On-line appendix 1: Codebook

Democracy-Related Provisions in PTAs

Coding Scheme

October 2022

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Introduction

The Trade and Democracy (TRADEM) research project aims to examine the relationship between preferential trade agreements (PTAs) and democracy. This coding scheme is designed to develop a fine-grained taxonomy to discern the levels of variation and extent to which PTAs contain provisions that relate to democracy. The wider project aims to use mixed-methods approach to investigate if democracy-related provisions in trade treaties between countries enhance or hinder democracy-related policies at the domestic level. This coding exercise is only limited to the main text of PTAs, as well as any annexes attached to the main text. It does not include or take into account side letters.

Democracy-related provisions in PTAs

This coding scheme is to be utilised to manually code a subset of PTAs, based on six main categories of democracy-related provisions in PTAs. An excerpt of what the six categories aim to capture is denoted below:

1. **General Objectives** This section captures whether the Preamble, objectives chapter/clause of the PTA includes provisions on democratic principles (please see definitions section below for further details).

2. **Democracy Promotion** This section captures whether the PTA includes any mechanism that are specific to the promotion of democracy among its members. Mechanisms include capacity building, technical assistance or joint bodies specifically and directly aimed at democratic consolidation or promotion, suspension or retaliation in case of coup d'état, or conditionality mechanisms.

3. **Individual Rights** This section captures whether the PTA includes individual rights provisions, and to what level of stringency are these provisions enforced through the PTA. Individual rights include civil and political rights, minorities' rights, women's rights, labour rights and consumer rights.

4. **Stakeholder participation** This section captures whether the PTA refers to stakeholder participation and stakeholders' equal access to administrative procedures throughout the trade policy cycle (trade policy formulation and implementation).

5. **Transparency** This section captures whether the PTA includes mechanisms for notification, publication of information and stakeholders' equal access to information.

6. **Policy Space** This section captures whether the PTA includes the right to regulate, general exemptions or general exemptions specifically related to public policy or democratic principles.

Specific coding questions:

General objectives

Principles

1. *[general_preamble_democracy] Does the Preamble and/or objectives chapter or clause* mention democracy?

2. *[general_preamble_stakeholder]* Does the Preamble and/or objectives chapter or clause mention stakeholder participation principles?

3. *[general_preamble_ruleoflaw]* Does the Preamble and/or objectives chapter or clause mention rule of law principles?

4. *[general_preamble_transparency]* Does the Preamble and/or objectives chapter or clause mention transparency principles?

Individual rights

5. *[general_preamble_cpr]* Does the Preamble or objectives chapter or clause mention civil and political rights?

6. *[general_preamble_cpr_inttreaty]* Does the Preamble or objectives chapter or clause refer to international treaties for civil and political rights?

7. *[general_preamble_labourrights]* Does the Preamble or objectives chapter or clause mention labour rights?

8. *[general_preamble_labourrights_inttreaty]* Does the Preamble or objectives chapter or clause refer to international treaties for labour rights?

9. *[general_preamble_consumerrights]* Does the Preamble or objectives chapter or clause mention consumer rights?

10. *[general_preamble_consumerrights_inttreaty]* Does the Preamble or objectives chapter or clause refer to international treaties for consumer rights?

11. *[general_preamble_minoritiesrights]* Does the Preamble or objectives chapter or clause mention minorities' rights?

12. [general_preamble_minoritiesrights_inttreaty] Does the Preamble or objectives chapter or clause refer to international treaties for minorities rights?

13. [general_preamble_womensrights] Does the Preamble or objectives chapter or clause mention women's rights?

14. [general_preamble_womensrights_inttreaty] Does the Preamble or objectives chapter or clause refer to international treaties for women's rights?

Democracy promotion

15. [demprom_cbm_conditional_democracy] Does the PTA have a capacity building mechanism that is conditional on sustaining or strengthening democratic principles in a member country?

16. [demprom_cbm_democracy] Does the PTA have a mechanism for capacity building to sustain or strengthen democracy in a member country?

17. [demprom_jointbody_democracy] Does the PTA include joint body specific to democracy promotion?

18. [demprom_trade_remedies_coup] Does the PTA include trade remedies or the possibility of retaliations in the case of a coup d'état?

19. [demprom_pre_conditionality_democracy] Does the PTA include any pre-ratification conditionalities on democratic principles that must be met by signatory parties before the ratification of the agreement?

Individual rights

Civil and Political Rights

20. [individualrights_cpr] Does the PTA refer to civil and political rights?

21. [individualrights_cpr_inttreaty] Do the civil and political rights provisions refer to international treaties?

22. [individualrights_cpr_committee] Do the civil and political rights provisions include the convening of a committee?

23. [individualrights_cpr_panel_experts] Do the civil and political rights provisions include a mechanism where a panel of experts can be convened if contracting parties are suspected to be in violation of CPR provisions?

24. *[individualrights_cpr_retaliation]* Do the civil and political rights provisions include a retaliation mechanism that can be enacted if contracting parties are found to be in violation of CPR provisions?

25. *[individualrights_cpr_ds]* Are the civil and political rights provisions explicitly exempted from the general dispute settlement mechanism of the PTA?

Labour Rights

26. *[individualrights_labourrights]* Does the PTA include labour rights provisions in a chapter, article or clause which applies generally to the whole agreement?

27. *[individualrights_labourrights_inttreaty]* Do the labour rights provisions refer to the adherence of international norms?

28. *[individualrights_labourrights_committee]* Do the labour rights provisions include the convening of a committee?

29. *[individualrights_labourrights_panel_experts]* Do the labour rights provisions include a mechanism where a panel of experts can be convened if contracting parties are suspected to be in violation of the provisions?

30. *[individualrights_labourrights_retaliation]* Do the labour rights provisions include a retaliation mechanism that can be enacted if contracting parties are found to be in violation of provisions?

31. *[individualrights_labourrights_ds]* Are the labour rights provisions explicitly exempted from the general dispute settlement mechanism of the PTA?

32. *[individualrights_labourrights_ds_labour]* Does the agreement have a dispute settlement mechanism specifically for labour rights disputes?

Consumer Rights

33. *[individualrights_consumerrights]* Does the PTA refer to consumer rights and/or protection?

34. *[individualrights_consumerrights_inttreaty]* Do the consumer rights provisions refer to international treaties?

35. *[individualrights_consumerrights_committee]* Do the provisions include the convening of a committee?

36. *[individualrights_consumerrights_panel_experts]* Do the consumer rights provisions include a mechanism where a panel of experts can be convened if contracting parties are suspected to be in violation of the provisions?

37. *[individualrights_consumerrights_retaliation]* Do the consumer rights provisions include a retaliation mechanism that can be enacted if contracting parties are found to be in violation of provisions?

38. *[individualrights_consumerrights_ds]* Are the consumer rights provisions also explicitly exempted from the general dispute settlement mechanism of the PTA?

Minorities Rights

39. *[individualrights_minoritiesrights]* Does the PTA refer to minorities' rights?

40. *[individualrights_minoritiesrights_inttreaty]* Do the minorities' rights provisions refer to international treaties?

41. *[individualrights_minoritiesrights_committee]* Do the minorities' rights provisions include the convening of a committee?

42. *[individualrights_minoritiesrights_panel_experts]* Do the minorities' provisions include a mechanism where a panel of experts can be convened if contracting parties are suspected to be in violation of the provisions?

43. *[individualrights_minoritiesrights_retaliation]* Do the minorities' rights provisions include a retaliation mechanism that can be enacted if contracting parties are found to be in violation of provisions?

44. *[individualrights_minoritiesrights_ds]* Are the minorities' rights provisions explicitly exempted from the general dispute settlement mechanism of the PTA?

Gender Equality

45. *[individualrights_womensrights]* Does the PTA refer to women's rights?

46. *[individualrights_womensrights_inttreaty]* Do the women's rights provisions refer to international treaties?

47. *[individualrights_womensrights_committee]* Do the women's rights provisions include the convening of a committee?

48. *[individualrights_womensrights_panel_experts]* Do the women's rights provisions include a mechanism where a panel of experts can be convened if contracting parties are suspected to be in violation of the provisions?

49. *[individualrights_womensrights_retaliation]* Do the women's rights provisions include a retaliation mechanism that can be enacted if contracting parties are found to be in violation of provisions?

50. [individualrights_womensrights_ds] Are the women's rights provisions explicitly exempted from the general dispute settlement mechanism of the PTA?

Stakeholder participation
Trade Policy Formulation

51. [stakeholder_trade_policy_cbm] Does the PTA have a capacity-building mechanism to promote stakeholder participation in trade policy formulation?

52. [stakeholder_trade_policy_cs] Does the PTA have a mechanism to include civil society in trade policy formulation?

53. [stakeholder_trade_policy_business] Does the PTA have a mechanism to include businesses in trade policy formulation?

54. [stakeholder_trade_policy_academics] Does the PTA have a mechanism to include academics and independent trade experts in trade policy formulation?

55. [stakeholder_trade_policy_public_consultation] Does the PTA have a mechanism for general public consultations in trade policy formulation?

Implementation

56. [stakeholder_implementation_cbm] Does the PTA have a capacity building mechanism to promote stakeholder participation in the implementation?

57. [stakeholder_implementation_cs] Does the PTA have a mechanism to include civil society in the implementation?

58. [stakeholder_implementation_business] Does the PTA have a mechanism to include businesses in the implementation?

59. [stakeholder_implementation_academics] Does the PTA have a mechanism to include academics and independent trade experts in the implementation?

60. [stakeholder_implementation_public_consultation] Does the PTA have a mechanism for general public consultations in the implementation?

61. [stakeholder_implementation_joint_stakeholder] Does the PTA have a mechanism for joint stakeholder consultation in the implementation?

62. [stakeholder_implementation_access_admin_decisions] Does the PTA include chapter(s) or clause(s) on access to administrative decisions?

63. *[stakeholder_implementation_access_admin_decisions_specific]* Does the chapter(s) or clause(s) on access to administrative decisions include specific rules, timelines and/or procedures?

64. *[stakeholder_implementation_review_appeal[1]]* Does the PTA include rules on access to courts for reviewing or appealing on administrative rulings?

Transparency

65. *[transparency_chapter]* Does the PTA refer to transparency in a separate chapter or article or clause?

66. *[transparency_publication_laws]* Do the transparency provisions refer to the publication of new (or changes to an existing) law, regulation, decree etc?

67. *[transparency_notification_laws]* Do the transparency provisions refer to notification requirements (i.e. the obligation to notify before the introduction of a new (or changes to an existing) law, regulation, decree etc)?

68. *[transparency_right_access_information]* Does the PTA establish stakeholders' rights to access information?

69. *[transparency _contact_points]* Does the transparency chapter or clause establish contact points for information exchange between contracting parties?

70. *[transparency_customs]* Is there a transparency clause in the customs chapter or clause?

71. *[transparency_customs_contact_points]* Does the transparency clause in the customs chapter or clause establish contact points for information exchange between contracting parties?

72. *[transparency_trade_remedies]* Is there a transparency clause in the trade remedies chapter or clause?

73. *[transparency_trade_remedies_contact_points]* Does the transparency clause in the trade remedies chapter or clause establish contact points for information exchange between contracting parties?

74. *[transparency_sps]* Is there a transparency clause in the Sanitary and Phytosanitary (SPS) chapter or clause?

75. *[transparency_sps_contact_points]* Does the transparency clause in the SPS chapter or clause establish contact points for information exchange between contracting parties?

76. *[transparency_tbt]* Is there a transparency clause in the Technical Barriers to Trade (TBT) chapter or clause?

[1] Previously named stakeholder_implementation_access_courts

77. *[transparency_tbt_contact_points]* Does the transparency clause in the TBT chapter or clause establish contact points for information exchange between contracting parties?

78. *[transparency_ipr]* Is there a transparency clause in the Intellectual Property Rights (IPR) chapter or clause?

79. *[transparency_ipr_contact_points]* Does the transparency clause in the IPR chapter or clause establish contact points for information exchange between contracting parties?

80. *[transparency_public_procurement]* Is there a transparency clause in the public procurement chapter or clause?

81. *[transparency_public_procurement_contact_points]* Does the transparency clause in the public procurement chapter or clause establish contact points for information exchange between contracting parties?

82. *[transparency_regulatory_cooperation]* Is there a transparency clause in the regulatory cooperation chapter or clause?

83. *[transparency_regulatory_cooperation_contact_points]* Does the transparency clause in the regulatory cooperation chapter or clause establish contact points for information exchange between contracting parties?

84. *[transparency_exante_assessments_impact]* Does the PTA refer to the publication of ex-ante assessments of the impact of the agreement?

85. *[transparency_expost_assessments_implementation]* Does the PTA refer to the review and/or publication of ex-post assessments of the implementation of the agreement?

Policy Space

86. *[policyspace_right_regulate]* Does the PTA include a right to regulate chapter or clause?

87. *[policyspace_exemptions_GATTart20]* Does the PTA, at any point, refer to article 20 of the GATT?

88. *[policyspace_exemptions_general]* Does the PTA have a general exemptions chapter or clause which applies to the whole agreement?

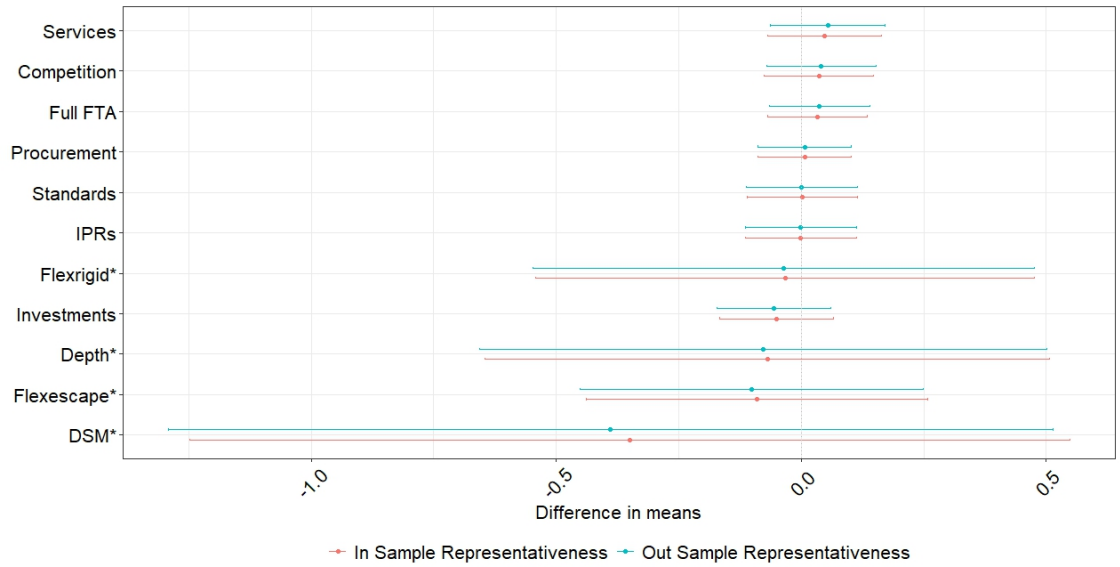
89. *[policyspace_exemptions_public_policy]* Do the general exemptions provisions refer to public policy?

90. *[policyspace_exemptions_democracy]* Do the general exemptions provisions refer to democratic principles?

On-line appendix 2: Further details on manual coding process

For the manual coding, we selected 80 PTAs, representing 10% of our full sample (792 PTAs) with a slight bias against older agreements. In other words, we prioritized, to some extent, PTAs signed predominantly after the 2010s. This decision was based on the expectation that newer agreements are more likely to include provisions related to democracy that we are interested in. It is important to note that this slight skew only affects the representativeness in terms of the year of signature and does not impact the representativeness with respect to other variables. Lastly, we operated a "double" manual coding, which means that all PTAs were at least coded twice.[2] At the end of the coding exercise, when discrepancies were observed, we discussed these discrepancies in the team and agreed on how the specific provision in question should be coded. It is imperative to establish a robust sub-sample before machine learning methods can be employed, as this directly determines the algorithm's performance.

Figure A1: Difference in means between the manually coded subsample and the full sample according to depth DESTA variables.



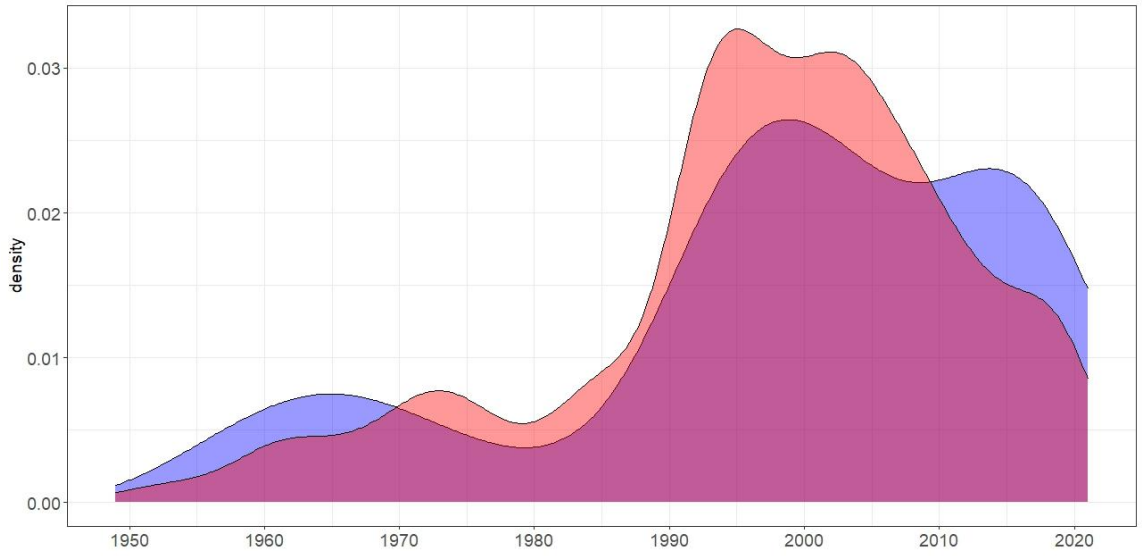
Source: Own computations based on the DESTA database

[2] In earlier stages of the manual coding process, additional coders were involved, enabling us to have PTAs coded by more than two individuals in some cases.

We observe that across all the relevant depth characteristics established by Dür et al. (2014), the difference in means between the manually coded subsample and the full sample is non-significantly different from zero. The manually coded subsample can therefore be considered representative to the full sample, based on these characteristics. Lastly, the 4 aggregated DESTA indexes (depth, 2 types of flexibility, and dispute settlement mechanism enforcement) appear to have a relatively greater difference in means (and in confidence intervals) compared to the other indexes. This may be due to the fact that these indexes are categorical variables, but also to the fact that our sub-sample is slightly skewed toward older (and deeper) PTAs. The difference remains non-statistically different from 0.

Figure A2: In-sample representativeness

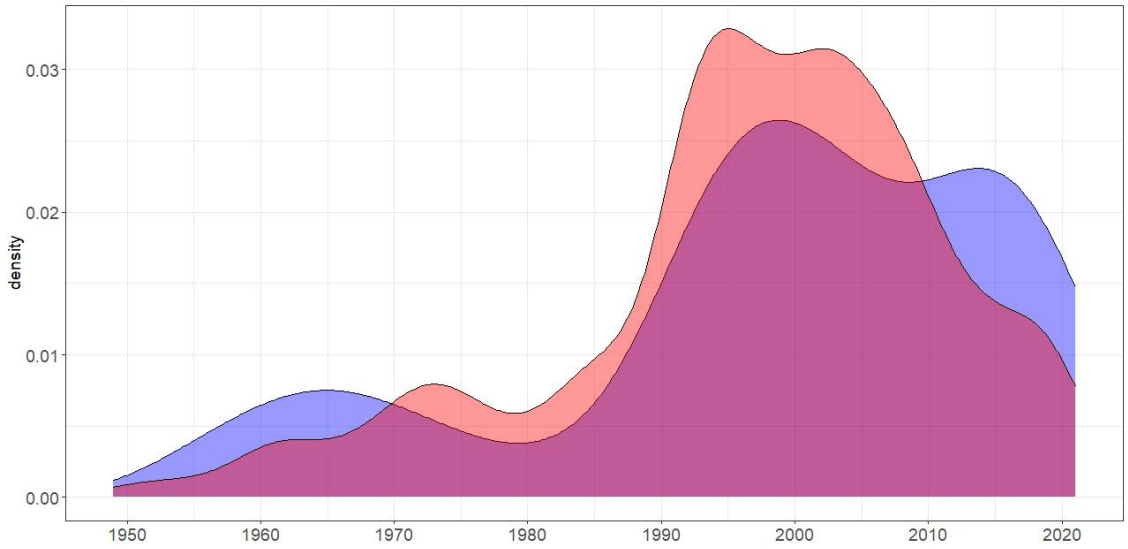
Density plot of the distribution of PTAs selected in the sub-sample (blue) compared to the whole sample (red).



Source: Own computations based on the DESTA database

Figure A3: Out-of-sample representativeness

Density plot of the distribution of PTAs selected in the sub-sample (blue) compared to the rest of the sample, excluding the sub-sample (red).



Source: Own computations based on the DESTA database

On-line appendix 3: Further details on variables drop (Rasch Index)

In the framework of our machine learning approach, null values are not informative and can even introduce a bias in the prediction. The algorithm needs to be given an example of what different scores represent to predict such scores on future texts. If it is given only zeros, it can only predict zeros by necessity. Since the codebook was initially written based on expectations from theory, it is expected that not all variables would be captured in the manual coding. For example, the variables included in the individual rights section were initially developed from reading labour rights chapters in trade agreements. For consistency, we included the different types of individual rights in the codebook, even if we had no particular expectations that they would all appear in the same level of comprehensiveness in PTAs.

It is also possible that some dimensions we seek to capture are present in PTAs that we did not manually code. By dropping these variables, we refrain from keeping these zeros in our algorithms, which would then necessarily predict zeros to all the other PTAs. An example would be the variable 'demprom_trade_remedies_coup', which looks at whether a PTA includes the possibility of trade sanctions in the event of a coup d'état in one of the country members. Therefore, our coding might not account for some provisions that potentially exist. If present, these variables are expected to be outliers in the breadth of PTAs we analyse. With that, we maintain that our approach of multiple checks on a manually coded representative subsample is based on a robust methodology.

We face the exact opposite case with one variable (policyspace_exemptions_GATTart20), where the algorithm would almost systematically predict "1" given that we assign a "1" to this variable in most PTAs. Such strong imbalance can be accounted for to some extent in the machine learning algorithm as previously discussed. However, in this case, the imbalance is so strong that

we cannot properly correct for this bias in the estimations. The omission of this variable is not expected to have a significant impact on the quality of the database. First, this provision is included in most PTAs. We would therefore not see a lot of variation across PTAs and countries, such provision being almost "standard". Second, it seems unlikely that GATT Article XX can make a successful case for policy space in a dispute.

The full list of dropped variables is available below.

List of dropped variables:

- general_preamble_consumerrights_inttreaty,
- general_preamble_minoritiesrights_inttreaty,
- demprom_jointbody_democracy,
- demprom_trade_remedies_coup,
- individualrights_cpr_ds,
- individualrights_cpr_committee,
- individualrights_cpr_panel_experts,
- individualrights_cpr_retaliation,
- individualrights_consumerrights_committee,
- individualrights_consumerrights_panel_exports,
- individualrights_consumerrights_ds,
- individualrights_consumerrights_retaliation,
- individualrights_minoritiesrights_panel_experts,
- individualrights_minoritiesrights_retaliation,
- individualrights_womensrights_panel_experts,
- individualrights_womensrights_retaliation,
- transparency_exante_assessments_impact,
- policyspace_exemptions_democracy,
- policyspace_exemptions_GATTart20

On-line appendix 4: Additional information on Rasch indices

Appendix 4.1: Rasch methodology

The methodology we employ to estimate the Rasch composite scores for each category is similar to the one adopted by Lechner (2016). In order to measure the "difficulty" of each variable within each category, and compile the Rasch composite score for each category, we use the R package "TAM". First, we obtain the difficulty of each variable within a category using a mixed-coefficients multinomial logit model (mml function of the TAM package, see also Adams and Wu, 2007). This method initially being developed for the purposes of psychometric test studies, the dependent variable would correspond to the set of test scores, and the independent variables are the associated response categories, and the person's ability. The coefficient associated to the first independent variable (response categories) estimates the difficulty of each of the response categories, while the person's ability captures all unobserved characteristics explaining the difference in test scores, other than that of the questions' difficulty, and is estimated by random effects (Adams and Wu, 2007). In our analysis, the dependent variable therefore corresponds to the manually coded variables, and the independent variables are the different questions included in the manual coding, and unobserved treaty characteristics.

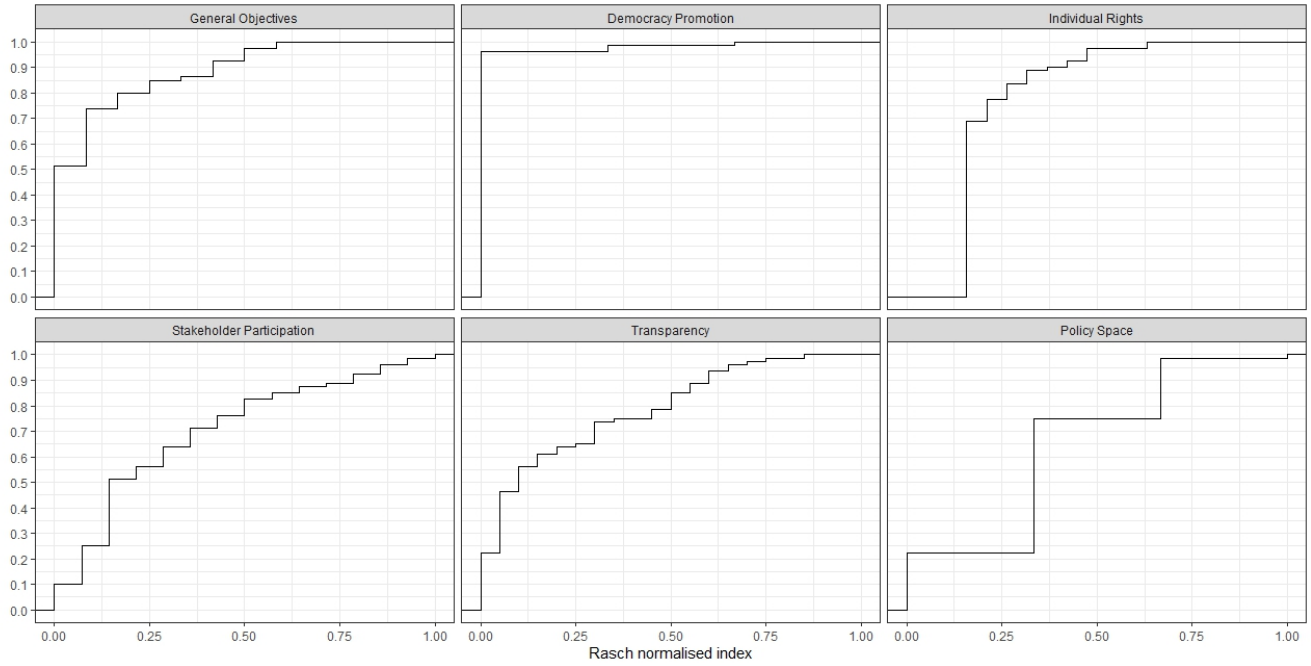
Second, we input those estimated difficulty parameters into a weighted maximum likelihood estimator (*wle* function of the TAM package, see also Warm, 1989) in order to obtain the Rasch composite score at the category level, combining scores from the manual coding questions associated to this category. These Rasch composite scores therefore capture the extent to which a PTA includes different aspects of democracy-related provisions across our six categories, accounting for the "difficulty" to find different types of clauses across agreements. The alternative method of computing a simple average of the scores obtained through our manual coding would lead to a bias towards clauses that are more often found in PTAs. Warm (1989) also demonstrates that a weighted maximum likelihood estimator performs better in the framework of item response theory.

This approach relies on a set of assumptions. First, we assume that clauses appearing in few agreements correspond to more comprehensive clauses. We argue this is plausible in the framework of trade agreements, and more specifically of democracy-related provisions. The literature already demonstrated that trade agreements are largely copied-pasted, leading to the

diffusion of templates (Allee and Lugg, 2016; Allee and Elsig, 2019), and became deeper over the years, including increasingly more issue areas and clauses (Dür et al, 2014, Milewicz et al, 2018). Second, we estimate the relative "difficulty" of different manual coding questions within category, and not across categories. This allows us to capture the evolution of different issue areas in trade agreements that may not have all evolved at the same time and/or at the same pace. Third, although we do not have missing observations as such,[3] coding questions for which we have no observations (i.e. no such clauses could be found in any of the PTAs manually coded) were dropped.[4]

Appendix 4.2: Cumulative distribution of normalised Rasch indices

Figure A4: Cumulative distribution of normalised Rasch composite scores by category



Source: Own computations

[3] Coders assigned a 0 or 1 to all questions included in the codebook
[4] Please refer to on-line appendix 3 for a detailed discussion of this issue.

Appendix 4.3: Converting Rasch composite scores into binary indices

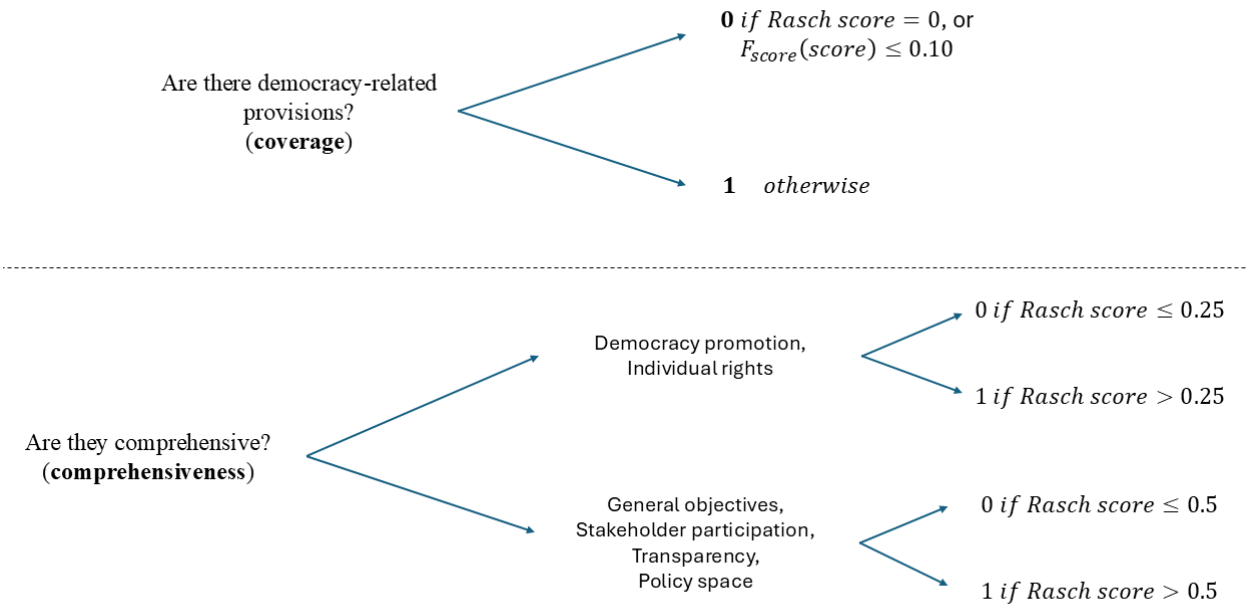
To convert the normalized Rasch composite scores into binary variables capturing democracy-related provisions' level of coverage and comprehensiveness, we use the distribution of variables to set appropriate thresholds. We found that the data distribution for normalized Rasch composite scores varies greatly across categories for both types of indices.[5] This is expected as some categories, like individual rights or democracy promotion, are more directly tied to the promotion of democracy and are generally less common in PTAs compared to other categories (e.g. transparency, inclusiveness, policy space), which often include standardized provisions like notification requirements or stakeholder participation.

The theoretical way of constructing the binary variables capturing the level of coverage would be to assign the binary variable a "0" when the Rasch composite score is 0, and assign "1" otherwise. To account for the variation in distribution, we opted for an additional condition. We assigned "0" if the Rasch composite score equals 0 *or* if the Rasch composite score takes a value in the bottom 10% of the distribution of Rasch scores, and we assigned "1" otherwise, as reflected in Figure A5. For Rasch composite scores capturing the level of comprehensiveness, we considered whether the PTA includes a certain number of provisions and if the extent to which these provisions are comprehensive. While a natural threshold would lie in either values above/below "0.5" for the Rasch composite scores, or in values above/below the top 90% of the distribution of Rasch composite scores, setting a common threshold seemed inappropriate. This is due to the variation in how often provisions of certain categories appear in PTAs. We therefore apply a 0.25 or 0.5 threshold depending on the category, as reflected in Figure A5. These varying

[5] See on-line appendix 4.1 for more information on the distribution.

thresholds mean we assign a "1" when the Rasch values are, at least, in the top 75% of the distribution, for Rasch composite scores capturing the level of comprehensiveness.

Figure A5: Construction of "coverage" and "comprehensiveness" binary variables from Rasch scores



On-line appendix 5: ICR Scores

ICR Scores comparison by category and model

Category/Model	Krippendorff's Alpha RF	Krippendorff's Alpha GBC	Comparison (RF-GBC)
General Objectives	0.84	0.82	0.02
Democracy Promotion	0.79	0.66	0.14
Individual Rights	0.88	0.89	-0.01
Stakeholder Participation	0.91	0.84	0.08
Transparency	0.89	0.79	0.10
Policy Space	0.83	0.86	-0.02

Note: Values displayed in this table are averages by category across the coverage and comprehensive dimensions.

On-line appendix 6: Word embeddings: TF-IDF and Word2Vec

TF-IDF

TF-IDF stands for Term Frequency Inverse Document Frequency. As the name suggests, TF-IDF converts words into a numerical representation taking into account its frequency with respect to the document but also to the rest of the corpus. When converting a text into a numerical representation, we effectively do not necessarily take into account all words. Although one could retain all words, it likely negatively affects the predictive performance of the model and might lead to overfitting. To capture words that are most relevant to each document, TF-IDF weights words that are very frequent in a particular document and relatively infrequent across the whole corpus (of all documents). At the word-document level, TF-IDF is therefore composed of two elements. TF is the term frequency and denotes the number of times a word shows up in a document. IDF is the inverse document frequency and is the *inverse* fraction of the number of documents in the corpus where the word appears out of the total number of documents in the corpus. Once this numerical representation is obtained for all words and documents, the numerical representation of texts is inputted in the machine learning model.

Word2Vec

Word2Vec is a well-known word embedding technique that represents words in a continuous vector. The primary way in which Word2Vec is unique is that it captures the semantic relationships between words, as opposed to other embedding techniques that often rely on the frequency of words. It uses neutral network-based models to learn word associations in long texts and documents. As such, it goes beyond frequency measures to make sense of the meaning of words, and its relation to other words as well. The resulting vector derived from the Word2Vec method is then used for machine learning tasks.

On-line appendix 7: Machine Learning Models

Random Forests (RF)

We use RF in association with TF-IDF. Random Forests relies on the distribution of words within the text to infer whether this distribution corresponds to a given category, based on the manually coded subsample used as reference. Unlike other models such as Logistic Regression, Naïve Bayes etc. RF breaks down this decision into a succession of smaller scale decisions through splitting randomly the text features multiple times. Statistically, it has been shown to lead to higher levels of prediction accuracy (Breiman, 2011). It has also been used for different international relations and political science applications (see for example: Muchlinski et al., 2016). Random Forest also has the advantage of supporting imbalanced data through under-sampling the majority class (Chen et al, 2004). This is particularly important in our case, as we have imbalanced categories (with either more zeros or ones) and this can create a bias in the algorithm prediction towards the over-represented category. We therefore re-weight the data at the level of each decision tree (see class weight parameter in the RandomForestClassifier function of the sklearn package in Python).

Gradient Boosting Classifier (GBC)

An alternative method we explored was the Gradient Boosting Classifier (GBC) model associated with Word2Vec word embeddings from the Skipgram model. Similarly to our main specification, this approach has two main steps: transforming the text to word embeddings using the Word2Vec Skipgram model, and then predictive modelling using the GBC model.

The Skipgram model is proficient in capturing contextual word relationships within large text corpora, which is vital for decoding the complex language in legal documents. It is also particularly adept at detecting nuanced semantic differences and syntactic relationships between words, crucial for legal texts where specific terms carry significant implications (Zhang et al.,

2019). This capability allows the model to recognize thematic connections between words that may not be immediately adjacent but share contextual similarities, thus enhancing the analysis of PTAs' content.

Beyond capturing word relationships, the Skipgram model's robust handling of large vocabularies ensures it performs effectively across diverse and extensive text data, making it suitable for the longitudinal scope of our dataset. The embeddings generated from this model not only facilitate a deeper understanding of how democracy-related terms cluster and vary but also support subsequent analytical methods. After generating word embeddings, each coded PTA has been assigned a document vector based on the words it contains. The next step involves using these vectors to predict scores for the remaining uncoded PTAs.

For predictive modelling of the remaining uncoded PTAs, we employed the Gradient Boosting Classifier. The rationale behind choosing this machine learning technique is due to its strength in handling complex, non-linear relationships within the data through an ensemble approach. Gradient Boosting builds multiple predictive models sequentially, where each new model corrects errors made by the previous ones, effectively enhancing the accuracy and robustness of predictions (Natekin & Knoll, 2013). This technique is particularly beneficial in our context as it allows for the precise classification of PTAs into categories of democracy-related provisions based on learned patterns. The GBC model then predicts the democracy-related provision scores for all 792 PTAs.

Theoretically, the GBC model is similar to the Random Forest model in that both utilize ensemble learning methods to improve prediction accuracy. However, the sequential nature of Gradient Boosting—where each new model aims to correct its predecessor's errors—potentially offers a more refined approach for our predictive task.

Transformers

As an alternative to RF and GBC models, we further test transformers models, considered as state-of-the-art natural language processing models. The structure of traditional ML approaches, such as RF or GBC, consists of inputs and outputs, the former determining the latter. More advanced ML approaches, pioneered initially by Recurrent Neural Networks (RNN) models, started to make the processus of inputs determining outputs recurrent. This "recurrent" process or "forward propagation" enables to fine-tune further the model iteratively and attain better convergence. Recurrent neural networks can be very slow and require high computational capacity due to the high number of iterations and feedback mechanism. Additionally, each input is processed one after the other, which is not always ideal when one needs the context of the sentence (for example in a translation task). A further improvement consisted in the creation of an "attention mechanism" introduced by Bahdanau et al. (2014). This mechanism enabled to weight at each stage of the process the relevance of the different features inputted in the model, improving the process substantially.

Transformers models build on these models, with the main difference being that the models leverage almost exclusively the attention mechanism and drop the recurrence aspect (Vaswani et al., 2017). Additionally, neural networks models rely on an "encoder-decoder" architecture. Initial inputs are first encoded, these encodings are then processed by the model and again decoded to produce the final output. Transformers also have the advantage of possibly relying on a more straightforward structure. Transformers models can rely on different types of architecture depending on the task at hand. A model with an encoder-only architecture can be used, for example, for classification tasks, a decoder-only architecture, for example, for text generation, or an encoder-decoder architecture for text summarization or translation.

In our application, we opt for a classical encoder-only model – BERT (Bidirectional Encoder Representations from Transformers), as we aim to classify PTAs. We test two different models: BERT base and BERT large, the main difference between them being mainly the model dimension. The way in which we use the model remains broadly similar to the one of RF and GBC. The only main difference is that we do not pre-process PTA texts before feeding them in the model. Transformers models typically perform better when texts went through little pre-processing as they are already pre-trained on very large text corpuses not necessarily pre-processed. These models, however, do not necessarily read well technical tables. Similarly to RF and GBC, we therefore remove tables including tariff lines. We use then respectively BERT base and BERT large for word embeddings and for the model itself.

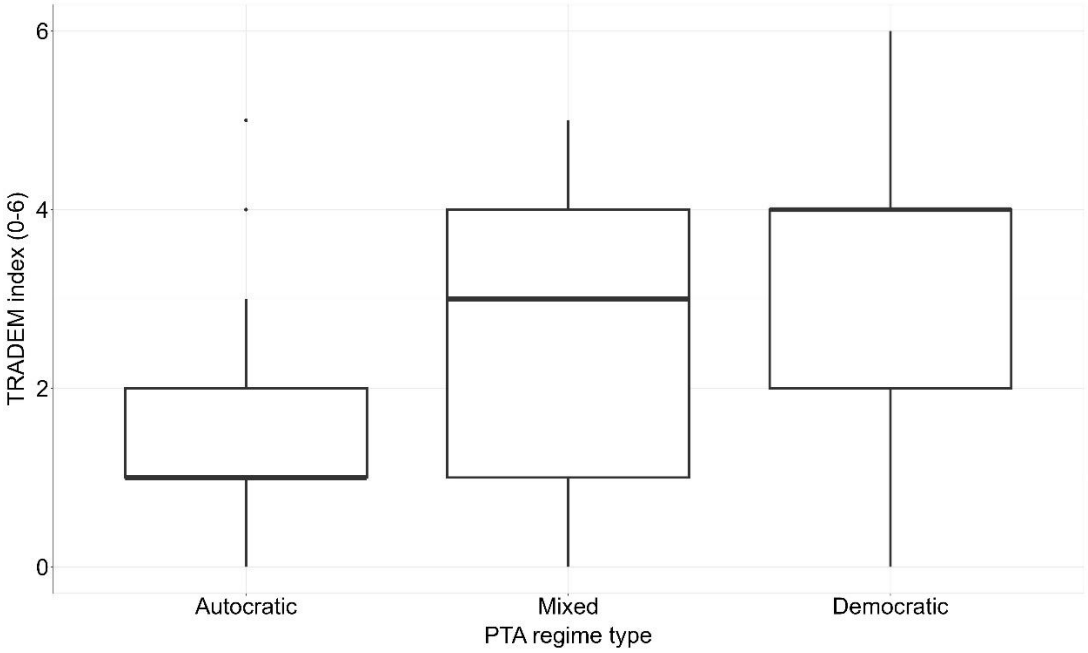
On-line appendix 8: PTA members regime type and inclusion of democracy-related provisions

To further explore the correlation between PTA members regime type and the inclusion of democracy-related provisions, we check whether the patterns displayed in Figure 6 hold when we average the level of democracy across PTA members. We rely on two measures of level of democracy: the regimes of the world (V-Dem) and the polity score (Polity project).

Using the regimes of the world measurement, we categorize PTAs as "democratic", if members are all classified as electoral or liberal democracies, "autocratic" if all members are classified as electoral or closed autocracies. PTAs are considered as "mixed" if members include both democracies and autocracies. The Polity score ranges from -10 (autocratic) to 10 (democratic). We then classify PTAs as "democratic", with average PTA members' polity score ranging between 6 and 10, "autocratic", for average PTA members' polity score ranging between -10 and 5, and "mixed" otherwise.

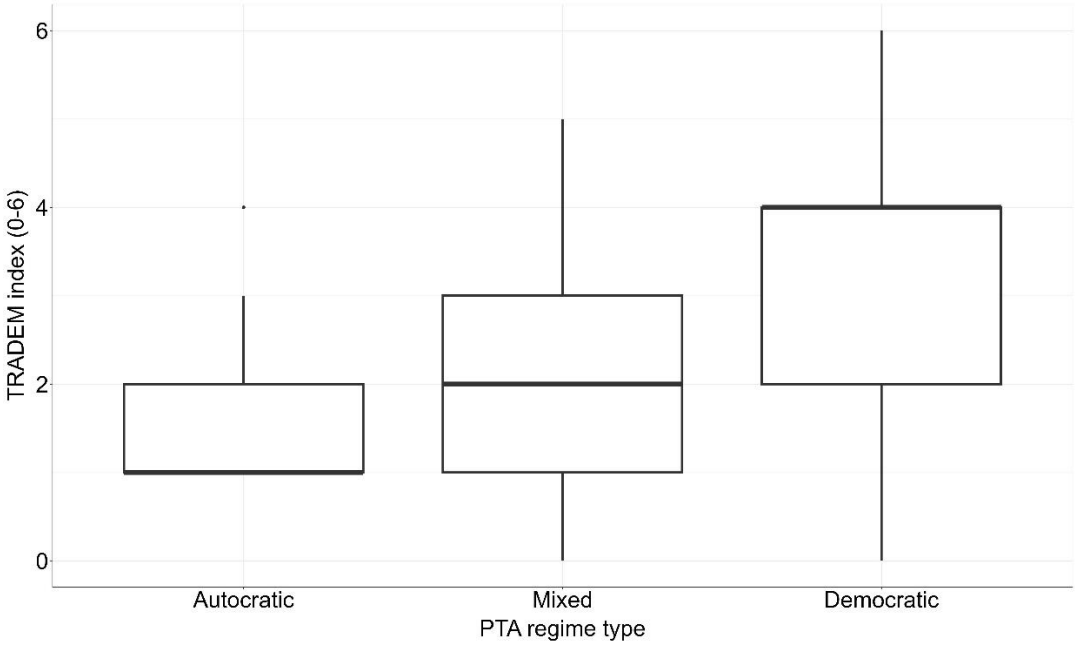
Considering either classification, we find that PTAs between democracies include on average, more democracy-related content that PTAs with "mixed" membership, and PTAs signed by countries classified as autocratic include the least democracy-related provisions overall.

Figure A6: Average democracy index by PTA (V-Dem measurement)



Source: Original data and V-Dem database

Figure A7: Average democracy index by PTA (Polity measurement)



Source: Original data and Polity Project database

On-line appendix 9: Robustness checks

Similar to Appendix 8, we test alternative ways of measuring PTAs democratic membership as robustness checks to models displayed in Tables 6 and 7. Instead of taking into account the share of democratic members, we compute the average democracy levels across all members at the PTA level. To do so, we rely on two different indices from the V-Dem database: the liberal democracy index and the polyarchy index. Overall, we find similar results with either three measurements of democratic membership. At the aggregated level (Tables A1 and A2), we only additionally find a negative significant effect of the average distance on the inclusion of democracy-related provisions. At the disaggregated level, we note a few differences, particularly for the role of signatories' membership at the GATT/WTO. These differences however do not affect the relationship we establish between the level of democracy among PTA members and the signature of democracy-related provisions.

9.1 PTA democratic membership operationalized with the liberal democracy index

Table A1: Determinants of the inclusion of democracy-related provisions in PTAs (Average liberal democracy measurement)

Dependent variable: TRADEM Index

	(1)	(2)	(3)	(4)	(5)
Mean level of democracy	3.76***	3.18***	2.74***	2.91***	2.73***
	(0.42)	(0.52)	(0.57)	(0.62)	(0.7)
PTA Depth	0.83***	0.81***	0.79***	0.74***	0.79***
	(0.05)	(0.06)	(0.06)	(0.07)	(0.08)
Mean GDP per capita (log)		0.22*	0.11	0.05	0.26
		(0.11)	(0.13)	(0.14)	(0.19)
WTO membership			1.26***	1.57***	1.46***
			(0.35)	(0.38)	(0.48)
Distance (log)				-0.11	-0.22*
				(0.11)	(0.13)
Common legal system				-0.79***	-1.08***
				(0.24)	(0.28)
Mean exports (log)					-0.14**
					(0.06)
Number of observations	584	518	445	407	310
McFadden R-squared	0.43	0.5	0.58	0.63	0.72

Note: Significance levels are 0.001(***), 0.01(**), 0.05(*).
Sources: DESTA database, Varieties of Democracy (V-Dem), World Development Indicators (WDI), Gravity dataset (CEPII).

Table A2: Determinants of the inclusion of five different types of democracy-related provisions in PTAs
(Average liberal democracy measurement)

Dependent variable: Category indices

	General	Individual rights	Transparency	Stakeholder participation	Policy space
Mean level of democracy	4.27***	-0.03	0.35	1.48*	4.44***
	(0.96)	(1.30)	(1.03)	(0.83)	(0.93)
PTA Depth	0.28***	1.03***	0.96***	1.06***	0.73***
	(0.08)	(0.17)	(0.11)	(0.10)	(0.10)
Mean GDP per capita (log)	0.31	0.37	0.17	-0.18	0.24
	(0.26)	(0.33)	(0.28)	(0.22)	(0.23)
WTO membership	1.18*	2.38*	2.14**	0.67	1.07*
	(0.70)	(1.23)	(1.20)	(0.61)	(0.64)
Distance (log)	-0.77***	-0.17	0.47***	0.07	-0.39**
	(0.17)	(0.24)	(0.18)	(0.15)	(0.15)
Common legal system	-1.00**	0.01	0.26	-0.30	-0.57
	(0.32)	(0.47)	(0.35)	(0.30)	(0.36)
Mean exports (log)	-0.30***	0.04	0.05	0.02	-0.19**
	(0.07)	(0.1)	(0.08)	(0.07)	(0.07)
Number of observations	310	310	310	310	310
McFadden R-squared	0.66	0.7	0.75	0.74	0.75

Note: Significance levels are 0.001(***), 0.01(**), 0.05(*).
Sources: DESTA database, Varieties of Democracy (V-Dem), World Development Indicators (WDI), Gravity dataset (CEPII).

9.2 PTA democratic membership operationalized with the polyarchy democracy index

Table A3: Determinants of the inclusion of democracy-related provisions in PTAs (Average polyarchy democracy measurement)

Dependent variable: TRADEM Index

	(1)	(2)	(3)	(4)	(5)
Mean level of democracy	3.64***	3.07***	2.66***	2.94***	2.81***
	(0.41)	(0.48)	(0.53)	(0.56)	(0.65)
PTA Depth	0.83***	0.8***	0.79***	0.74***	0.8***
	(0.05)	(0.06)	(0.06)	(0.07)	(0.08)
Mean GDP per capita (log)		0.3***	0.18	0.1	0.29
		(0.1)	(0.11)	(0.13)	(0.18)
WTO membership			1.29***	1.6***	1.47***
			(0.35)	(0.38)	(0.48)
Distance (log)				-0.12	-0.22*
				(0.11)	(0.12)
Common legal system				-0.85***	-1.1***
				(0.24)	(0.28)
Mean exports (log)					-0.14**
					(0.06)
Number of observations	588	522	449	411	312
McFadden R-squared	0.43	0.5	0.58	0.63	0.72

Note: Significance levels are 0.001(***), 0.01(**), 0.05(*).
Sources: DESTA database, Varieties of Democracy (V-Dem), World Development Indicators (WDI), Gravity dataset (CEPII).

Table A4: Determinants of the inclusion of five different types of democracy-related provisions in PTAs
(Average polyarchy democracy measurement)

Dependent variable: category indices

	General	Individual rights	Transparency	Stakeholder participation	Policy space
Mean level of democracy	4.40***	0.19	0.91	1.7**	4.05***
	(0.96)	(1.27)	(1.00)	(0.78)	(0.84)
PTA Depth	0.27***	1.03***	0.96***	1.05***	0.74***
	(0.08)	(0.17)	(0.11)	(0.10)	(0.10)
Mean GDP per capita (log)	0.41	0.36	0.13	-0.16	0.32
	(0.25)	(0.32)	(0.26)	(0.21)	(0.22)
WTO membership	1.07	2.33*	2.13*	0.74	1.03
	(0.69)	(1.24)	(1.2)	(0.61)	(0.63)
Distance (log)	-0.76***	-0.17	0.49**	0.07	-0.38**
	(0.17)	(0.24)	(0.18)	(0.15)	(0.15)
Common legal system	-1.03***	0.01	0.24	-0.35	-0.58
	(0.32)	(0.47)	(0.35)	(0.30)	(0.36)
Mean exports (log)	-0.29***	0.04	0.06	0.01	-0.18**
	(0.07)	(0.10)	(0.08)	(0.07)	(0.07)
Number of observations	312	312	312	312	312
McFadden R-squared	0.66	0.70	0.75	0.74	0.75

Note: Significance levels are 0.001(***), 0.01(**), 0.05(*).
Sources: DESTA database, Varieties of Democracy (V-Dem), World Development Indicators (WDI), Gravity dataset (CEPII).