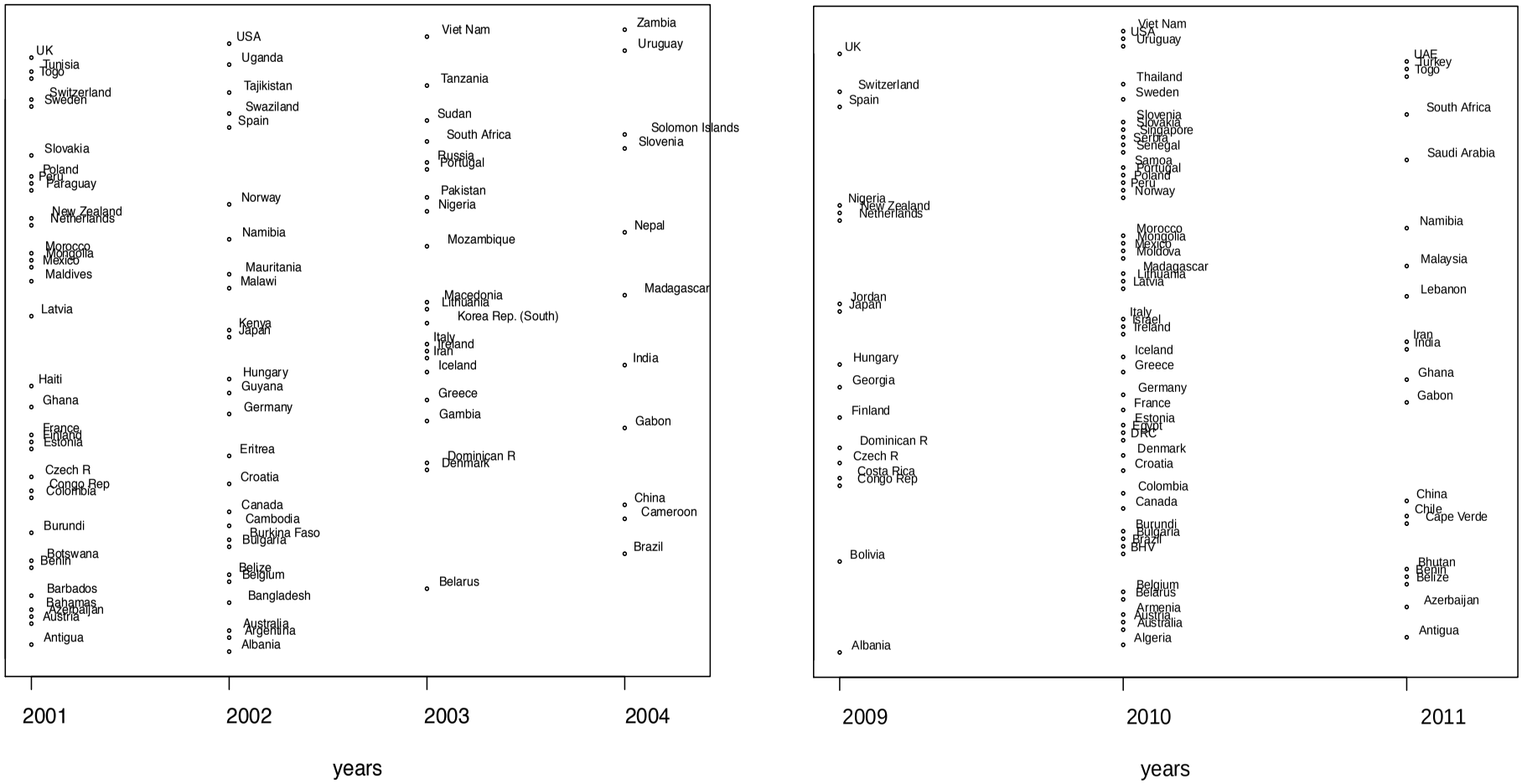
Period 1	*Period 2*
1. CDM engagement	1. CDM engagement
2. Emission trading	2. Emission trading
3. Binding commitment	3. Binding commitment
4. LUCF accounting	4. LUCF historical records
5. Funding approach	5. Funding approach
6. Abatement credits	6. Abatement credits
7. LUCF eligible threshold	7. REDD eligible threshold
8. Nuclear energy use	8. Nuclear energy use
9. Technology transfers	9. CCS adoption
10. Adaptation funds	10. Adaptation funds
11. LUCF–based abatement	11. Technology transfers
12. GHG abatement target	12. GHG abatement target
13. Int'l accountability	13. Int'l accountability
14. Legislative action level	14. Legislative action level
15. Offset projects credit	15. Offset projects credit
16. Regulatory approach	16. Regulatory approach
17. Systematic observation	17. Systematic observation
18. Historical responsibility	18. Historical responsibility
19. ODA diversion	19. ODA diversion
20. Supplementarity	20. Supplementarity
21. Proportional industry impact	21. Temperature rise limit
22. Uncertainty of policy	22. Post–2012 regime
	23. Int'l bunkers

This table lists the issues upon which each country presents a position at the UNFCCC according to the NC coding.

Figure B.1: *Sample coverage*

This figure lists the 115 countries included in each of the two periods (2001-04 and 2008-11) covered by my dataset. The colored ticks indicate when a given country and its preferences, which constitute the main outcome variable of the second analysis of the paper, are available in the dataset.

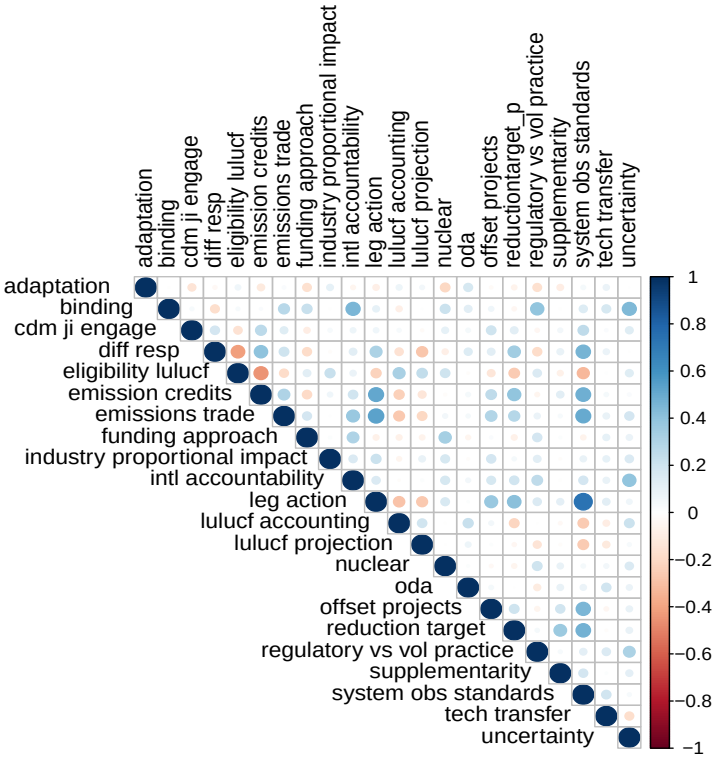
Figure B.2: *Country Sample by Coded Period*



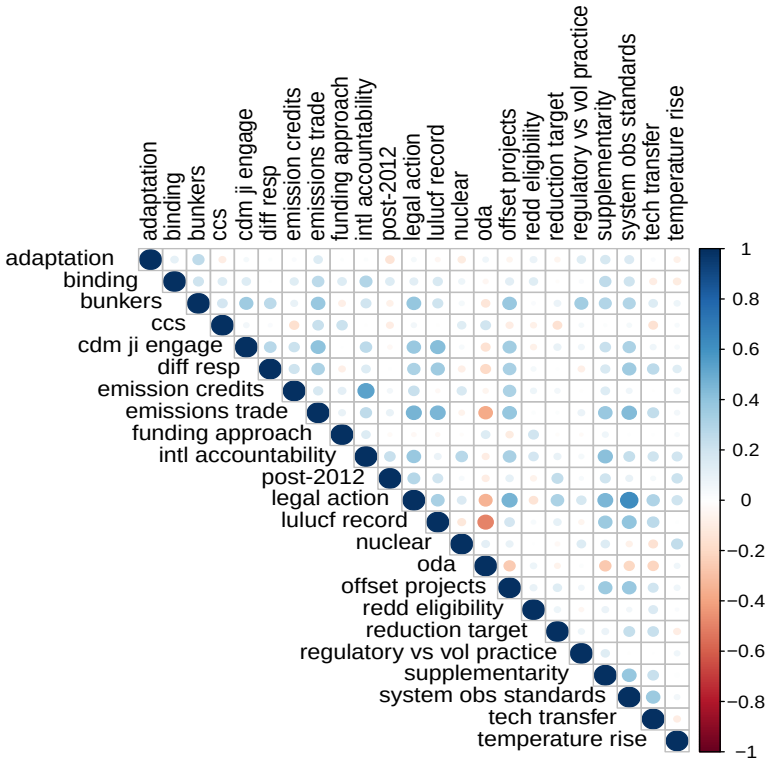
This dot plot lists the National Communications collected for both 2001-04 and 2008-11 negotiation periods. Countries are listed by year of submission and in inverted alphabetical order (the y-axis is used only for illustration purposes).

Figure B.3: *Correlation Plots Across Coded Issues*

Period 1 (2001-04)

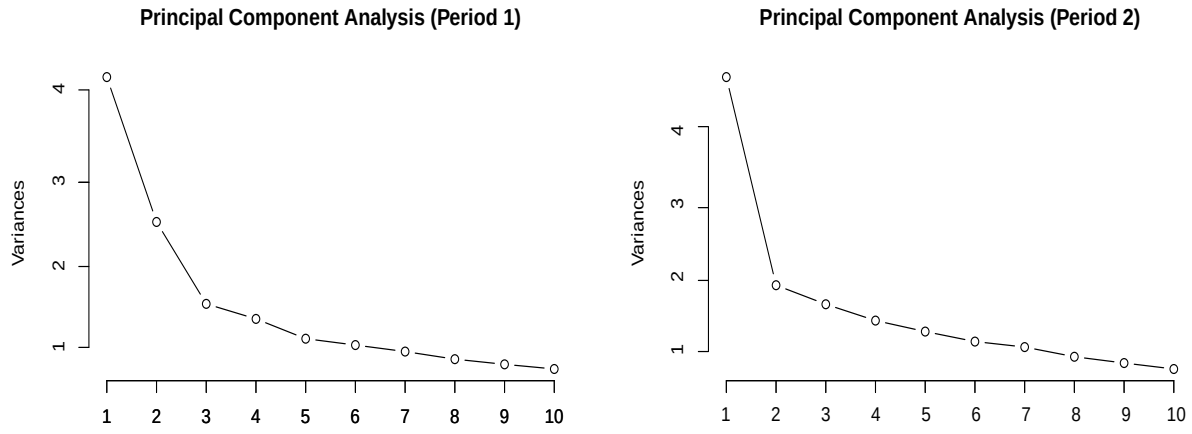


Period 2 (2008-11)



The figure shows in two separate plots the correlations of the national positions across the issues coded in my dataset.

Figure B.4: *Scree Plots from Principal Component Analysis of Country Positions Across Issues*



This plot shows the scree plots from a factor analysis of the NC position data for the two time periods.

Figure B.5: *GHG Volume and Trade Openness of Agricultural Sector by Country and Period*

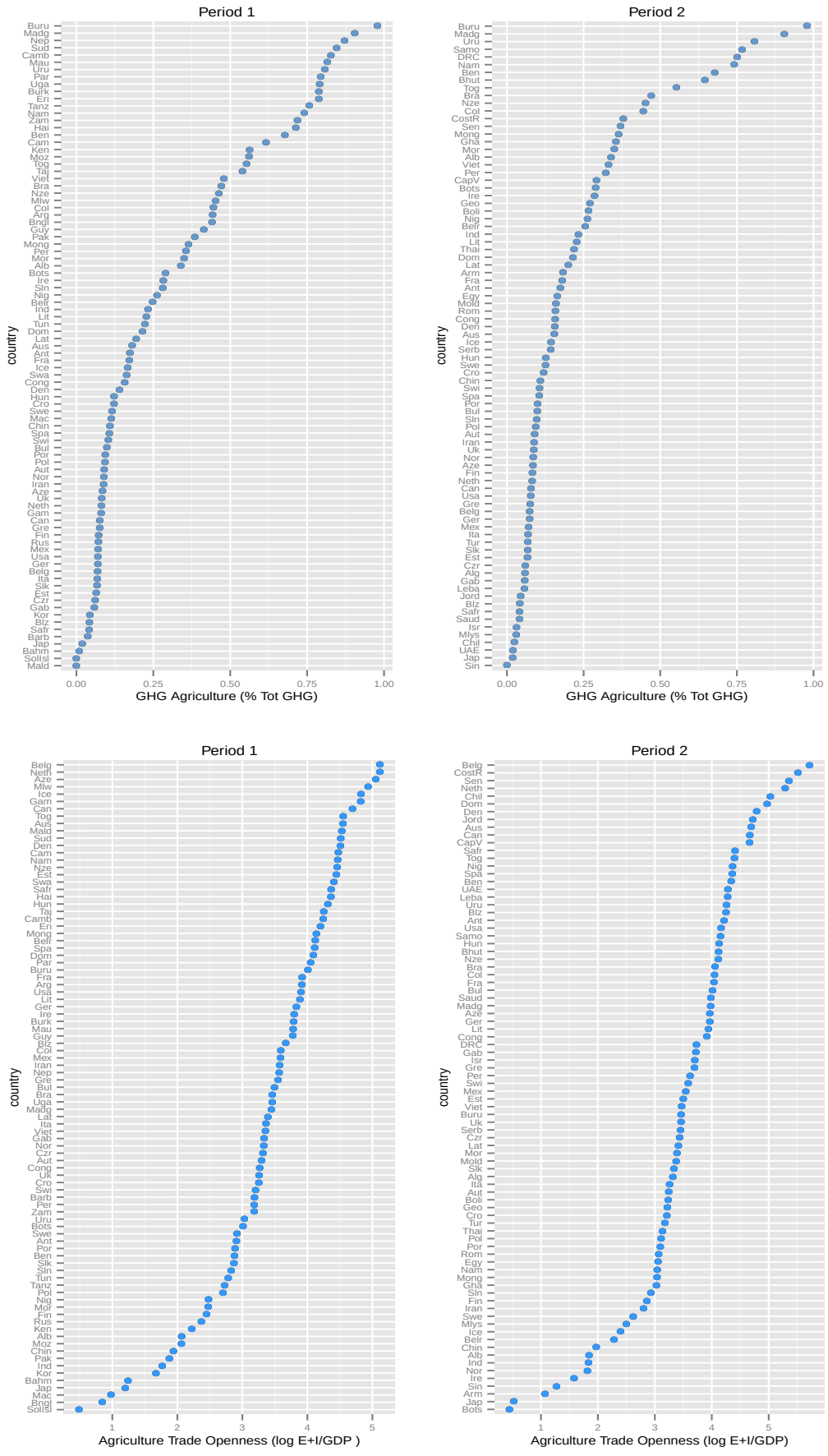


Figure B.6: *GHG Volume and Trade Openness of Mining Sector by Country and Period*

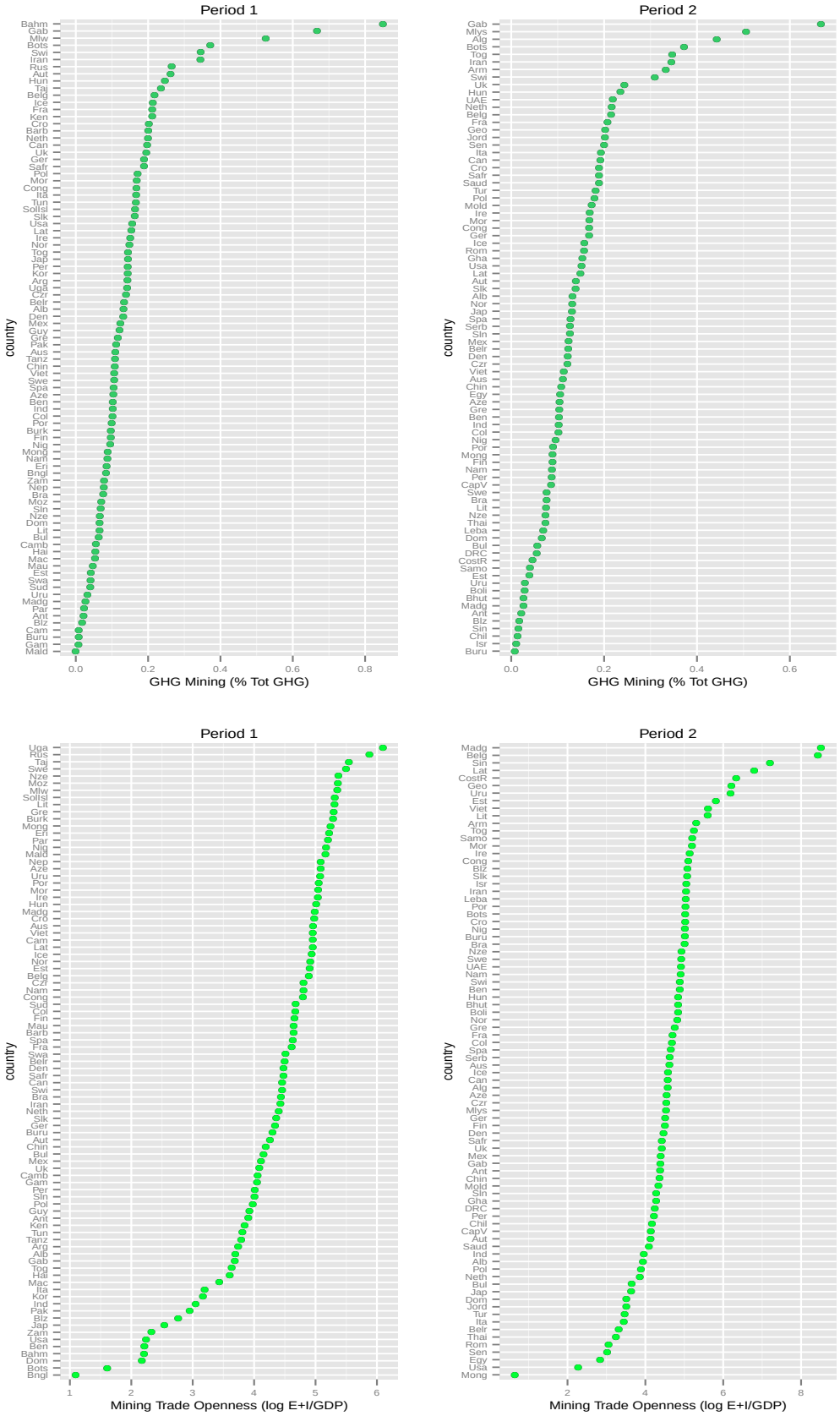
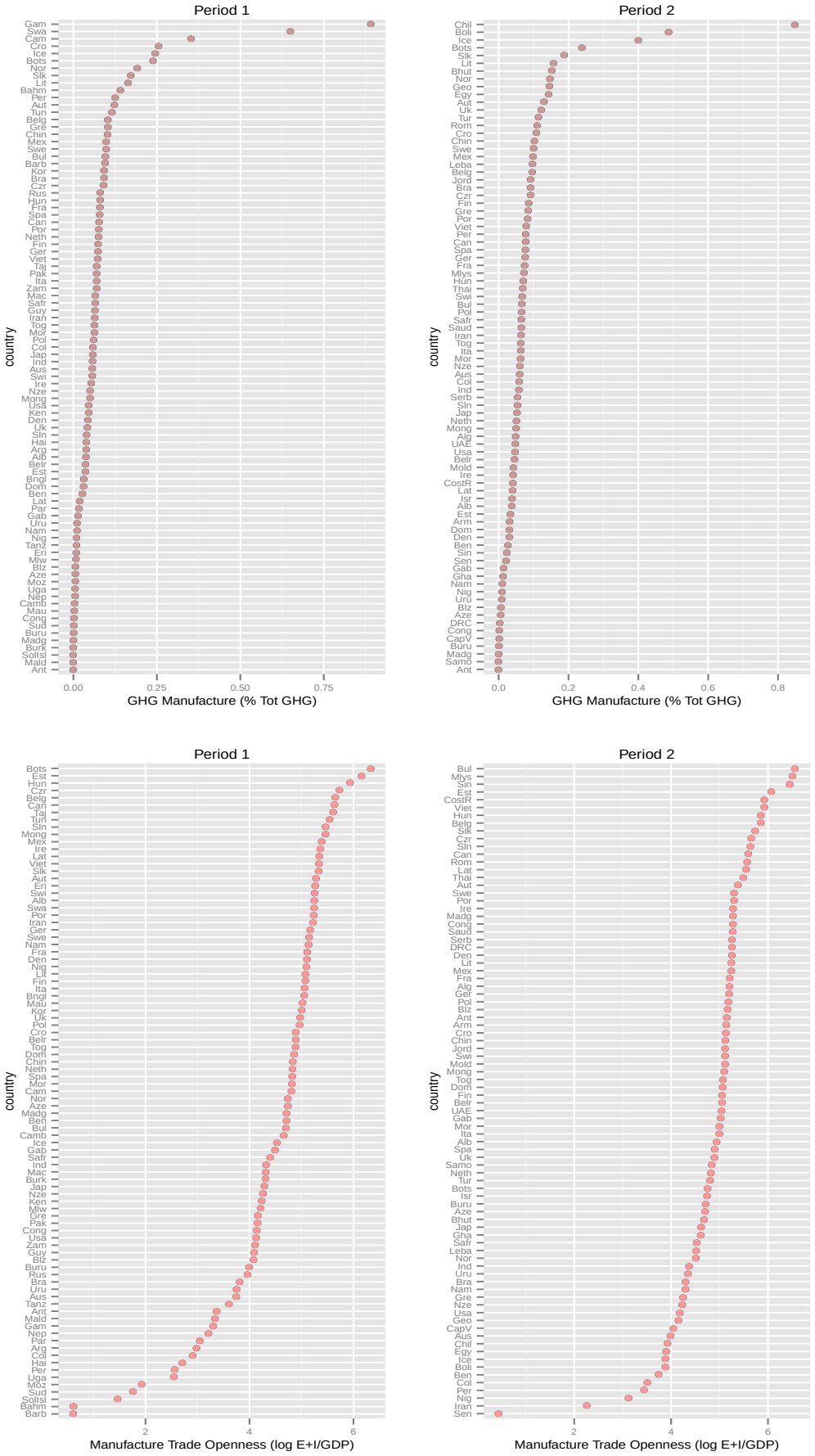


Figure B.7: *GHG Volume and Trade Openness of Manufacturing Sector by Country and Period*



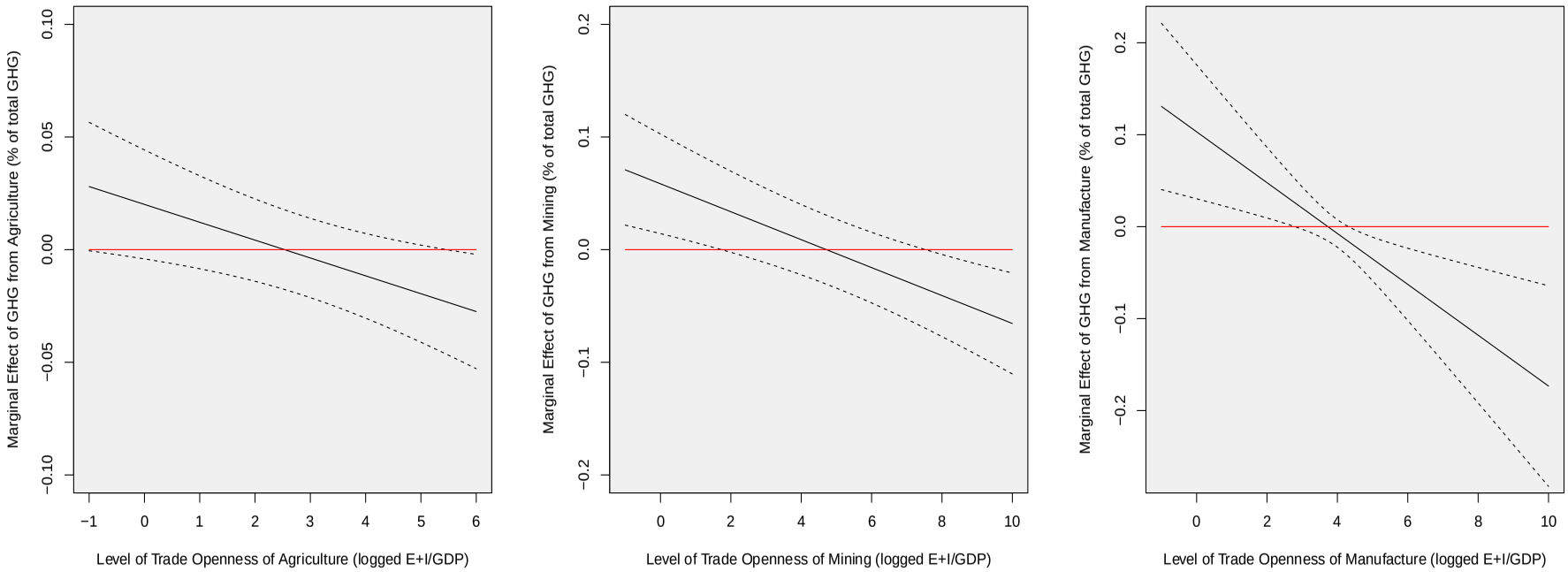
	Y: Climate Cooperation Position (Main Factor Loading)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Agriculture: GHG Volume	0.010	0.031*	0.021							0.035*
	(0.012)	(0.015)	(0.013)							(0.013)
Agriculture: Trade Openness	0.026	0.248***	0.266**							0.362***
	(0.065)	(0.117)	(0.120)							(0.107)
Agriculture: GHG Volume Trade Openness (log)*		-0.007*	-0.007*							-0.013***
		(0.003)	(0.003)							(0.003)
Mining: GHG Volume				-0.005	0.057**	0.050*				0.079*
				(0.016)	(0.023)	(0.024)				(0.040)
Mining: Trade Openness				0.087	0.223***	0.203***				0.349***
				(0.032)	(0.056)	(0.055)				(0.119)
Mining: GHG Volume Trade Openness (log)*					-0.012**	-0.011**				-0.018***
					(0.003)	(0.003)				(0.003)
Manufacture: GHG Volume							-0.013	0.111**	0.114**	0.157***
							(0.009)	(0.034)	(0.034)	(0.038)
Manufacture: Trade Openness							0.174*	0.351***	0.363***	0.263***
							(0.067)	(0.086)	(0.085)	(0.076)
Manufacture: GHG Volume Trade Openness*								-0.030***	-0.030***	-0.042***
								(0.009)	(0.009)	(0.010)
GDP per capita	-0.017	0.011	-0.069	0.008	0.090	0.011	-0.041	-0.091	-0.163	0.081
	(0.132)	(0.116)	(0.122)	(0.125)	(0.125)	(0.152)	(0.119)	(0.113)	(0.122)	(0.107)
Co2 per capita	-0.167	-0.143	-0.072	-0.308**	-0.096	-0.053	-0.197*	-0.412**	-0.345**	-0.311
	(0.142)	(0.132)	(0.126)	(0.128)	(0.156)	(0.150)	(0.110)	(0.151)	(0.145)	(0.278)
Co2 per capita squared	0.010	0.010	0.004	0.018	0.011	0.007	0.014	0.022	0.018	0.021
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.018)
Vulnerability	0.313***	0.335***	0.341***	0.330***	0.370***	0.373***	0.333***	0.318***	0.321***	0.431***
	(0.058)	(0.065)	(0.071)	(0.059)	(0.049)	(0.055)	(0.063)	(0.062)	(0.067)	(0.097)
Democratic regime	0.306***	0.371***	0.330***	0.376***	0.401***	0.367***	0.247**	0.248**	0.158*	0.517***
	(0.092)	(0.089)	(0.090)	(0.082)	(0.074)	(0.088)	(0.098)	(0.092)	(0.107)	(0.105)
Government ideology			-0.032			-0.016			-0.044	-0.030
			(0.019)			(0.022)			(0.028)	(0.017)
Sector's trade tariff			0.019			0.013			0.005	-0.004
			(0.014)			(0.015)			(0.013)	(0.011)
N. of ENGOs			0.044*			0.042			0.041	0.029
			(0.021)			(0.024)			(0.026)	(0.022)
Constant	-2.591*	-3.670**	-2.837*	-2.617*	-4.506**	-3.823**	-2.819*	-2.843**	-2.264**	-7.096***
	(1.250)	(1.098)	(1.144)	(1.221)	(1.322)	(1.522)	(1.036)	(0.957)	(0.991)	(1.166)
N	173	173	173	173	173	173	173	173	173	173
Adjusted R^2	0.697	0.708	0.705	0.703	0.718	0.710	0.714	0.727	0.722	0.757

Table B.2: *The Effect of Pollution and Trade Openness on National Positions on Climate Cooperation.* The table reports the coefficients of linear panel models with clustered standard errors. Period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)					
	Agriculture		Mining		Manufacture	
	(1)	(2)	(3)	(4)	(5)	(6)
Sector's GHG Volume	0.017	0.029	0.012	0.046*	-0.055*	0.055*
	(0.015)	(0.013)	(0.022)	(0.018)	(0.022)	(0.020)
Sector's Import Openness	0.033		-0.028		-0.073	
	(0.121)		(0.070)		(0.067)	
Sector's Export Openness		0.242*		0.219***		0.276***
		(0.138)		(0.060)		(0.075)
*Sector's GHG Volume**	-0.003		-0.001		0.008	
Sector's Import Openness	(0.003)		(0.004)		(0.005)	
*Sector's GHG Volume**		-0.008*		-0.011***		-0.022***
Sector's Export Openness		(0.003)		(0.002)		(0.007)
GDP per capita	-0.053	-0.041	-0.015	0.081	-0.050	0.028
	(0.135)	(0.115)	(0.133)	(0.128)	(0.125)	(0.113)
Co2 per capita	-0.165	-0.178	-0.119	-0.081	-0.161	-0.310*
	(0.124)	(0.133)	(0.170)	(0.125)	(0.120)	(0.140)
Co2 per capita squared	0.010	0.010	0.008	0.010	0.010	0.017
	(0.010)	(0.011)	(0.011)	(0.009)	(0.010)	(0.010)
Vulnerability	0.314***	0.347***	0.295***	0.407***	0.306***	0.320***
	(0.061)	(0.070)	(0.060)	(0.058)	(0.0616)	(0.065)
Democratic regime	0.338**	0.362**	0.300**	0.428***	0.378**	0.356**
	(0.091)	(0.083)	(0.087)	(0.089)	(0.097)	(0.081)
Constant	-2.418*	-3.169**	-2.041	-4.448***	-1.507	-3.048**
	(1.157)	(1.133)	(1.457)	(1.435)	(1.267)	(1.103)
N	173	173	173	173	173	173
Adjusted R^2	0.693	0.720	0.692	0.730	0.697	0.719

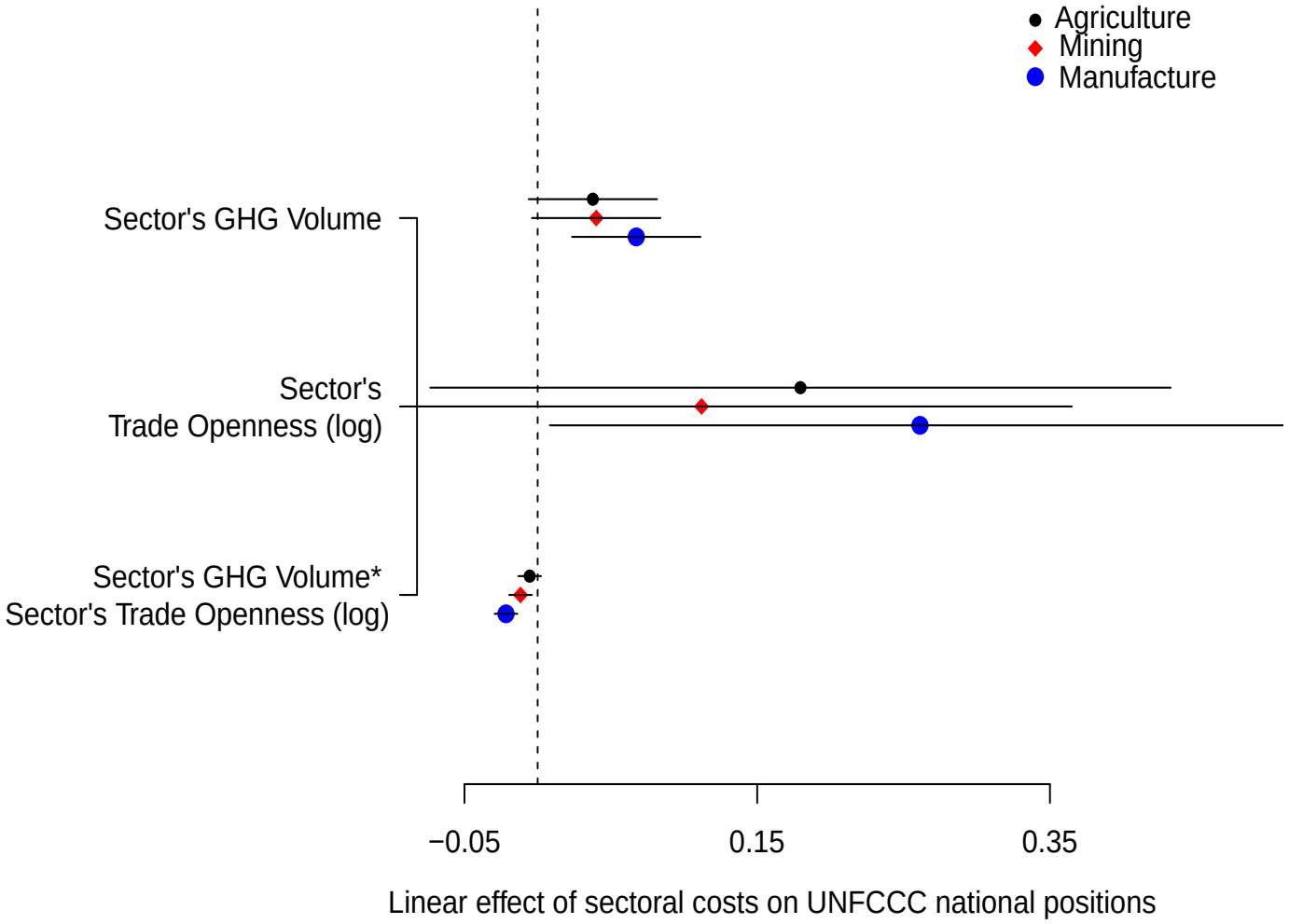
Table B.3: *Interaction Effects of Sectoral GHG Emissions and Sectors' Import and Export Values on National Positions on Climate Cooperation.* The table reports the coefficients of a linear model with clustered standard errors. Period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

Figure B.8: *The Joint Effect of Pollution and Trade on National Positions on Climate Cooperation: Sectoral GHG as Trade Openness increases*



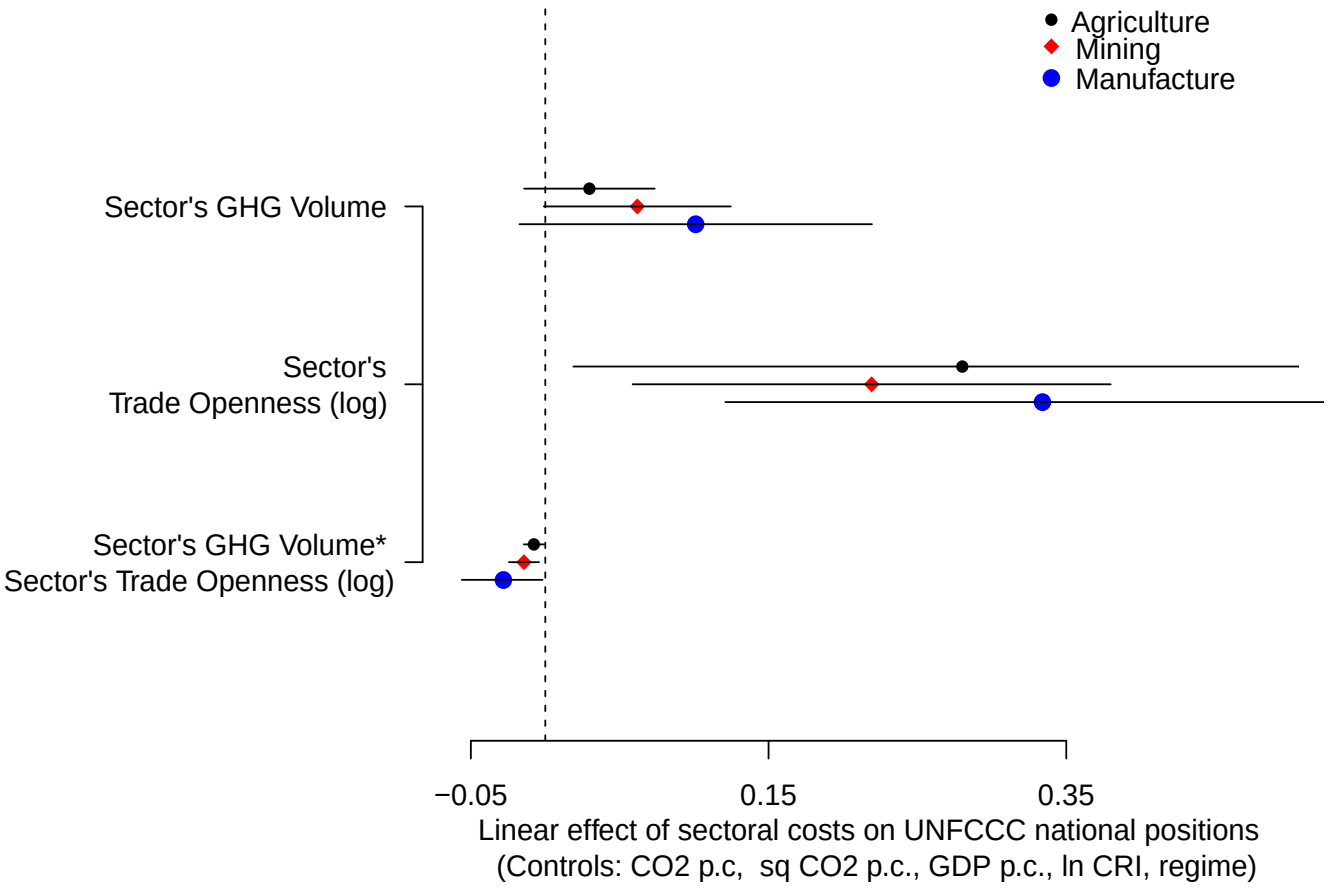
This figure illustrates the marginal effect plots based on the interactions reported in Table 1. Dotted lines are 95% confidence intervals. Constant, controls, country and time effects are included.

Figure B.9: *The Effect of Pollution and Trade Openness on National Positions for Global Climate Cooperation: No Controls*



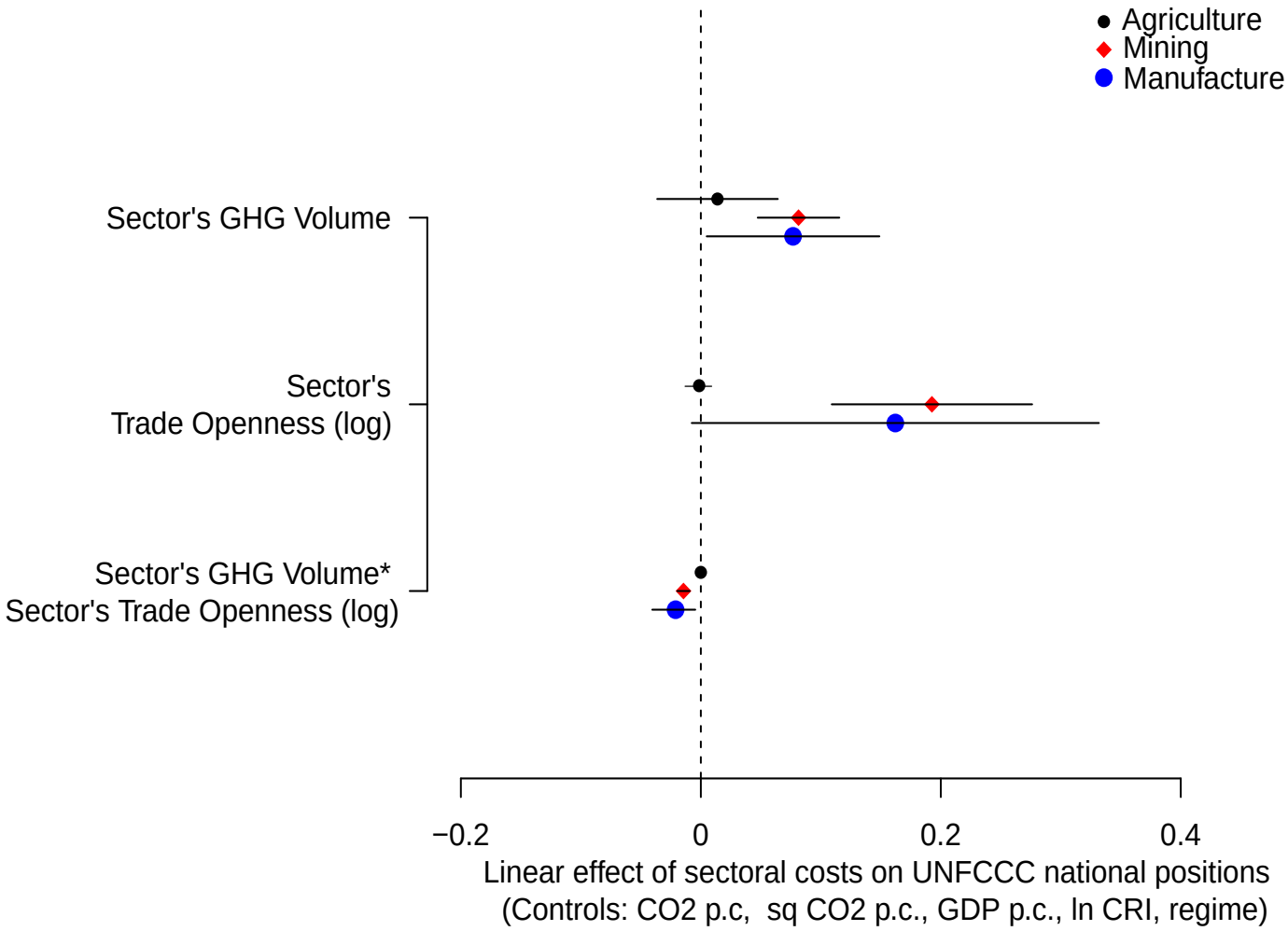
This figure illustrates the results of the main linear model with no additional set of controls by sector. Estimates are based on the full sample, N = 173. Each dot corresponds to the estimated coefficient, while the line corresponds to the 95% confidence interval. Constant, country and time effects not reported.

Figure B.10: *The Effect of Cost Considerations on National Positions for Global Climate Cooperation: Main Models (with non-robust standard errors)*



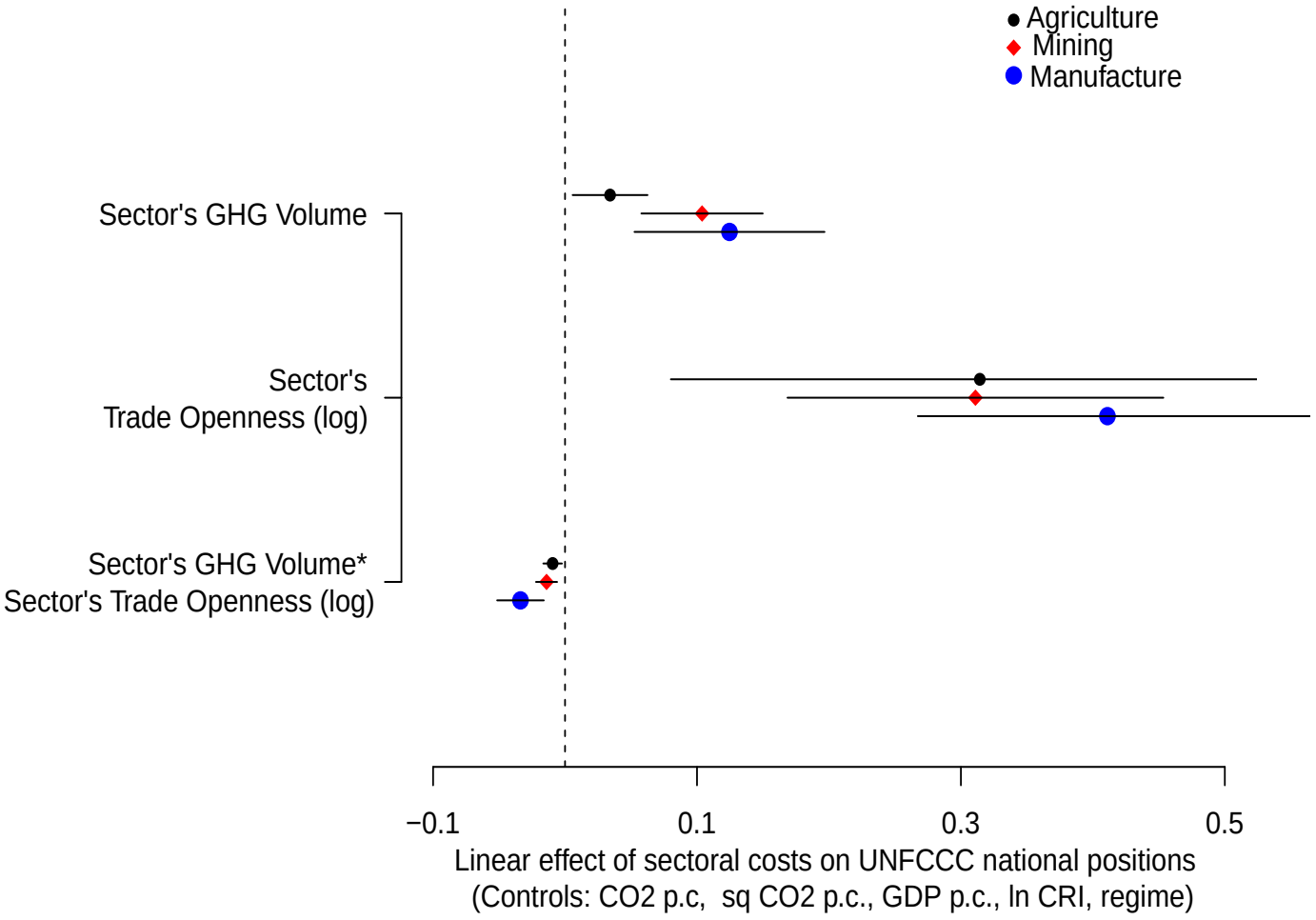
This figure illustrates the results of the main linear model with the set of reported controls by sector. Estimates are based on the full sample, N = 173. Each dot corresponds to the estimated coefficient, while the line corresponds to the 90% confidence interval. Constant, controls, country and time effects not reported.

Figure B.11: *The Effect of Pollution and Trade Openness on National Positions for Global Climate Cooperation: Wordfish Estimates*



This figure illustrates the results of the linear model of the Wordfish Estimates with the reported set of controls by sector. Estimates are based on the Wordfish sample, N = 134. Each dot corresponds to the estimated coefficient, while the line corresponds to the 95% confidence interval. Constant, controls, country and time effects not reported.

Figure B.12: *The Effect of Pollution and Trade Openness on National Positions for Global Climate Cooperation: Democracies Subsample*



This figure illustrates the results of the linear model with the reported set of controls by sector. Estimates are based on the democracies subsample, N = 142. Each dot corresponds to the estimated coefficient, while the line corresponds to the 95% confidence interval. Constant, controls, country and time effects not reported.

	Y: Climate Cooperation Position		
	Agriculture	Mining	Manufacture
	(1)	(2)	(3)
Agriculture: GHG Volume	0.031		
	(0.027)		
Agriculture: Trade Openness	0.32		
	(0.31)		
Democratic regime	0.66	-0.986	-0.544
	(1.17)	(0.950)	(1.070)
*Agriculture: GHG Volume**	-0.0076*		
Agriculture: Trade Openness	(0.0044)		
*Agriculture: GHG Volume**	0.00		
Democratic regime	(0.00)		
*Agriculture: Trade Openness**	-0.077		
Democratic regime	(0.27)		
Mining: GHG Volume		0.039	
		(0.047)	
Mining: Trade Openness		0.112	
		(0.136)	
*Mining: GHG Volume**		-0.013**	
Mining: Trade Openness		(0.0064)	
*Mining: GHG Volume**		0.053	
Democratic regime		(0.044)	
*Mining: Trade Openness**		0.18	
Democratic regime		(0.16)	
Manufacture: GHG Volume			0.122*
			(0.072
Manufacture: Trade Openness			0.145
			(0.275
*Manufacture: GHG Volume**			-0.033*
Manufacture: Trade Openness			(0.017)
*Manufacture: GHG Volume**			0.00
Democratic regime			(0.00)
*Manufacture: Trade Openness**			0.27
Democratic regime			(0.31)
Other Controls	yes	yes	yes
N	173	173	173
Within R^2 0.23	0.31	0.29	

Table B.4: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Interactions with Political Regime.* The table reports the coefficients of a linear panel model. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)			
	Agriculture	Mining	Manufacture	Full
	(1)	(2)	(3)	(4)
Agriculture: GHG Volume	0.029			0.037
	(0.027)			(0.025)
Agriculture: Trade Openness	0.26*			0.36**
	(0.16)			(0.17)
Agriculture: GHG Volume Trade Openness*	-0.007*			-0.013***
	(0.004)			(0.004)
Mining: GHG Volume		0.042		0.073*
		(0.040)		(0.043)
Mining: Trade Openness		0.22**		0.36***
		(0.10)		(0.11)
Mining: GHG Volume Trade Openness*		-0.012*		-0.018***
		(0.006)		(0.007)
Manufacture: GHG Volume			0.090	0.13*
			(0.076)	(0.081)
Manufacture: Trade Openness			0.33**	0.23*
			(0.14)	(0.14)
Manufacture: GHG Volume Trade Openness*			-0.026	-0.037**
			(0.018)	(0.019)
Co2 per capita	-0.13	-0.10	-0.37	-0.33
	(0.22)	(0.25)	(0.24)	(0.27)
Co2 per capita squared	0.009	0.011	0.021	0.023
	(0.016)	(0.017)	(0.017)	(0.017)
GDP per capita	0.035	0.084	-0.071	0.11
	(0.17)	(0.17)	(0.16)	(0.17)
Vulnerability	0.33***	0.37***	0.32***	0.43***
	(0.098)	(0.098)	(0.094)	(0.094)
Democratic regime	0.35	0.39	0.23	0.56
	(0.58)	(0.57)	(0.56)	(0.53)
Annex I dummy	0.47	0.54	0.38	0.31
	(0.41)	(0.45)	(0.42)	(0.46)
N	173	173	173	173
Within R^2	0.25	0.28	0.29	0.47

Table B.5: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Annex I Dummy.* The table reports the coefficients of a linear panel model. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)					
	Agriculture		Mining		Manufacture	
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture: GHG Volume	-0.044	0.10*				
	(0.040)	(0.052)				
Agriculture: Trade Openness	-0.29	0.75**				
	(0.25)	(0.32)				
*Agriculture: GHG Volume**	-0.014	-0.015**				
Trade Openness (log)	(0.012)	(0.006)				
Mining: GHG Volume			0.12	0.032		
			(0.083)	(0.096)		
Mining: Trade Openness			0.48	0.16		
			(0.34)	(0.20)		
*Mining: GHG Volume**			-0.025	-0.012		
Trade Openness (log)			(0.019)	(0.016)		
Manufacture: GHG Volume					-0.010	-0.31
					(0.087)	(1.28)
Manufacture: Trade Openness					-0.20	0.52**
					(0.30)	(0.22)
*Manufacture: GHG Volume**					-0.004	-0.080*
Trade Openness (log)					(0.020)	(0.048)
Co2 per capita	-0.050	0.47	-0.065	0.084	-0.17	-0.029
	(0.45)	(0.56)	(0.44)	(0.82)	(0.44)	(0.67)
Co2 per capita squared	0.008	-0.044	0.009	-0.003	0.017	-0.053
	(0.021)	(0.063)	(0.022)	(0.090)	(0.021)	(0.084)
GDP per capita	0.068	-0.18	0.12	-0.28	0.014	-0.51
	(0.31)	(0.34)	(0.30)	(0.44)	(0.31)	(0.34)
Vulnerability	0.35**	0.28*	0.37***	0.43**	0.40***	0.25
	(0.14)	(0.15)	(0.14)	(0.21)	(0.13)	(0.16)
Democratic regime	-0.26	0.38	-5.51	0.55	0.00	0.40
	(5.65)	(0.69)	(4.86)	(0.82)	(0.00)	(0.72)
N	70	103	70	103	70	103
Within R^2	0.35	0.49	0.38	0.29	0.37	0.44

Table B.6: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Annex I and Non-Annex I subsamples.* The table reports the coefficients of a linear panel model. For each specified sector, the left column (1, 3 and 5) correspond to results for the Annex I subsample, while the right column (2, 4, and 6) correspond to results for the Non-Annex I subsample. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)				
	Agriculture		Industry		Full
	(1)	(2)	(3)	(4)	(5)
Agriculture: VA-Weighted GHG Volume	0.086	3.14**			2.46*
	(0.16)	(1.26)			(1.36)
Agriculture: Trade Openness	0.023	0.10			0.0073
	(0.094)	(0.096)			(0.12)
Agriculture: VA-Weighted GHG Volume Trade Openness*		-0.72**			-0.54*
		(0.30)			(0.33)
Industry: VA-Weighted GHG Volume			8.27	18.70*	19.10*
			(38.0)	(10.82)	(11.18)
Industry: Trade Openness			0.11*	0.22***	0.23**
			(0.059)	(0.084)	(0.097)
Industry: VA-Weighted GHG Volume Trade Openness*				-18.9*	-18.2*
				(10.7)	(10.9)
Co2 per capita	-0.12	-0.054	-0.36	-0.33	-0.22
	(0.23)	(0.23)	(0.24)	(0.23)	(0.27)
Co2 per capita squared	0.008	0.007	0.022	0.020	0.015
	(0.017)	(0.016)	(0.017)	(0.017)	(0.018)
GDP per capita	0.048	0.17	0.017	0.055	0.22
	(0.20)	(0.20)	(0.16)	(0.16)	(0.21)
Vulnerability	0.31***	0.31***	0.34***	0.36***	0.36***
	(0.098)	(0.094)	(0.096)	(0.095)	(0.100)
Democratic regime	0.33	0.35	0.34	0.37	0.41
	(0.59)	(0.56)	(0.57)	(0.56)	(0.56)
Government ideology					-0.011
					(0.046)
Sector's trade tariff					-0.0021
					(0.024)
N. of ENGOs					0.046
					(0.043)
N	173	173	173	173	173
Within R^2	0.19	0.27	0.24	0.28	0.37

Table B.7: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Value Added-Standardized GHG*. The table reports the coefficients of a linear panel model. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)				
	Agriculture		Industry		Full
	(1)	(2)	(3)	(4)	(5)
Agriculture: Employee-Weighted GHG Volume	-0.000	0.0067*			0.011**
	(0.001)	(0.0035)			(0.0050)
Agriculture: Trade Openness	0.029	0.023			-0.10
	(0.096)	(0.093)			(0.11)
Agriculture: Employee-Weighted GHG Volume Trade Openness*		-0.002**			-0.004**
		(0.001)			(0.001)
Industry: Employee-Weighted GHG Volume			-0.35	7.52	6.73
			(1.95)	(4.86)	(5.32)
Industry: Trade Openness			0.11*	0.21***	0.28***
			(0.060)	(0.081)	(0.097)
Industry: Employee-Weighted GHG Volume Trade Openness*				-0.77*	-0.77*
				(0.44)	(0.46)
Co2 per capita	-0.18	-0.29	-0.35	-0.28	-0.69**
	(0.26)	(0.25)	(0.23)	(0.22)	(0.32)
Co2 per capita squared	0.012	0.020	0.022	0.018	0.047*
	(0.021)	(0.021)	(0.017)	(0.017)	(0.025)
GDP per capita	-0.0057	-0.15	0.016	0.084	-0.092
	(0.18)	(0.19)	(0.16)	(0.16)	(0.20)
Vulnerability	0.31***	0.30***	0.34***	0.38***	0.41***
	(0.11)	(0.11)	(0.096)	(0.097)	(0.11)
Democratic regime	0.30	0.42	0.33	0.38	0.64
	(0.61)	(0.59)	(0.57)	(0.56)	(0.58)
Government ideology					0.059
					(0.065)
Sector's trade tariff					-0.012
					(0.023)
N. of ENGOs					0.046
					(0.044)
N	170	170	173	173	170
Within R^2	0.17	0.23	0.24	0.28	0.39

Table B.8: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Employees-Standardized GHG.* The table reports the coefficients of a linear panel model. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Climate Cooperation Position (Main Factor Loading)		
	Agriculture	Mining	Manufacture
	(1)	(2)	(3)
Agriculture: GHG Volume	0.0063		
	(0.024)		
Net Exports	0.30*		
	(0.18)		
*Agriculture: GHG Volume**	-0.0078**		
Net Exports	(0.0039)		
Mining: GHG Volume		0.000	
		(0.020)	
Mining: Net Exports		0.33***	
		(0.097)	
*Mining: GHG Volume **		-0.015**	
Net Exports		(0.0058)	
Manufacture: GHG Volume			-0.036
			(0.028)
Manufacture: Net Exports			0.21**
			(0.097)
*Manufacture: GHG Volume**			-0.012
Net Exports			(0.0079)
Co2 per capita	-0.19	-0.30	-0.21
	(0.21)	(0.20)	(0.20)
Co2 per capita squared	0.011	0.019	0.013
	(0.016)	(0.015)	(0.016)
GDP per capita	0.066	0.044	-0.077
	(0.17)	(0.15)	(0.16)
Vulnerability	0.31***	0.40***	0.28***
	(0.098)	(0.11)	(0.096)
Democratic regime	0.33	0.41	0.55
	(0.57)	(0.53)	(0.58)
N	173	173	173
Within R^2	0.25	0.34	0.26

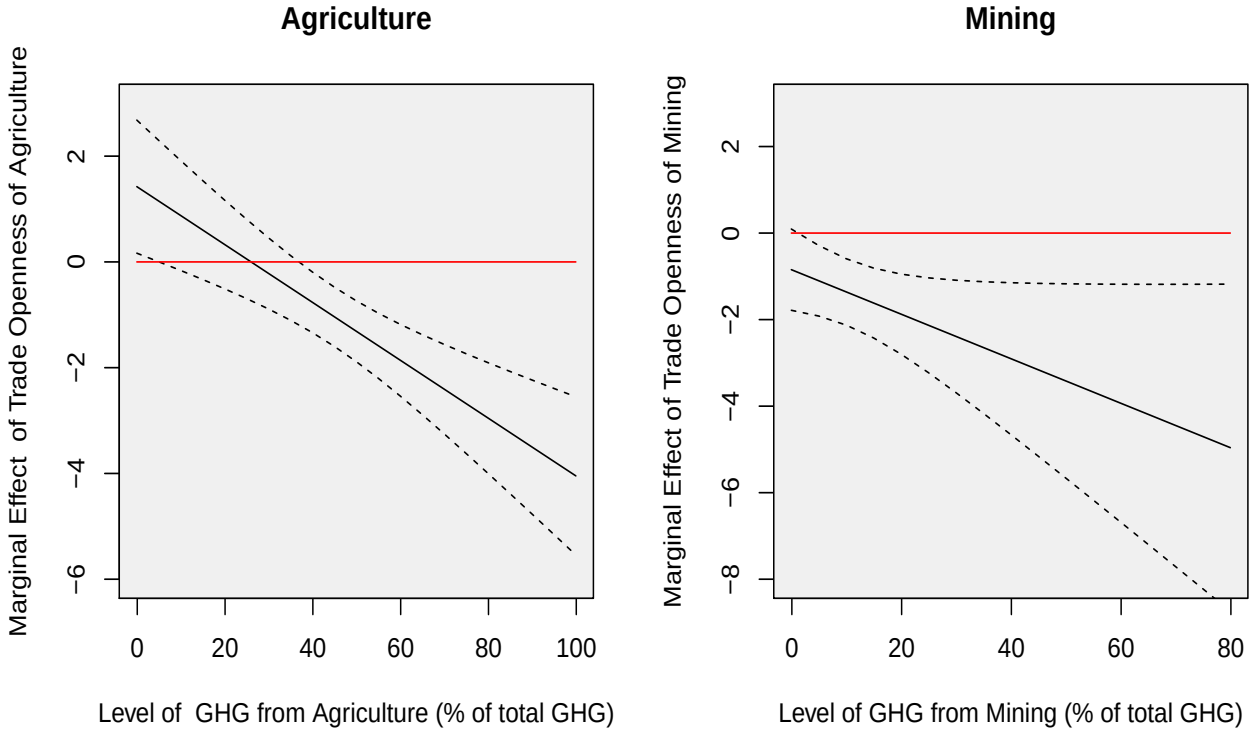
Table B.9: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Net Exports instead of Trade Openness.* The table reports the coefficients of a linear panel model. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

	Y: Adaptation		*Y: Nuclear Energy*	
	Agriculture	Mining	Agriculture	Mining
	(1)	(2)	(3)	(4)
Sector's GHG Volume	-0.267	0.205	-0.036	0.150*
	(0.209)	(0.300)	(0.061)	(0.086)
Sector's Trade Openness (log)	1.591	-0.889	0.645*	0.441*
	(1.217)	(0.802)	(0.359)	(0.237)
*Sector's GHG Volume**	-0.056*	-0.053	-0.010	-0.029**
Sector's Trade Openness (log)	(0.031)	(0.048)	(0.009)	(0.014)
Controls	yes	yes	yes	yes
Fixed effects	yes	yes	yes	yes
N	173	173	173	173
Adjusted R^2	0.348	0.350	0.259	0.260

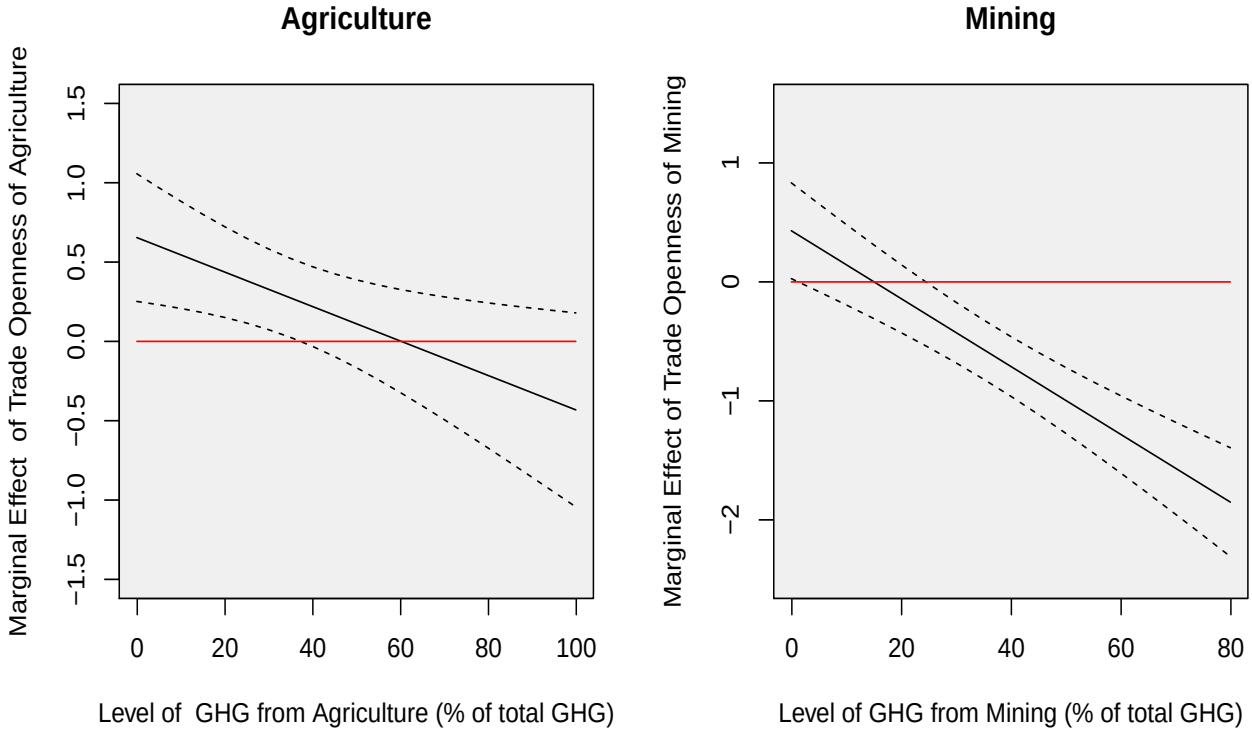
Table B.10: *The Effect of Pollution and Trade on National Positions on Climate Cooperation: Specific Issues*. The table reports the coefficients of a linear model. The outcome variables are, respectively, *Adaptation fund (log)*, which corresponds to the amount of domestic funds a country would be willing to give for adaptation (0 to 12 scale), and *Eligibility of Nuclear Energy*, which captures the position (0 to 4 scale) on whether nuclear energy should be counted against national mitigation efforts. Constant, period and country fixed effects calculated but omitted for presentation. *** p<0.01, ** p<0.05, * p<0.1.

Figure B.13: *The Joint Effect of Pollution and Trade Openness on Issue-Specific Positions on Climate Cooperation*

Y: Allocation of Domestic Funds for Adaptation



Y: Nuclear Energy Eligibility for Mitigation



This figure illustrates the marginal effects based on the linear interaction models where the dependent variable is - respectively - *adaptation domestic funds* and *nuclear energy eligibility* (see Table B.10). Dotted lines are 95% confidence intervals. Constant, controls, country & time effects are included.

	Y: Climate Cooperation Position (Main Factor Loading)				
	(1)	(2)	(3)	(4)	(5)
Topic 1 Proportion (prevalence posterior)	-1.54				-2.63*
	(1.42)				(1.50)
Topic 2 Proportion (prevalence posterior)		2.61*			
		(1.33)			
Topic 3 Proportion (prevalence posterior)			-0.67		-2.28
			(1.92)		(2.17)
Topic 4 Proportion (prevalence posterior)				-1.59	-2.92
				(2.05)	(2.22)
Country fixed effects	yes	yes	yes	yes	yes
Constant	0.99**	-0.044	0.70	0.94*	2.74**
	(0.42)	(0.31)	(0.45)	(0.52)	(1.18)
N	59	59	59	59	59
$F-statistic$	1.18	3.86	0.12	0.60	1.01

Table B.11: *Relation between Business Statements and National Positions: Predictive Power of Topic Prevalence on Main Factor Scores.* The table reports the coefficients of a linear model. Prevalence posteriors are calculated with a lasso-based estimation of four-topic model of the business UNFCCC submissions in states for which I calculate climate cooperation scores. All data measured for Period 2 due to the timing of the Business Statements (2007-2014). *** p<0.01, ** p<0.05, * p<0.1.