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Free Trade Agreements and the movement of business people

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Abstract

Using provisions to ease the movement of business visitors in trade agreements, we show that removing barriers to the movement of business people promotes trade. We document the increasing complexity of Free Trade Agreements and develop an algorithm that combines machine learning and text analysis techniques to examine the content of FTAs. We use the algorithm to determine which FTAs include provisions to facilitate the movement of business people and whether these are included in dispute settlement mechanisms. We show that provisions facilitating business travel are effective in promoting them and eventually increase bilateral trade flows. The paper provides (indirect) evidence of the role of face-to-face interaction on aggregate bilateral trade flows.

1 Introduction

Many of the measures to contain Covid-19 severely constrained the international mobility of people. Interestingly, the first exceptions made – and the first restrictions to be lifted – in the Spring of 2020 concerned business trips.¹ Maybe the most telling example of such relaxation is brought by Japan’s policy of reopening of its borders to foreign travelers “in stages, with business people at the head of the line and tourists at the very back.”² The lasting and substantial importance of face-to-face interactions when conducting business (Cristea, 2011; Startz, 2024; Umana-Dajud, 2019) is one possible explanation of why business people and governments took these risks despite the raging pandemic.

Comprehensive integration agreements such as the European Union or the Trans-Pacific Partnership reflect the importance of in-person interactions and include measures to facilitate the cross-border movement of business visitors and of people in general. We document here that this is also true for an increasing number of other trade agreements. In many cases, trade agreements include provisions facilitating short-term business trips or liberalizing permanent migration. We use these provisions to examine the impact of easing business travel on trade flows.

¹See for example “Japan Maps out How to Begin Accepting Foreign Travelers.” *Nikkei Asia* 21 May 2020 and “Singapore, China to Launch ‘Fast Lane’ Arrangement with COVID-19 Measures for Essential Business, Official Travel.” *CNA, Channel News Asia*, 29 May 2020.

²“Japan Maps out How to Begin Accepting Foreign Travelers.” *Nikkei Asia*, *Nikkei Asia*, 21 May 2020.

The number of trade agreements has steadily increased during the last forty years. As of October 1st 2019, the World Trade Organization reports that more than 300 Regional Trade Agreements are in force.³ In this paper, we delve into the intricate landscape of Free Trade Agreements (FTAs), acknowledging the substantial efforts made by prominent projects like the Design of Trade Agreements (DESTA) and the World Bank’s Content of Deep Trade Agreements database. These initiatives have traditionally relied on the meticulous hand-coding of FTA texts by legal experts and economists, covering a wide range of topics. While recognizing the value of these manual efforts, we introduce a novel approach that harnesses the capabilities of text analysis and machine learning to streamline and complement the traditional coding process. Our proposed method aims to mitigate the significant costs and time constraints associated with manual coding, offering a viable alternative for analyzing unexplored topics within FTAs, swiftly evaluating new trade agreements, and potentially guiding the hand-coding process by pinpointing relevant sections.

Our methodology is centered around an algorithm that systematically processes the vast amounts of textual data contained within FTAs. This algorithm integrates text analysis with machine learning techniques to achieve two primary objectives: firstly, to automatically ascertain whether a given FTA addresses a specific topic; and, secondly, to determine whether the topic is included in the agreement’s dispute resolution mechanisms.⁴ We run the algorithm on FTA texts using a predefined set of keywords or regular expressions relevant to the topic of interest.

The algorithm’s analysis yields a dual-output: i) a binary variable indicating whether a given topic is mentioned within the FTA; and ii) an assessment of its inclusion in dispute settlement mechanisms. The latter is achieved through the deployment of a Naive Bayes Classifier, which evaluates sentences within the FTA text to classify them according to their relevance to dispute settlement inclusions or exclusions.⁵

We initially train the algorithm with a dataset of manually coded sentences from a diverse array of trade agreements. This process enables the algorithm to subsequently analyze new sentences, ultimately producing a dataset that not only signals the presence of a topic within an FTA but also determines if it is included within dispute resolution procedures. This innovative approach, detailed in section 3, represents a significant leap forward in the analysis of FTAs by increasing the efficiency and scope of future research in this field. In this paper, this tool allows us to show, in a systematized way, the increasing role of trade agreements in the regulation of the movement of business people across the globe.

The algorithm has wider applicability than just the movement of business people. To assess the algorithm’s accuracy, we apply it to identify all the topics covered by the hand-coded “Con-

³<http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>, accessed on 16/11/2019.

⁴Determining whether the topic is included in the agreement’s dispute settlement mechanisms is important because it can potentially impact the effect of provisions pertaining to the topic. If a topic is not included in the dispute settlement mechanisms, the agreement’s signatories may not have the means to enforce the provisions related to the topic. This can potentially render certain provisions unbinding. For example, if a trade agreement includes provisions on the respect of human rights and democracy but does not include these provisions in the dispute settlement mechanisms, the signatories may not have the means to enforce these standards.

However, excluding a topic from the dispute settlement mechanisms does not necessarily mean that signatories cannot enforce the provisions related to the topic. For example, even excluded topics give leverage to diplomatic negotiations. Moreover, FTAs often include consultative mechanisms that are not legally binding but can still be used to address disputes. In this paper, we focus on the inclusion of topics in dispute settlement mechanisms as the most straightforward and strongest way to ensure the enforceability of the provisions related to a topic.

⁵In the context of our algorithm, the Naive Bayes Classifier plays a critical role in analyzing the text of Free Trade Agreements (FTAs). The Naive Bayes Classifier is a probabilistic machine learning model that applies Bayes’ theorem with the assumption of independence between predictors. Essentially, it calculates the probability of a certain outcome (in our case, whether a sentence includes or excludes a topic from dispute resolution mechanisms) based on the presence of specific features in the input data (words in a sentence).

tent of Deep Trade Agreements” World Bank’s database.⁶ We determine if an agreement was identified by the WB as covering a given topic⁷ and check then if the algorithm also identifies the agreement as covering that same topic. The results overlap in over 80% of cases. Of all 2012 international trade taking place between countries with an active FTA, the FTAs coded identically by the WB and the algorithm, for at least 20 different topics, accounted on average for 99% of trade under FTAs. Beyond 20 topics this percentage rate drops substantially (figure B1). This is mainly explained by topic definitions that could potentially be interpreted differently by multiple coders. Annex C illustrates this by focusing on the discrepancies arising from one of these topics (nuclear safety).

Recent advances in large language models (LLMs) have significantly improved the processing of textual data.⁸ However, LLMs are often trained on general text corpora and may not be optimized for specific tasks such as analyzing FTAs. Our algorithm, on the other hand, is tailored to the unique characteristics of trade agreements, enabling a more efficient analysis of these complex texts. In this respect, our algorithm requires modest computational resources. As a result it can be run locally on a standard computer, making it accessible to researchers with limited computational capacity. Perhaps more importantly, the results of the algorithm are completely reproducible. Running the algorithm on the same input data will always yield the same output, ensuring the reliability and consistency of the analysis. This reproducibility is crucial for the transparency and robustness of our research findings. It should be noted that this is not the case for LLMs, where there is always a degree of randomness in the output. Finally, our algorithm is highly interpretable, providing clear insights into what features contribute to the classification of a topic as included or excluded from dispute resolution mechanisms. This interpretability is crucial for researchers seeking to understand the specific provisions of FTAs, making our algorithm a valuable tool for analyzing the regulatory frameworks governing international trade.

Using the output of the algorithm, we analyze the impact of business travel provisions on trade and migration flows. We show that facilitating the movement of business people highly correlates with increased trade flows. At the same time, these provisions increase the intensity of business travel while having no impact on long-term migration flows.

Our estimation strategy employs a gravity equation estimated both using OLS and the Poisson Pseudo-Maximum-Likelihood (PPML) estimator to address potential issues of heteroscedasticity. Also the PPML estimator allows for the presence of zero trade values. Our results show that the provisions facilitating business travel have a positive and significant impact on trade flows. The estimated coefficients are robust to the inclusion of a wide range of control variables, including the presence of other trade agreements, the depth of the agreements, and the presence of provisions liberalizing permanent migration. Our analysis, also controls for other observed and unobserved variables along multiple dimensions by including country-pair fixed effects, year fixed effects, and a wide range of gravity controls.

Our paper is related to other efforts to code the topics covered by trade agreements (Dür et al., 2014; Hofmann et al., 2017). The main difference is that these databases are hand-coded whereas our algorithm provides a method to do the coding automatically. While the analysis and hand-coding of agreements by legal experts and economists remains obviously the best practice, it is very costly and time-consuming. Our approach provides a fast and less costly alternative. As a result, any topic can efficiently be coded. Moreover, the algorithm can be applied to other

⁶We use the database version published in February 2018. The WB has since published another comprehensive database containing nearly 900 provisions. The more circumscribed perimeter of the February 2018 version of the database provides an ideal benchmark to gauge the performance of our algorithm.

⁷From WB’s database, we use data on mentions of “obligations that are outside the current mandate of the WTO” (see sheet WTO-X AC in the original data).

⁸For example, one could submit the text of a trade agreement to a LLM such as Claude or ChatGPT through an API and ask it look for a specific topic and whether it is included or excluded from dispute resolution mechanisms.

international agreements beyond trade agreements.

In this respect, our paper relates to an increasing number of papers using text analysis in economics. In international trade, text analysis has been mostly limited to comparing the similarities between the texts of trade agreements (Allee et al., 2017b,a; Alschner et al., 2017b,a). Our paper is however the first to develop an algorithm to automatically code trade agreements features. The output produced can then be incorporated into the analysis of the impact of trade agreements.

It also relates to a growing body of literature examining the effect of trade agreements' depth, in particular Dür et al. (2014) and Hofmann et al. (2017). These papers, however, focus on the assessment of the overall depth of trade agreements, whereas we focus on a single (yet unexamined) important dimension, namely, the movement of business people, while at the same time controlling for the overall depth of FTAs.

This paper contributes to the literature exploring the nexus between information frictions and international trade, particularly focusing on the role of business travel as a mitigating factor of such frictions. It builds upon a body of research that has established a significant connection between the frequency of business travel and the expansion of international trade. For instance, Cristea (2011) highlighted the positive correlation between increased business-class air travel from U.S. states to other countries and the subsequent growth in exports, underscoring the importance of face-to-face interactions in strengthening buyer-seller ties and enhancing trade. Similarly, Söderlund (2023), leveraged the decrease in business travel time between Europe and East Asia, following the liberalization of Soviet airspace, to illustrate the causal impact of business travel on facilitating trade. Adding to this, Startz (2024), delved into the underlying mechanisms, revealing that despite the substantial costs associated with international business trips - surpassing the combined expenses of shipping and regulatory compliance - Nigerian traders often choose to incur the travelling costs to China to overcome search and contracting problems. Beyond business travel, our paper also engages with research investigating the effects of information frictions through alternative channels, enriching the understanding of their multifaceted impact on international trade dynamics. Portes and Rey (2005) examine bilateral gross cross-border equity flows between 14 countries from 1989 to 1996. The paper underscores the role of telephone calls as a key indicator of information flows between countries, finding a strong association between the volume of calls and the magnitude of cross-border equity flows. This suggests that telephone communications significantly lower information barriers, thereby enhancing the ease of international equity transactions. Similarly, Steinwender (2018) investigates the impact of the transatlantic telegraph on trade. By analyzing historical data on cotton prices and trade volumes before and after the telegraph's introduction, the paper finds significant reductions in price discrepancies and increases in trade volume, underscoring the role of information frictions as a significant determinant of trade patterns.

Finally, an increasing literature has demonstrated the trade-creating effect of migration (e.g. Rauch and Trindade, 2002; Combes et al., 2005; Felbermayr and Toubal, 2010; Bahar and Rapoport, 2018; Parsons and Vézina, 2018; Bahar et al., 2019; Orefice et al., 2021). This literature has shown that migrants can act as bridges between countries, facilitating trade by reducing information frictions and transaction costs. However, differently to this stream of literature, our paper shows that business visitors' provisions in trade agreements foster trade flows without increasing permanent migration.

The rest of the paper is organized as follows. The following section briefly describes the evolution of FTAs over time. Section 3 describes the algorithm used to analyze FTAs and evaluates its performance. Section 4 summarizes the results obtained when using the algorithm to determine which FTAs include provisions to ease business travel. Section 5 analyzes the impact of trade agreements that contain such provisions on trade flows. Section 6 concludes.

2 Evolution of FTAs 1950-2015

Three features have made the analysis of FTAs' landscape increasingly complex. First, their number has surged since 1950 (panels (a) and (b) of figure A5 in appendix A). Second, FTA texts have become considerably longer (panel (a) of figure 1). Third, these agreements cover an increasing number of topics (panel (b) of figure 1).

Panel (a) of figure A5 shows the total number of FTAs notified to the WTO, by signature year, that are in force today. In 2015, 275 FTAs were in force. Similarly, panel (b) of the same figure plots the number of FTAs, notified to the WTO, by signature year regardless of whether they are still in force or not. The progression is remarkable. While in the 80s, just 9 agreements were signed, the number increased to 116 between 2010 and 2018.

Accompanying the increasing number of signed and in force FTAs, the complexity of the agreements has increased too. Panel (a) of figure 1 shows the word count of FTAs' texts by signature year. While in the 60s signed trade agreements contained on average 4426 words, this number increased to almost 25000 for the agreements signed since 2000.

Panel (b) of this same figure highlights the main reason explaining FTAs' increasingly longer texts. It shows the number of different topics covered by FTAs, as coded in World's Bank's Content of Deep Trade Agreements database, by signature year. While FTAs signed in the 90s covered on average 11.1 topics, this number almost doubled for FTAs signed since the year 2000 (20.1 topics).

3 An automatization of FTAs' text analysis

This section describes the algorithm we developed to analyze the text of FTAs. It also compares the performance of our algorithm using the hand-coded WB's Content of Deep Trade Agreements database (Hofmann et al., 2017) as a benchmark. Finally, it evaluates the performance of our algorithm in different languages.

3.1 Description of the algorithm

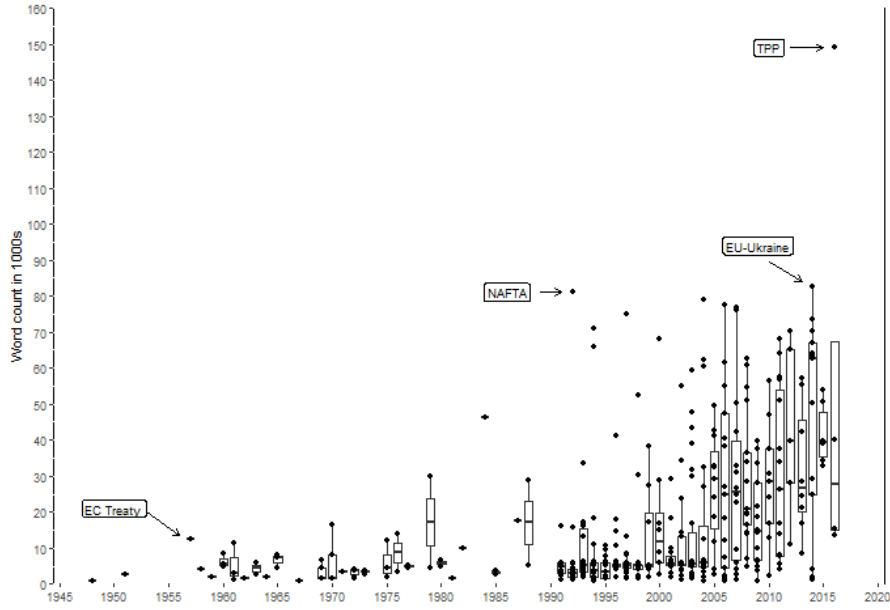
To analyze, in a systematic way, the vast amount of data that the corpus of FTAs represents, we develop an algorithm that combines text analysis and machine learning techniques. The algorithm has two main objectives. First, to automatically determine whether a FTA covers a given topic. Second, when the topic is covered, to analyze if the topic is included in the agreement's dispute settlement mechanisms or not.

The algorithm needs two inputs. The first is the text of FTA or FTAs to be analyzed. In our case, we take advantage of the machine readable corpus of FTAs developed in Alschner et al. (2017b). The corpus sources FTAs from WTO's Regional Trade Agreements Information System, applies OCR techniques to the texts and converts them into XML files that are easier to use in computational analysis than PDF files.

The second input, is a set of keywords or regular expressions that must be fed to the algorithm. For example, to identify if a FTA covers labor issues, we feed two keywords and one regular expression `labor; labour; and labora[a-zA-Z]*`.

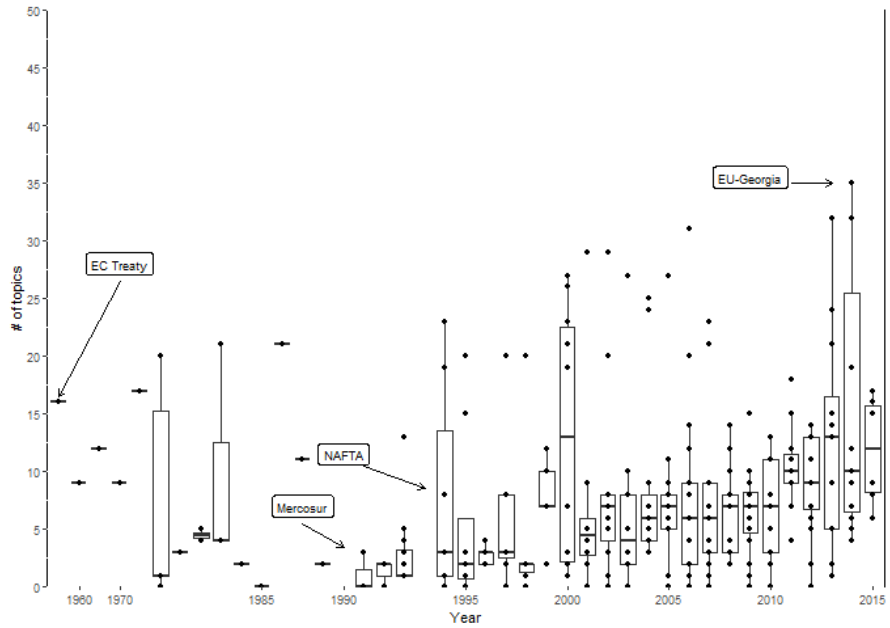
The algorithm then proceeds as follows. First, it starts by identifying the structure of the agreement (i.e. chapters, articles, paragraphs...). Second, it determines if a chapter's title mentions the topic we would like to code. In a third step, if the topic is indeed covered by the agreement, it looks for sentences mentioning disputes in the relevant chapter. It then looks for a dispute settlement chapter. If the agreement includes such a chapter, the algorithm searches then for sentences covering the topic in this chapter.

Figure 1: Evolution of the depth of FTAs over time



(a) Word count of FTAs texts

Notes: panel (a) shows the total number of words in each FTA text. We compute these figures using the FTAs text corpus provided by Alschner et al. (2017b).



(b) Number of topics covered

Notes: panel(b) shows the number of different topics covered by each FTA. The figures were computed using the data provided by World Bank's Content of Deep Trade Agreements database (Hofmann et al. (2017)).

There are cases where a whole chapter is not devoted to a particular subject but the topic is nonetheless covered by the agreement. Also, a number of agreements are not organized in chapters. In these two cases, the algorithm looks for the topic in every single article. If an article covering the topic is found, it then searches for articles covering disputes in the section where it was found.

This part of the procedure delivers two outputs. First, it produces a dummy variable indicating whether the topic is covered or not. If the dummy variable is equal to 1, signaling that the topic is covered, the algorithm delivers a collection of sentences referring to the dispute settlement of matters related to the topic. Note that the collection of sentences can be an empty set.

Determining whether the topic is included in the agreement's dispute settlement mechanisms is important because it can potentially impact the effect of provisions pertaining to the topic. If a topic is not included in the dispute settlement mechanisms, the agreement's signatories may not have the means to enforce the provisions related to the topic. This can potentially render certain provisions unbinding. For example, if a trade agreement includes provisions on the respect of human rights and democracy but does not include these provisions in the dispute settlement mechanisms, the signatories may not have the means to enforce these standards.

However, excluding a topic from the dispute settlement mechanisms does not necessarily mean that signatories cannot enforce the provisions related; indeed, FTAs often include consultative mechanisms that are not legally binding but can still be used to address disputes. In this paper, we focus on the inclusion of topics in dispute settlement mechanisms as the most straightforward and strongest way to ensure the enforceability of the provisions related to a topic.

The algorithm proceeds then to analyze whether the collection of sentences includes or excludes the topic from dispute settlement mechanisms. For this purpose, the algorithm applies a Naive Bayes Classifier to the set of sentences. As suggested by its name, a Naive Bayes classifier applies Bayes theorem to perform the classification task. The 'Naive' part refers to the independence assumptions that are made to ease the estimation/training of the classifier. As it is explained in some more detail below, these are mainly about the relation between words.

To train our Naive Bayes Classifier, we define two classes of sentences:

$$K = \begin{cases} \text{Includes a topic in dispute settlement mechanisms} \\ \text{Excludes a topic in dispute settlement mechanisms} \end{cases}$$

where K is the set that contains the two classes.

To determine to which class a sentence belongs to, the algorithm applies Bayes' rule:

$$P(\text{class}|\text{sentence}) = \frac{P(\text{sentence}|\text{class})P(\text{class})}{P(\text{sentence})} \quad (1)$$

The algorithm uses a maximum a posteriori (MAP) decision rule comparing the probability of belonging to each of the two classes. Note that the denominator (i.e. the probability of observing a sentence) is positive and fixed for any given sentence. As result, we do not need to compute $P(\text{sentence})$. The most likely hypothesis is therefore given by:

$$\text{class}_{MAP} = \underset{\text{class} \in K}{\operatorname{argmax}} P(\text{sentence}|\text{class})P(\text{class}) \quad (2)$$

By defining the words of each sentence as x_1, x_2, \dots, x_n , equation (2) can be written as:

$$\text{class}_{MAP} = \underset{\text{class} \in K}{\operatorname{argmax}} P(x_1, x_2, \dots, x_n|\text{class})P(\text{class}) \quad (3)$$

To estimate equation (3), we work with two simplifying assumptions. First, we apply a Bags of Words hypothesis and assume that the relative position of words does not matter. Second, we assume that these words are independent. The Naive Bayes Classifier essentially calculates the probability of a certain outcome (in our case, whether a sentence includes or excludes a topic from dispute resolution mechanisms) based on the presence of specific features in the input data (words in a sentence). The assumption of independence between predictors means that the probability of the presence of a particular word in a sentence is considered to be independent of the presence of other words in the sentence. For example, the word “dispute” is likely to be followed by the word “resolution” in a sentence. Therefore, the conditional probability of observing the word “resolution” given that we have observed the word “dispute” is not nil. However, the Naive Bayes Classifier assumes this conditional probability to be nil, simplifying the calculation of the probability of a sentence being classified as including or excluding a topic from dispute resolution mechanisms. While such an assumption may not hold in practice, the Naive Bayes Classifier has been shown to perform well in text classification (Rish et al., 2001).

Using these assumptions we can write the Naive Bayes Classifier as:

$$class_{NB} = \underset{class \in K}{argmax} \left[\prod_x P(x|class) \right] P(class) \quad (4)$$

To train this Naïve Bayes Classifier, we begin by gathering, from a broad range of trade agreements, a collection of sentences referring to disputes settlement. We manually code two sets of sentences: a set of sentences gathered specifically from Dispute Settlement chapters and a set of sentences gathered from the rest of the agreement. The set gathered from Dispute Settlement chapters contains 65 sentences, while the set gathered from the rest of the agreement contains 110 sentences. With each set, we train and test two different classifiers: one for Dispute Settlement chapters and one for the rest of the agreement. We finally estimate equation (4) using the set of manually classified sentences. With the two trained classifiers in hand, the algorithm can now allocate any new sentence into one of the two defined classes.

The estimation of equation (4) is based on a simple maximum likelihood estimator that uses the relative frequencies of words plus a Laplace smoothing factor. More precisely, the likelihood of a observing a word given a class is estimated as:

$$P(x|class = y) = \frac{N_{yx} + 1}{N_y + n} \quad (5)$$

where $P(x|class = y)$ is the estimated probability of observing word x in class y , N_x is the number of times word x appears in class y , N_y is the total number of words in class y , and n is the total number of unique words in the training set.

The algorithm applies the classifier to the collection of sentences pertaining to dispute settlements for a given topic. In this way, it is able to analyze whether a sentence in the FTA text includes or excludes the topic from dispute settlement mechanisms. If in this collection any of the sentences is classified in the “Excludes a topic in dispute settlement mechanisms” class, the algorithm sets the topic as excluded from dispute settlement mechanisms. In this way, as a final result, it delivers a dummy variable indicating whether the topic is covered by the agreement’s dispute settlement mechanism or not.

In summary, the algorithm will deliver at the end a line of data containing the signatory countries of the FTA; a dummy variable indicating if the FTAs includes the studied topic; and, for cases where the topic is treated by the agreement, a dummy variable indicating whether the topic is included in dispute settlement mechanisms or not. To make the results more transparent the Python package implementing the algorithm generates an HTML file that shows where

the topic is found in the agreement as well as the collection of dispute settlement sentences accompanied by their classification.

3.2 Assessment of the algorithm results

We evaluate the performance of the algorithm by comparing the results of the algorithm to World Bank’s Content of Deep Trade Agreements database. The database codes 52 provisions in 279 WTO notified FTAs and signed between 1958 and 2015.

We automatically code the provisions retained in World Bank’s database using the algorithm. We do this by running the algorithm on the corpus of machine readable trade agreements compiled in Alschner et al. (2017b). By doing this, we obtain a database containing 449 observations (i.e. the number of agreements’ texts compiled in Alschner et al. (2017b)). Among the 279 agreements currently covered by WB’s data, 217 agreements are matched successfully.

We base our comparison on whether an agreement has been identified by the WB and/or the algorithm as covering a topic. In other words, we determine if an agreement was identified by the WB as containing a given topic and check then if the algorithm also identified the agreement as covering that same topic.⁹

The algorithm’s results are very similar to WB’s database. Figure 2a plots the number of FTAs that the algorithm identifies as covering each topic against the same number taken from WB’s database. The overall correlation is 81.4%. On average, the algorithm identifies a larger number of FTAs as containing a given topic. This is likely explained by the fact that the algorithm never misses the mention of a topic whereas humans eyes could potentially miss some mentions when going through tens of thousands of text pages.

Similarly, figure 2b shows, for each topic, the percentage of agreements that the algorithm and WB’s database coded identically. The average across topics is 85.61%. Figure B2 in the appendix presents the same results but restricted to those agreements that the WB’s database identifies as covering a given topic. In other words, among the agreements that according to WB’s database do cover a specific topic, how many agreements the algorithm also identifies as covering the topic. Across topics, on average, 69.33% of agreements identified by WB’s database were also identified by the algorithm. Figure B3, also in the appendix, presents the results of a similar exercise but focusing on the agreements that WB’s database classifies as not covering a topic. On average, across topics, 87.74% were also classified by the algorithm as not containing the topic.

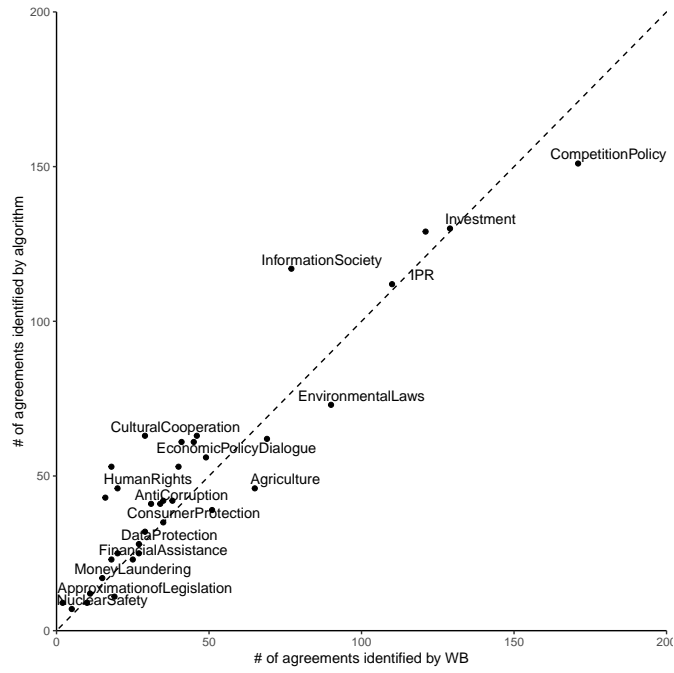
Note that some of these discrepancies would arise also when hand-coding the agreements. Section C in the appendices details the discrepancies between the algorithm and WB’s database for the Nuclear safety topic. These differences illustrate the advantages, but also the limitations, of the algorithm.

3.3 Performance of the algorithm in different languages

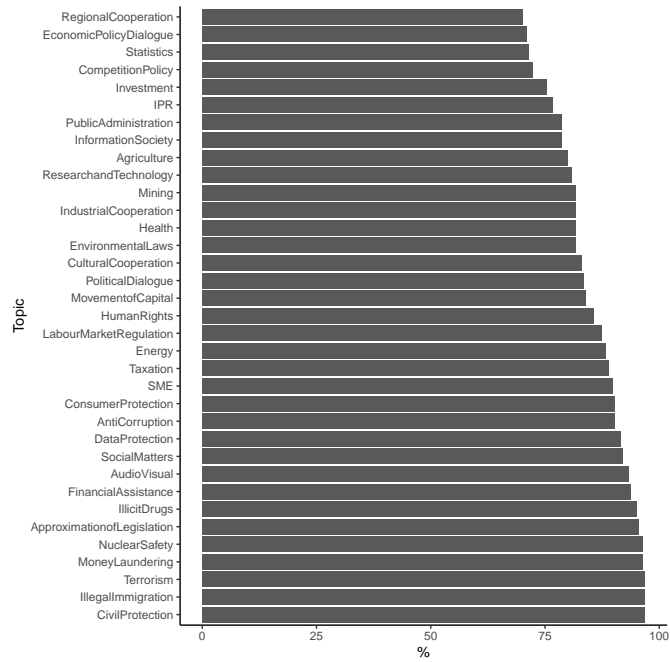
In the original corpus of FTAs, we identified 424 FTAs in English, 23 in Spanish, and only 2 in French. After merging the results of the algorithm with WB’ data, we are left with 198 FTAs in English, 15 in Spanish, and 2 in French. To evaluate the algorithm’s performance across different languages, we compare the coding results for the 15 FTAs in Spanish and the 2 FTAs in French with the results for the 198 FTAs in English. The comparison is based on the percentage of FTAs coded identically for each topic.

⁹WB’s database includes a dummy variable to indicate that the provisions on a given topic are legally enforceable. This is different to what is identified by our algorithm. The algorithm determines whether the topic is included or not in the agreement’s dispute settlement mechanism.

Figure 2: Comparison of WB's database and algorithm results



(a) Number of Agreements identified by WB vs algorithm



(b) Percentage of FTAs coded identically for each topic

Figure 1, in the online appendix, illustrates the very close coding percentages for each topic in Spanish and French. These results can be compared with those for all languages combined, as shown in Figure 4 of the main text. The comparison reveals slightly higher percentages for Spanish at 81% compared to 79% for French. This consistency with the main text demonstrates the algorithm’s robustness across different linguistic contexts.

4 Business mobility clauses in trade agreements

We then use the algorithm to determine which trade agreements include provisions to facilitate the movement of business people. Note that we restrict ourselves to provisions that directly relate to the category of business people¹⁰ and do not include clauses that liberalize permanent migration for everyone (e.g. European Union) or to very broad categories (e.g. Caricom).¹¹ As is explained in more detail below, in order to account for agreements that liberalize migration in a broad sense, we include a dummy variable named ‘Free mobility of persons’. Of course, this broader liberalization of the movement of people includes business people. However, separating the effect of the facilitation of the movement of business people from the effect of dropping all migration restrictions is not possible using only data from these agreements.

The first trade agreement containing such provisions was signed in 1988 between Canada and the United States. Since that year and up to 2016, 1.5 agreements containing provisions on this topic were signed on average each year (figure 3). Most of these agreements involve countries in North and South America (see figure 2 in the Online Appendix). Some countries in Asia and Oceania have also signed trade agreements with such provisions.

The provisions facilitating the movement of business visitors can be categorized into five broad areas. The first category involves general and often vague commitments to facilitate business visitor movement. For instance, the agreement between the Gulf Cooperation Council (GCC) and Singapore includes the following provision: “The Parties, recognizing the importance of the exchange of business visits in their respective economies, shall promote such visits and exchanges, including pre-establishment visits, between the Parties.” This agreement, however, does not specify any concrete measures to facilitate the movement of business visitors. Such general commitments are common in most agreements that aim to facilitate business visitor movement but lack specific, actionable measures.

The second involves clauses reducing the amount of paperwork business visitors need to include in their visa’s applications. For example, NAFTA includes the following provision: “A Party shall normally **accept an oral declaration as to the principal place of business** and the actual place of accrual of profits. Where the Party requires further proof, it shall normally consider a letter from the employer attesting to these matters as sufficient proof.”

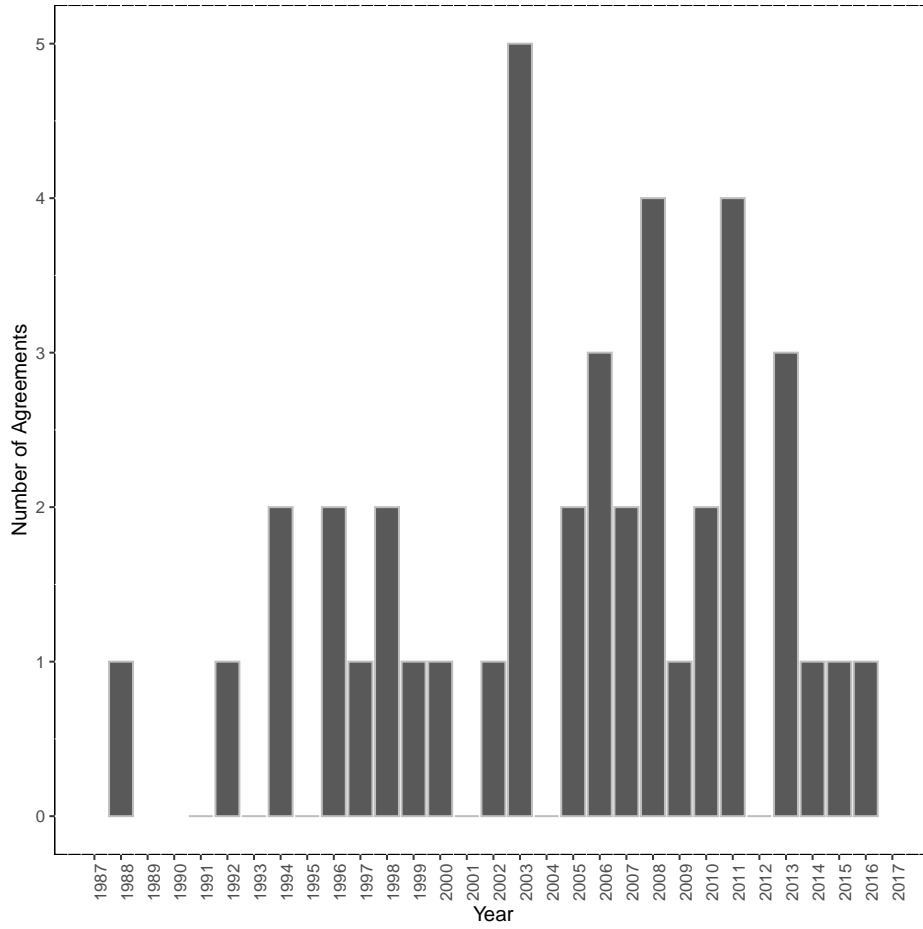
The third type of clauses seeks to establish clear requirements and procedures for business visitors. This provision from the agreement between Honk Kong and New Zealand is an example that aims to “establish streamlined and transparent immigration procedures for applications made by business persons of the other Party.”

The fourth category of clauses limits or eliminates visa application fees for business visitors. The Canada-Colombia FTA illustrates this: “Each Party **shall limit any fees** for processing

¹⁰The sample of countries used in the estimations includes all country pairs irrespective of whether they have a trade agreement or not or whether the trade agreement includes a clause on the movement of business people.

¹¹We feed into the algorithm the following words and regular expressions: ‘business vi[a-zA-Z]*’; ‘Temporary Entry Of Business Persons’; ‘temporary entry of natural person’; ‘Movement Of Business Person’; ‘Temporary Entry For Business Persons’; ‘Entrada Temporal De Personas De Negocios’, ‘Entrada Temporal De Personas Naturales’.

Figure 3: Number of FTAs signed each year containing business visitors provisions



Notes: this figure shows the number of FTAs that contain business visitor provisions that were signed each year. We use the algorithm to identify FTAs containing business visitors provisions.

applications for temporary entry of business persons so as to not unduly impair or **delay trade in goods...**"

Finally, a last, and less common, type of provisions, forbids any caps in the number of business visitors that can be granted visas. In this matter, NAFTA includes this telling clause: "No Party may: (...) (b) impose or **maintain any numerical restriction** relating to temporary entry under paragraph 1 or 3."

On average agreements that include provisions to facilitate the movement of business visitors contain 3 different categories of provisions. Figure 3 in the online appendix illustrates the number of business visitor provisions categorized by type. Most trade agreements featuring business visitor provisions contain vague, general commitments. Nonetheless, a significant number of agreements include provisions aimed at ensuring transparent and clear requirements and procedures for business visitors. Additionally, many agreements contain provisions to limit visa application fees. In contrast, only a few agreements address reducing the paperwork required for business visitor visa applications. Notably, only one agreement, NAFTA, includes provisions to eliminate caps on the number of business visitor visas that can be granted. Finally, Table 2 in the online appendix details for each agreement which provisions are included.

5 Impact of facilitating business visitors entry

In this section, we evaluate whether facilitating business visitors' travel has an impact on trade flows. More precisely, we examine whether the provisions of FTAs easing business visitors entry increases trade flows between signatory countries.

5.1 Data

This subsection presents the datasets employed to assess the impact of Free Trade Agreements (FTAs) business visitors' entry provisions on bilateral trade flows.

Bilateral aggregate trade flows are sourced from the IMF's Direction of Trade Statistics (DOTS) database, covering the period from 1950 to 2015. This dataset distinguishes clearly between zero trade and missing trade flows, a distinction that is important for our analysis. The dataset is used in the main econometric specification to estimate the impact of business visitors' provisions on trade flows (Table 2).

Disaggregated bilateral trade data at the six-digit level are drawn from CEPII's BACI database (Gaulier and Zignago, 2010). This granularity allows for a more nuanced examination of trade patterns. The dataset is used to assess whether a product is traded between two countries. The results are presented in Tables 7 and 8.

Gravity controls, including measures of distance, common borders, and shared official languages or currencies, are derived from CEPII's Gravity dataset (Head et al., 2010). These variables are crucial for controlling for geographic and cultural factors that influence trade flows.

FTA-related data, including the Free Trade Dummy variable and controls for the depth of FTAs, are obtained from the World Bank's Content of Deep Trade Agreements Database (Hofmann et al., 2017). These controls are essential for understanding the extent and nature of FTA provisions.

Migration data is gathered from the OECD's International Migration Database OECD (2011), which tracks flows to and from OECD countries. To provide a broader perspective, we also incorporate data from the World Bank's Global Bilateral Migration Database, covering nearly all countries from 1960 to 2010. This World Bank dataset estimates migration flows based on changes in migrant stocks, offering an alternative approximation of migration patterns. The results obtained using these datasets are presented in Tables 9 and 10.

Data on the entry provisions for business visitors are generated by running the algorithm on the texts of trade agreements. The FTA’s text corpus we use to generate these data is a marginally augmented version of (Alschner et al., 2017b), ensuring comprehensive coverage of relevant provisions.

The free mobility of people is captured by a dummy variable encompassing agreements that include free mobility of persons or workers, such as those within the European Union, the European Economic Area, the European Free Trade Association, the Australia-New Zealand Free Trade Agreement, and CARICOM. For instance, the European Economic Community of 1957 and the Treaty of Maastricht in 1992 established rights for EU citizens to live and work across member states. Similar provisions are in place for nationals of Iceland, Liechtenstein, Norway, and Switzerland through the European Economic Area and bilateral agreements. The Trans-Tasman Travel Arrangement of 1973 facilitates free mobility between New Zealand and Australia, and since 1996, specific CARICOM nationals can move and work freely among member states (“graduates of all recognized universities in the world; Artistes; Musicians; sportspersons; Media Workers; Nurses; Teachers; Artisans with a Caribbean Vocational Qualification; and holders of Associate Degrees or comparable qualification” CARICOM (2001)).

Data on the number of business trips between countries are derived from Coscia et al. (2020). The data are generated using confidential data on international expenditures through corporate payment cards. The number of business trips is measured by the count of the “number of cards that were issued in a country of origin and that made payments in the country of destination.” A number of important characteristics of this data are worth mentioning. First, the authors also add to this count ATM withdrawals to avoid underrepresenting countries with less developed credit card networks. Second, the count of business trips includes only stays of more than one day to avoid counting countries where connecting flights take place as destination countries. Third, personal credit cards are excluded from the count. The data are available for 127 countries that appear both as origin and destination countries. Only the average value of the 2011-2016 period is available. The data are used to assess the impact of business visitors’ provisions on business trips between countries (Tables 5 and 6).

The final dataset used for the main econometric specification spans from 1958 to 2015 and comprises trade flows between 209 countries or territories over 58 years. Notably, 26 countries¹² have signed FTAs that include provisions to facilitate the movement of business persons. This comprehensive dataset provides the foundation for analyzing the impact of business visitors provisions on bilateral trade flows.

5.2 Trade Regressions

In this section, we examine the impact of easing the mobility of business visitors on bilateral trade flows.

The literature exploring the connection between information frictions and trade flows has highlighted the significant role of travel in reducing fixed trade costs (e.g. Rauch, 1999; Startz, 2024). Models of heterogeneous firms commonly assume that firm productivity follows a Pareto distribution (e.g. Melitz, 2003; Arkolakis et al., 2008; Chaney, 2008). This assumption aligns well with observed data and allows for the decomposition of the roles of fixed and variable trade costs in determining trade flows. Within this framework, a reduction in both fixed and variable trade costs is expected to increase bilateral aggregate trade flows. Specifically, a reduction in variable trade costs drives an increase in bilateral aggregate trade flows by both expanding the

¹²Australia, Bahrain, Canada, Chile, China, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Israel, Kuwait, Mexico, New Zealand, Nicaragua, Oman, Panama, Peru, Qatar, Saudi Arabia, Singapore, South Korea, Taiwan, United Arab Emirates, and the United States.

number of exporting firms and raising the average export value per firm. Conversely, reducing fixed trade costs primarily impacts bilateral aggregate trade flows by increasing the number of exporting firms (Melitz and Redding, 2014).

Building on these theoretical and empirical insights, we hypothesize that provisions facilitating the movement of business visitors will lead to an increase in aggregate bilateral trade flows. To test this hypothesis, we estimate the impact of these provisions on bilateral trade flows (refer to equation 6 below). However, consistent with the literature on information frictions and trade flows, we expect that the primary impact of these provisions will manifest through an increase in the number of exporting firms since facilitating the movement of business visitors is likely to reduce fixed trade costs. While direct data on the number of exporting firms is unavailable, we use the probability of a product being traded between two countries as a proxy (see equation 8 below).

Accordingly, we begin by estimating the following gravity equation:

$$X_{i,j,t} = \exp(\lambda_{it} + \lambda_{jt} + \lambda_{ij} + \alpha'c_{ijt} + \beta'm_{ijt}) \times \chi_{ijt} \quad (6)$$

where λ_{it} , λ_{jt} , λ_{ij} are exporter-year, importer-year and exporter-importer fixed effects. c_{ijt} are time-invariant (distance, shared border and common official language) and time-varying controls (FTA and common currency). m_{ijt} is the set of mobility variables¹³:

- FTA contains provisions facilitating the entry of business visitors
- FTA contains provisions facilitating the entry of business visitors included in dispute settlement mechanisms.
- FTA grants free mobility to citizens of signatory countries.

5.3 Baseline results

Table 1 reports our baseline results. In this table, we estimate equation (6) using the Poisson Pseudo-Maximum-Likelihood estimator (PPML). Provisions to ease the movement of business visitors increase bilateral trade flows in all tested specifications of table 1. Including these provisions in dispute settlement mechanisms does not have a statistically significant impact on trade.

The coefficient of the FTA dummy variable is not statistically significant at the 10% level when country-year and country-pair fixed effects are included (columns (3) and (4) of Table 1). While these results for the FTA coefficient are surprising, analogous results are found elsewhere in the trade literature. Recent estimates of the effect of FTAs that include three-way fixed effects and use the PPML estimator find similarly small coefficients (e.g. Heid et al., 2021; Weidner and Zylkin, 2021). For example Weidner and Zylkin (2021) find an estimate of 0.082 (between 0.086 and 0.088 after incidental parameter bias correction). The recent literature has also found

¹³When the dummy variable for FTAs that contain provisions facilitating the entry of business visitors is equal to 1, it always coincides with the FTA dummy being equal to 1. However, the reverse is not necessarily true; an FTA dummy can be equal to 1 without the corresponding dummy for provisions facilitating the entry of business visitors also being 1. In other words, the dummy for business visitor provisions is a subset of the broader FTA dummy. The same logic applies to the dummy variable representing FTAs that grant free mobility to citizens of signatory countries. Moreover, the dummy variable for FTAs that include provisions facilitating the entry of business visitors within dispute settlement mechanisms is a subset of the dummy for provisions facilitating the entry of business visitors. In other words, for the dispute settlement-related dummy to be equal to 1, the dummy for business visitor provisions must also be 1, but the reverse does not hold. As a result, the dummies for provisions facilitating business visitor entry and granting free mobility to citizens capture the specific trade effects of these provisions in addition to the overall trade effects of FTAs.

statistically insignificant effects of FTAs in some specifications, when using the PPML estimator (e.g. Mayer et al., 2019; Anderson and Yotov, 2020; Head and Mayer, 2021; Heid et al., 2021). In some of these cases, the coefficients are even negative (e.g. Heid et al., 2021; Weidner and Zylkin, 2021). In Weidner and Zylkin (2021) the negative coefficients are obtained only for a number of specific sectors (e.g. forestry; communications equipment; paper and printed products).

Table 2 and Table D1, in the appendix confirm the baseline results using two alternative specifications. Table 2 reports the results of using trade shares, instead of trade flows, as the dependent variable. As pointed out by Sotelo (2019), using shares and PPML amounts to assigning different weights to each importer country. Hillrichs and Vannoorenberghe (2022) show that if some of these shares are particularly large this might be problematic for the estimation using PPML. For this reason, the table also reports the minimum, maximum, and average values of the trade shares. As a robustness test, Table 3 in the online appendix excludes trade shares larger than 60% from the estimation sample. The results are very similar to those of Table 2 both in the magnitude and statistical significance of the coefficients associated with business visitors provisions.

The results in Table 2 are very similar to the results of estimating equation (6) in levels (Table 1). Business visitors provisions have a positive, in all specifications, and statistically significant effect in three of them at the 10% level. While the coefficient signaling the inclusion of these provisions in dispute settlement mechanisms is negative and statistically significant, the overall impact of these clauses remains positive.

Table D1 in the appendix shows the results of the estimation of equation (6) using OLS. OLS estimates of gravity equations are more vulnerable to bias arising from heteroskedasticity than PPML estimates. Also, using OLS implies dropping zero trade flows from the estimation sample, which are not randomly distributed among country pairs. With OLS, business visitors provisions have a positive effect on trade in the specifications presented in the first three columns. In the last column, the coefficient for these provisions is negative when they are not included in disputes settlement mechanisms but positive when they are included. The overall impact in this case is largely positive.

Table 1: Effect of business visitors provisions: PPML

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.236 ^a (0.055)	0.236 ^a (0.055)	-0.042 (0.050)	-0.042 (0.050)
Entry of Business Visitors	0.421 ^a (0.099)	0.576 ^a (0.121)	0.144 ^c (0.078)	0.201 ^c (0.113)
Entry of Business Visitors, disp. settlement		-0.172 (0.155)		-0.070 (0.132)
Free mobility of persons	0.176 ^b (0.079)	0.174 ^b (0.079)	0.347 ^a (0.049)	0.347 ^a (0.049)
Ln. Dist.	-0.751 ^a (0.032)	-0.752 ^a (0.032)		
Common border	0.370 ^a (0.061)	0.372 ^a (0.061)		
Common official language	0.216 ^a (0.052)	0.217 ^a (0.052)		
Common currency	-0.010 (0.067)	-0.011 (0.067)	0.111 ^b (0.046)	0.111 ^b (0.046)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.945	0.945	0.989	0.989
Observations	930321	930321	929943	929943

Note: The dependent variable is the trade flow between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

Table 2: Effect of business visitors provisions: PPML in shares

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.409 ^a (0.048)	0.409 ^a (0.048)	0.030 (0.028)	0.031 (0.028)
Entry of Business Visitors	0.157 (0.105)	0.593 ^a (0.173)	0.109 ^c (0.066)	0.350 ^a (0.122)
Entry of Business Visitors, disp. settlement		-0.486 ^b (0.194)		-0.274 ^b (0.132)
Free mobility of persons	-0.694 ^a (0.077)	-0.695 ^a (0.077)	0.534 ^a (0.046)	0.534 ^a (0.046)
Ln. Dist.	-1.063 ^a (0.027)	-1.063 ^a (0.027)		
Common border	0.252 ^a (0.061)	0.253 ^a (0.061)		
Common official language	0.894 ^a (0.065)	0.895 ^a (0.065)		
Common currency	0.716 ^a (0.153)	0.716 ^a (0.153)	0.306 ^a (0.043)	0.306 ^a (0.043)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.312	0.312	0.377	0.377
Min. Dep. Var.	0.000	0.000	0.000	0.000
Max. Dep. Var.	0.997	0.997	0.997	0.997
Mean Dep. Var.	0.009	0.009	0.009	0.009
Observations	929783	929783	929405	929405

Note: The dependent variable is the trade flow share between origin and destination countries. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

Table E1 in the appendix shows the results obtained when including dummy variables for the EU and CUSFTA/NAFTA. Whereas the statistical significance of free mobility of persons is impacted, to some extent, by the inclusion of the EU and CUSFTA/NAFTA dummies, the same is less the case for business visitors provisions. The business visitors dummy remains positive in all but one specification of panels A and B. In the only specification where the coefficient of the business visitors dummy is negative (column (4) of panel B), the business visitors dispute settlement dummy is positive and statistically significant at the 10% level.

In columns (2) and (4) of panel A, the business visitors dummy is not longer statistically significant at the 10% level. This is likely explained by the partial collinearity between CUSFTA/NAFTA and business visitors dummies. For this reason, panels C and D exclude NAFTA countries (Canada, Mexico and United States) from the estimation sample. In these two panels, the business visitors dummy is always positive and statistically significant at the 10% level with the sole exception of column (4) of panel D. In this specification while the business visitors dummy is no longer statistically significant, the business visitors disputes settlement dummy is positive and significant at the 1% level.

5.4 Controlling for FTA's depth

FTAs that include business visitors provisions might also include a broader range of other topics. To examine this possibility in this section, we add two different measures of the depth of FTAs. Table 3 reports these results. All estimations are performed using PPML.

In panel A, we use the length of FTAs' texts as a measure of depth. To do this we count the number of words of each text. The final variable we include in this panel is the length in tens of thousands words. The coefficient of the variable for the presence of business visitors provisions remains positive in all specifications. It is also statistically significant at the 10% level in three of them.

In Panel B, the depth measure is based on World Bank's "Content of Deep Trade Agreements" database. It corresponds to the sum of topics reported as included in each FTA by the WB's database. The coefficient for the business visitors provisions is positive and statistically significant at the 10% level in all specifications.

5.5 Business travel intensity

In this section we examine the impact of business visitors provisions on business travel. For this purpose we use the bilateral count of business trips intensity developed in Coscia et al. (2020). Since data on business travel flows is not available, the authors estimate the number of business trips between two countries using credit cards data. More precisely, the authors count the number of corporate credit cards that were used in a different country from the issuing country. The data covers 127 countries. Only the average bilateral number of business trips during the 2011–2016 period is available. Using this data we estimate equation (7) below. For the other variables we take data from 2013.

$$BT_{ij} = \lambda_i + \lambda_j + \alpha' c_{ij} + \beta' m_{ij} + \epsilon_{ij} \quad (7)$$

where BT_{ij} is the average number of business trips originating in i and with destination j during the period 2011-2016. The other variables are the same as in the main gravity model (equation (6)).

Table 4 reports the results of estimating equation (7) using OLS. The table shows that the inclusion of provisions facilitating the entry of business visitors is positively correlated to the number of bilateral business trips. In all specifications the coefficient for business visitors provisions is positive and statistically significant at the 10% level.

In this case, since $[T=1]$, OLS is our preferred because it does not suffer from incidental parameter bias (Fernández-Val and Weidner, 2016). Table 5 shows the results of estimating equation (7) using PPML. To mitigate the bias in standard errors arising from the non-linear nature of the PPML estimator, we apply the analytical bias correction proposed by Weidner and Zylkin (2021). While the asymptotic performance of the analytical bias correction is remarkable, in finite samples it will only reduce the bias in the standard errors but does not eliminate it entirely. In finite samples, when N is substantially larger than T , the bias in standard errors remains considerable. The results of Table 5 show that the coefficient for business visitors provisions is always positive but not statistically significant at the 10% level.

Table 3: Controlling for FTA's measures of depth

	(1)	(2)	(3)	(4)
Panel A: Text's length				
Free Trade Agreement	0.229 ^a (0.067)	0.221 ^a (0.069)	-0.080 (0.079)	-0.087 (0.081)
Entry of Business Visitors	0.403 ^a (0.149)	0.567 ^a (0.123)	0.088 (0.084)	0.193 ^c (0.110)
Entry of Business Visitors, disp. settlement		-0.208 (0.198)		-0.143 (0.146)
Free mobility of persons	0.178 ^b (0.079)	0.177 ^b (0.079)	0.388 ^a (0.056)	0.391 ^a (0.057)
Text length in 10000s words	0.003 (0.022)	0.008 (0.024)	0.016 (0.014)	0.020 (0.016)
Pseudo-R2	0.945	0.945	0.989	0.989
Observations	930321	930321	965276	965276
Panel B: Number of covered topics				
Free Trade Agreement	0.110 (0.090)	0.110 (0.090)	-0.136 (0.129)	-0.137 (0.129)
Entry of Business Visitors	0.401 ^a (0.100)	0.562 ^a (0.120)	0.150 ^c (0.079)	0.209 ^c (0.112)
Entry of Business Visitors, disp. settlement		-0.178 (0.155)		-0.072 (0.130)
Free mobility of persons	0.137 ^c (0.078)	0.134 ^c (0.078)	0.353 ^a (0.042)	0.353 ^a (0.042)
# of topics in FTA	0.007 ^b (0.003)	0.007 ^b (0.003)	0.005 (0.004)	0.005 (0.004)
Pseudo-R2	0.945	0.945	0.989	0.989
Observations	930321	930321	965276	965276
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes

Note: The dependent variable is the trade flow between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

Table 4: Effect of business visitors provisions on Business Trips

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.271 ^a (0.037)	0.263 ^a (0.038)	0.260 ^a (0.038)	0.265 ^a (0.038)
Entry of Business Visitors		0.160 ^c (0.087)	0.343 ^a (0.112)	0.344 ^a (0.112)
Entry of Business Visitors, disp. settlement			-0.265 ^c (0.153)	-0.271 ^c (0.153)
Ln. Dist.	-1.314 ^a (0.023)	-1.312 ^a (0.023)	-1.314 ^a (0.023)	-1.326 ^a (0.025)
Common border	0.213 ^b (0.089)	0.214 ^b (0.089)	0.215 ^b (0.089)	0.207 ^b (0.089)
Common official language	0.785 ^a (0.045)	0.782 ^a (0.045)	0.787 ^a (0.045)	0.784 ^a (0.045)
Common currency	-0.267 ^a (0.061)	-0.264 ^a (0.061)	-0.266 ^a (0.061)	-0.227 ^a (0.065)
Free mobility of persons				-0.091 (0.063)
R2	0.886	0.886	0.886	0.886
Observations	6617	6617	6617	6617

Note: The dependent variable is the log of the average number of business trips between 2011 and 2016 from country i to country j as computed in variable as computed in Coscia et al. (2020). All specifications include origin and destination fixed effects. Standard errors in parentheses are robust and clustered at country pair level. All columns include origin and destination fixed effects. Statistically significant at ^c 10% ^b 5% ^a 1%.

Table 5: Effect of business visitors provisions on Business Trips: PPML with analytical bias corrections as in Weidner and Zylkin (2021)

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.040 (0.103)	-0.013 (0.100)	-0.014 (0.100)	0.166 ^c (0.096)
Entry of Business Visitors		0.221 (0.185)	0.111 (0.193)	0.141 (0.195)
Entry of Business Visitors, disp. settlement			0.118 (0.249)	-0.022 (0.248)
Ln. Dist.	-0.950 ^a (0.060)	-0.944 ^a (0.060)	-0.944 ^a (0.061)	-1.071 ^a (0.073)
Common border	0.089 (0.132)	0.071 (0.138)	0.070 (0.139)	0.012 (0.140)
Common official language	0.545 ^a (0.138)	0.548 ^a (0.139)	0.547 ^a (0.140)	0.529 ^a (0.135)
Common currency	-0.008 (0.132)	0.007 (0.133)	0.007 (0.133)	0.085 (0.133)
Free mobility of persons				-0.678 ^a (0.211)
Pseudo-R2	0.974	0.974	0.974	0.974
Observations	13105	13105	13105	13105

Note: The dependent variable is the average number of business trips between 2011 and 2016 from country i to country j as computed in variable as computed in Coscia et al. (2020). All specifications include origin and destination fixed effects. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

In Appendix F, Table F1 displays the results of the same analysis but this time using the share of trade flows. Although the coefficient corresponding to business visitors loses its statistical significance at the 10% level, it consistently maintains a positive value across all specifications.

5.6 Export probability

In this section, we test whether including business visitors provisions impacts the probability of exporting a product. For this purpose we use CEPII's BACI database. BACI reports bilateral trade flows at the six digit level of the Harmonized System nomenclature. Using this data we estimate the following equation:

$$ExportStatus_{ijkt} = \lambda + \alpha' c_{ijt} + \beta' m_{ijt} + \epsilon_{ijt}, \quad (8)$$

where λ is a set of fixed effect that varies in different specifications, $ExportStatus_{ijkt}$ is a dummy variable equal to 1 whenever the trade flow of product k between two countries is positive, c_{ijt} are the control variables, and m_{ijt} is the set of mobility variables.

Given the large number of observations, the variety of fixed effects, and the period covered by BACI, we keep only three years of data: 1996, 2005 and 2014. These three years yield more 600 millions of observations. This also justifies estimating equation (8) with OLS. Table 6 reports the results. Note that we add a variety of additional fixed effects including country-pair-product and country-year-product fixed effects. In all seven tested specifications the coefficient

for business visitors provisions is positive and statistically significant at the 5% level. The dummy for the inclusion of these provisions in dispute settlement mechanism is also always positive but statistically significant at the 10% level in only one specification. On average, across specifications, business mobility provisions increase the probability of exporting a given product by 7.8%.

Table 6: Effect of business visitors provisions on export probability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Free Trade Agreement	0.02614*** (0.006375)	0.02621*** (0.006384)	0.02614*** (0.006375)	0.02621*** (0.006384)	0.02126*** (0.003455)	0.02129*** (0.003455)	0.02126*** (0.003455)
Entry of Business Visitors	0.1286*** (0.0349)	0.06818** (0.02142)	0.1286*** (0.0349)	0.06818** (0.02142)	0.06008*** (0.0104)	0.03268*** (0.01165)	0.06008*** (0.0104)
Entry of Business Visitors, disp. set.		0.07412 (0.04597)		0.07412 (0.04597)		0.0369* (0.01508)	
Ln. Dist.	-0.01589*** (0.002125)	-0.01585*** (0.002121)	-0.01589*** (0.002125)	-0.01585*** (0.002121)			
Common border	0.09795*** (0.01295)	0.09778*** (0.01296)	0.09795*** (0.01295)	0.09778*** (0.01296)			
Common official language	0.01131*** (0.002621)	0.01122*** (0.002625)	0.01131*** (0.002621)	0.01122*** (0.002625)			
Free mobility of persons	0.2322*** (0.02942)	0.2323*** (0.02942)	0.2322*** (0.02942)	0.2323*** (0.02942)	0.06722*** (0.01458)	0.0672*** (0.01458)	0.06722*** (0.01458)
Pair Fixed Effects	No	No	No	No	Yes	Yes	Yes
Pair-HS6 Fixed Effects	No	No	No	No	No	No	No
Country-Year Fixed Effects	Yes	Yes	No	No	Yes	Yes	No
Country-Year-HS6 Fixed Effects	No	No	Yes	Yes	No	No	Yes
R2	0.21675	0.21678	0.36451	0.32852	0.32852	0.32853	0.47716
Observations	630,820,064	630,820,064	630,820,064	630,820,064	633,702,668	633,702,668	633,702,668

Note: The dependent variable is dummy variable equal to 1 whenever the trade flow of product k between two countries is positive. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

5.7 Product level analysis

In this section we examine the impact of business visitors provisions on trade flows at the product level. For this purpose we estimate the following equation:

$$X_{i,j,k,t} = \exp(\lambda_{it} + \lambda_{jt} + \lambda_{ij} + \lambda_{kt} + \alpha'c_{ijt} + \beta'm_{ijt}) \times \chi_{ijt}, \quad (9)$$

where $X_{i,j,k,t}$ is the trade flow of product k between countries i and j at time t . k is a product code at the six-digit level of the Harmonized System nomenclature. The other variables are the same as in the main gravity model of equation (6). We estimate equation (9) using the PPML estimator. All specifications include country-year-product fixed effects.

To reduce the computational burden, we restricted the sample to countries that have, at some point, signed FTAs containing provisions facilitating the entry of business visitors. It is important to note that not all FTAs in the sample include these provisions, as most countries in the sample have signed multiple FTAs that do not contain such provisions. The sample includes data collected every three years from 1996 to 2014, resulting in a final dataset with over 8.5 million observations.

Table 7 presents the results. The table shows that the coefficient associated with the inclusion of provisions facilitating the entry of business visitors is positive across all four specifications. Moreover, it is statistically significant at the 10% level in three of the specifications, including the most demanding ones that incorporate country-year-product and country pair fixed effects.

Table 7: Effect of business visitors provisions at the HS six digit level: PPML

	Flow			
	(1)	(2)	(3)	(4)
Free Trade Agreement	0.285 ^a (0.033)	0.284 ^a (0.034)	0.043 (0.039)	0.042 (0.038)
Entry of Business Visitors	0.118 (0.156)	0.137 ^a (0.052)	0.142 ^c (0.075)	0.170 ^a (0.043)
Entry of Business Visitors, disp. settlement		-0.026 (0.185)		-0.051 (0.105)
Free mobility of persons	2.568 ^a (0.182)	2.567 ^a (0.181)		
Ln. Dist.	-0.716 ^a (0.099)	-0.717 ^a (0.100)		
Common border	1.278 ^a (0.288)	1.282 ^a (0.300)		
Common official language	0.201 ^c (0.120)	0.203 ^c (0.115)		
Common currency	-0.161 (0.212)	-0.163 (0.215)		
Observations	13,802,278	13,802,278	13,802,278	13,802,278
Pseudo R ²	0.96667	0.96667	0.97285	0.97285
Country-Year-Product fixed effects	Yes	Yes	Yes	Yes
Country Pair fixed effects			Yes	Yes

Note: The dependent variable is the trade flow between origin and destination at the six digit level of the HS classification. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

5.8 Homogeneous vs differentiated products

In this section, we examine whether the impact of business visitor provisions on trade flows differs between homogeneous and differentiated products. If business travel helps reduce information frictions, we would expect the impact of these provisions to be greater for differentiated products, which typically require more detailed information. To investigate this, we use the classification system proposed by Rauch (1999), which categorizes products based on the Standard International Trade Classification (SITC). Products are divided into three categories: organized exchange, reference priced, and differentiated commodities. The organized exchange and reference priced categories are similar; the former includes commodities traded on centralized markets where prices are set, while the latter consists of products with reference prices listed in trade publications. Products that do not fall under the organized exchange or reference priced categories are considered differentiated products.

We group together the referenced priced and organized exchange categories as both pertain to homogeneous products. The remaining products are classified as differentiated products. As in the previous section, to reduce the computational burden, we restricted the sample to countries that have, at some point, signed FTAs containing provisions facilitating the entry of business

visitors. We then estimate 9 but this time k is a product code at the four-digit level of the SITC instead of a six-digit code of the HS classification. We also include an interaction term between the business visitors provisions dummy and the dummy for differentiated products. We estimate the equation using the PPML estimator. All specifications include country-year fixed effects. Table 8 reports the results. The table shows that the coefficient for the interaction term between business visitors provisions and differentiated products is positive and statistically significant at the 10% level in all specifications. This result suggests that the impact of business visitors provisions on trade flows is larger for differentiated products.

Table 8: Gravity Regression Results. Rausch's product classification

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.182 ^a (0.061)	0.208 ^a (0.062)	-0.022 (0.061)	-0.039 (0.060)
Differentiated product dummy				
Entry of Business Visitors	0.467 ^a (0.157)	0.336 ^b (0.154)	-0.044 (0.153)	-0.107 (0.152)
Entry of Bus. Visitors × Diff. product dummy	0.326 ^c (0.181)	0.452 ^b (0.192)	0.341 ^c (0.181)	0.423 ^b (0.191)
Full Labor Mobility	0.810 ^a (0.122)	0.722 ^a (0.120)	0.238 ^a (0.061)	0.223 ^a (0.061)
Ln. Dist.	-0.354 ^a (0.044)	-0.399 ^a (0.043)		
Common border	0.563 ^a (0.081)	0.558 ^a (0.081)		
Common official language	0.116 ^c (0.063)	0.165 ^a (0.062)		
Common currency	-0.359 ^c (0.183)	-0.409 ^b (0.185)		
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
SITC Code Fixed Effects	No	Yes	No	Yes
Pseudo-R2	0.333	0.615	0.368	0.649
Observations	9000287	9000287	8997085	8997085

Note: The dependent variable is the trade flow at the four digits level of the SITC between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. All columns include product-year fixed effects. Statistically significant at ^c 10% ^b 5% ^a 1%.

5.9 Permanent migration

Finally we test whether the observed increase in bilateral trade flows could be explained by an increase in permanent migration flows. Indeed, a vast literature has demonstrated the trade-creating effect of migration (e.g. Combes et al., 2005; Bahar and Rapoport, 2018; Parsons and Vézina, 2018; Bahar et al., 2019). While the objective of business visitors provisions in FTAs is to facilitate short term visits for business purposes, these clauses could potentially be used to permanently migrate. To test this, we estimate again equation (6) but replacing trade flows with migration flows.

Table 9 reports the results when using OECD data for migration flows. These OECD data cover inflows and outflows of migrants in member countries for the 2000-2015 period. Table 10 shows the results when using World Bank's data instead. WB data cover a longer period, 1960 to 2010, and most countries in the world. However, migration flows are constructed as changes in migration stocks, which is an imperfect proxy for true flows. In any event, in none of the specifications, either the variable for business visitors provisions or for their inclusion in dispute settlement mechanisms, is statistically significant at the 10% level.

Table 9: Effect on business visitors provisions on migration flows (MigrationDataOecd)

	(1)	(2)	(3)	(4)
Free Trade Agreement	-0.025 (0.123)	-0.024 (0.123)	-0.084 (0.112)	-0.084 (0.112)
Entry of Business Visitors	-0.227 (0.399)	0.052 (0.493)	-0.156 (0.219)	-0.118 (0.171)
Entry of Business Visitors, disp. settlement		-0.293 (0.608)		-0.048 (0.319)
Free mobility of persons	0.229 (0.249)	0.227 (0.249)	0.910 ^a (0.197)	0.910 ^a (0.197)
Ln. Dist.	-1.040 ^a (0.065)	-1.041 ^a (0.065)		
Common border	0.327 ^c (0.171)	0.331 ^c (0.170)		
Common official language	1.307 ^a (0.115)	1.307 ^a (0.115)		
Common currency	-0.241 (0.168)	-0.242 (0.168)	-0.127 (0.149)	-0.127 (0.149)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.834	0.834	0.980	0.980
Observations	59991	59991	59612	59612

Note: The dependent variable is the migration flow between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

5.10 Falsification tests

In this section, we present the results of the two falsification tests. In a first placebo exercise, we randomly assign the Entry of Business Visitors dummy variable to different pair of countries and re-estimate the model. We repeat this process 1000 times to obtain the distribution of the estimated coefficients. The results are presented in Figure 4. The figure shows that the estimated coefficients are close to zero, which confirms the robustness of the results presented in the main specification (i.e. Table 1).

Note that this falsification test is a very demanding test because we mimic the actual distribution of the Entry of Business Visitors dummy. To do this, for a given pair of countries that have an FTA with Entry of Business Visitors provisions, we randomly assign a pair of countries

Table 10: Effect on business visitors provisions on migration flows (WBMigrationFlows)

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.564 ^a (0.120)	0.565 ^a (0.120)	0.064 (0.071)	0.064 (0.071)
Entry of Business Visitors	0.371 (0.271)	-0.197 (0.684)	-0.002 (0.191)	0.138 (0.162)
Entry of Business Visitors, disp. settlement		0.588 (0.723)		-0.153 (0.249)
Free mobility of persons	-1.947 ^a (0.255)	-1.946 ^a (0.255)	0.436 ^b (0.173)	0.436 ^b (0.173)
Ln. Dist.	-1.299 ^a (0.057)	-1.299 ^a (0.057)		
Common border	0.769 ^a (0.113)	0.769 ^a (0.113)		
Common official language	0.995 ^a (0.099)	0.995 ^a (0.099)		
Common currency	0.954 ^a (0.157)	0.955 ^a (0.157)	-0.027 (0.139)	-0.027 (0.139)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.856	0.856	0.978	0.978
Observations	59808	59808	53168	53168

Note: The dependent variable is the migration flow between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

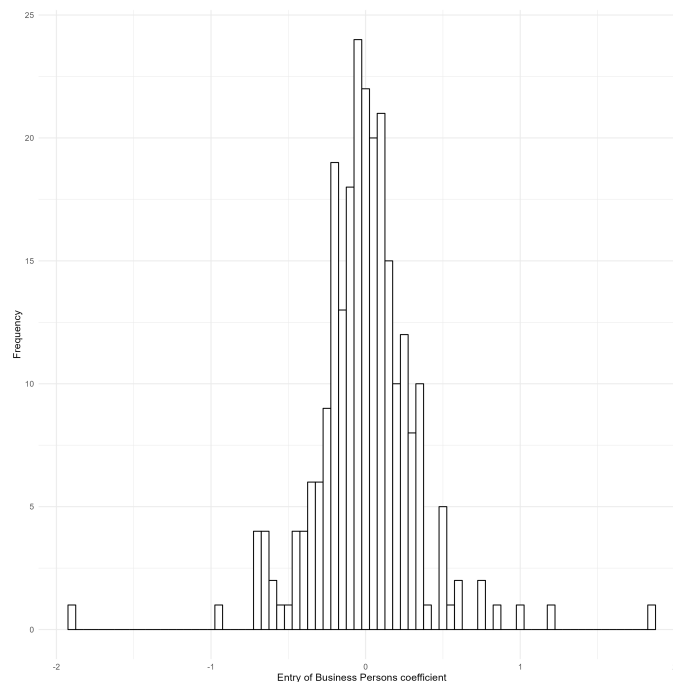


Figure 4: Falsification tests with random Entry of Business Visitors dummies

that do not have an FTA with Entry of Business Visitors provisions. The length of the business visitors remains the same as in the original data.

As an additional robustness check, we test whether the mean of the estimated coefficients is significantly different from zero. We find that the mean of the estimated coefficients is -0.006 . The large p-value of the t test, 0.76 , allows us to reject the hypothesis that the true mean is different from zero at the 0.1% level. This result is consistent with the results presented in the main text.

As a second placebo exercise, we discuss the outcomes of an additional falsification test involving a false Business Visitors dummy, specifically for one and two years before the Free Trade Agreement (FTA). The results, as displayed in Table 11, reveal that these proxies—representing years one and two prior to the FTA—are not statistically significant at the 10% level. In contrast, the Entry of Business Visitors dummy retains its statistical significance at the same confidence level. This finding underscores the reliability of our results, reinforcing their robustness.

Table 11: Placebo Test: Anticipation of Entry of Business Visitors

Dependent Variable: Model:	Flow	
	(1)	(2)
<i>Variables</i>		
Free Trade Agreement	-0.0377 (0.0669)	-0.0375 (0.0670)
Entry of Business Visitors	0.1532 ^c (0.0811)	0.1593 ^c (0.0852)
Free mobility of persons	0.3730 ^a (0.0903)	0.3728 ^a (0.0904)
Entry of Business Visitors 1 year prior to the agreement	0.0651 (0.0575)	
Entry of Business Visitors, 2 years prior to the agreement		0.0666 (0.0612)
<i>Fixed-effects</i>		
IsoO-Year	Yes	Yes
IsoD-Year	Yes	Yes
IsoO-IsoD	Yes	Yes
<i>Fit statistics</i>		
Observations	965,740	965,740
Squared Correlation	0.99036	0.99036
Pseudo R ²	0.98914	0.98914
BIC	2.16×10^{13}	2.16×10^{13}

Clustered (IsoO & IsoD) standard-errors in parentheses
Signif. Codes: a: 0.01, b: 0.05, c: 0.1

6 Conclusion

Many of the measures taken to control the Covid-19 pandemic severely reduced the movement of business people. We use provisions that ease business visitors entry in trade agreements to examine the importance of business travel for international trade.

We begin by documenting the increasing number and complexity of trade agreements. 116 trade agreements were signed in the past decade alone, the average length of the texts was multiplied by 5 and the number of included topics doubled since the 1960s.

To study this vast amount of text we develop an algorithm that combines machine learning and text analysis techniques. The algorithm identifies whether a topic is covered and determines then if it is included in dispute settlement mechanisms. This innovative algorithmic approach represents a significant leap forward in the analysis of FTAs by increasing the efficiency and scope of future research in this field. In this paper, this tool allows us to show, in a systematized way, the increasing role of trade agreements in the regulation of the movement of business people across the globe. To assess the algorithm's accuracy, we apply it to identify all the topics covered by the hand-coded "Content of Deep Trade Agreements" World Bank's database and compare the results. The results on whether an agreement contains a topic or not overlap in over 80% of cases.

We then show that provisions easing business travel increase the intensity of business travel without having any impact on permanent migration flows. We also show that easing business travel increases bilateral trade flows and the probability to export a product. The results are robust to controlling for the depth of the agreement measured as the number of topics covered or the length of the text. In our preferred specifications, these provisions increase trade flows by 11% and the probability to export a given product by 6%. In this context, we provide evidence demonstrating the impact of face-to-face interactions on overall bilateral trade flows.

Improving our understanding of the channels that are at play during face-to-face meetings and why they are particularly important for international trade are interesting avenues for future research.

Finally, recall that we use the algorithm developed for this paper to identify topics related to the movement of people and demonstrate its usefulness. One could imagine using this algorithm to study other research questions. One could envision using it to study topics that have or have not been previously hand-coded in bilateral agreements (FTAs or else) as well as, most obviously, to analyze the content of new trade agreements. Of course, hand-coding by legal scholars remains the first best practice, however algorithmic coding can represent a cost-effective substitute in some instances.

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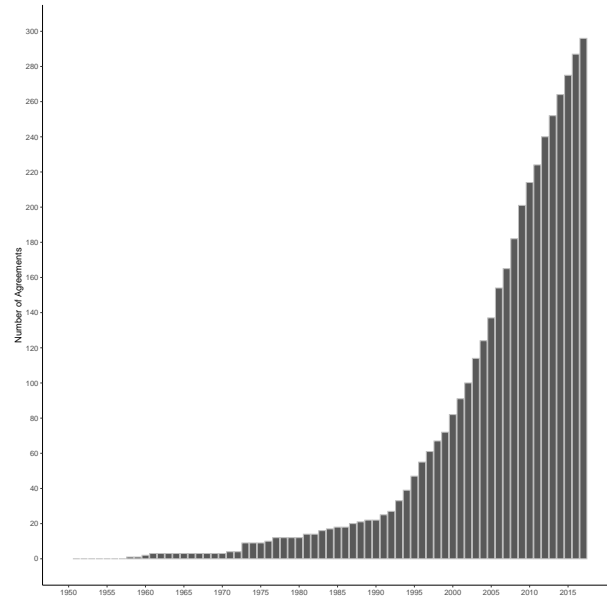
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Appendices

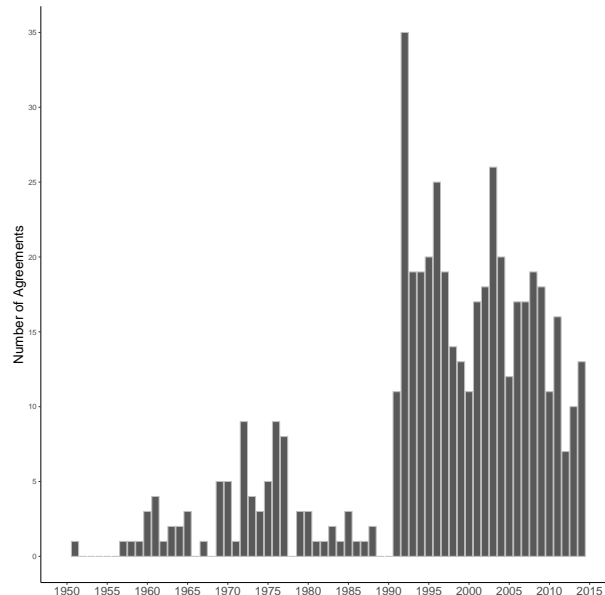
A Number of FTAs in force

Figure A5: Evolution of the number of FTAs over time



(a) Number of FTAs in force

Note: panel (a) shows the total number of FTAs notified to the WTO and in force in 2015 by entry into force year. Based on WTO's RTA database.



(b) Number of FTAs signed

Note: panel (b) shows the total number of FTAs notified to the WTO by signature year. Both currently active and inactive FTAs are included. Based on WTO's RTA database.

B Percentage of agreements identically identified

Figure B1: Percentage of all international trade taking place between countries with a FTA, covered by FTAs identically coded by the WB and the algorithm for a given minimum number of topics in 2012

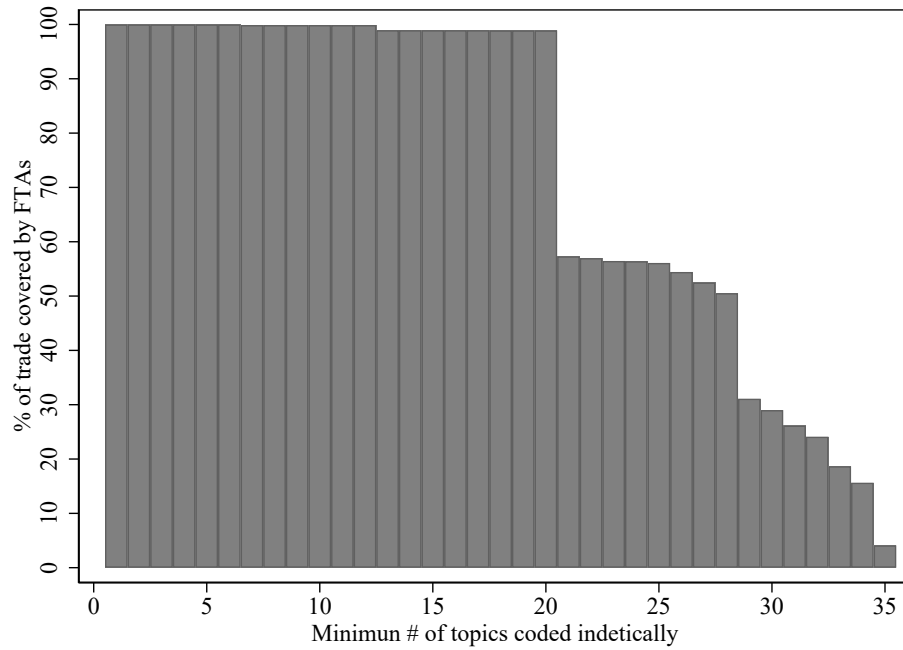


Figure B2: Percentage of agreements identified by FTA coder as treating a given topic among the agreements coded by WB as treating that same topic.

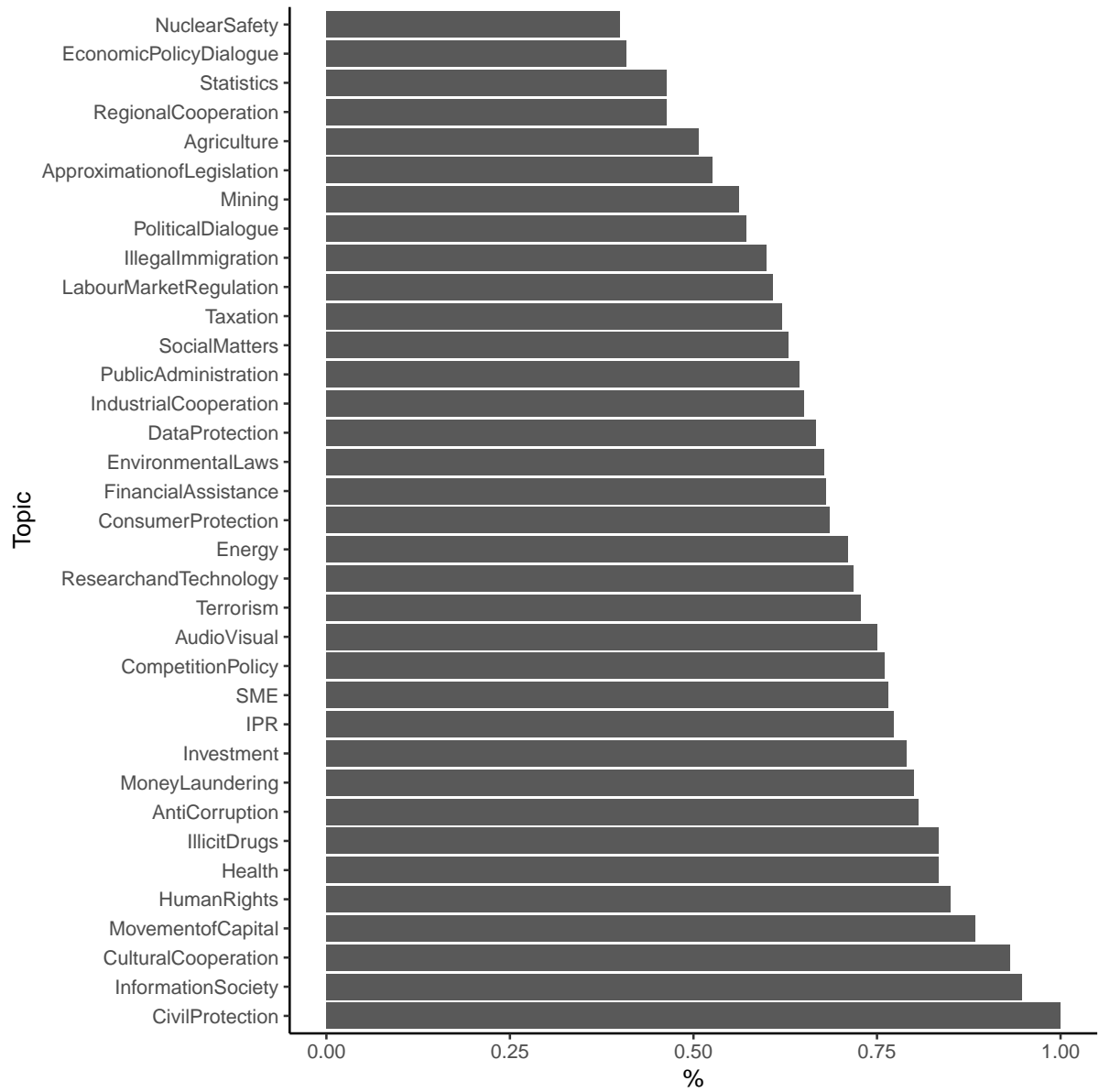
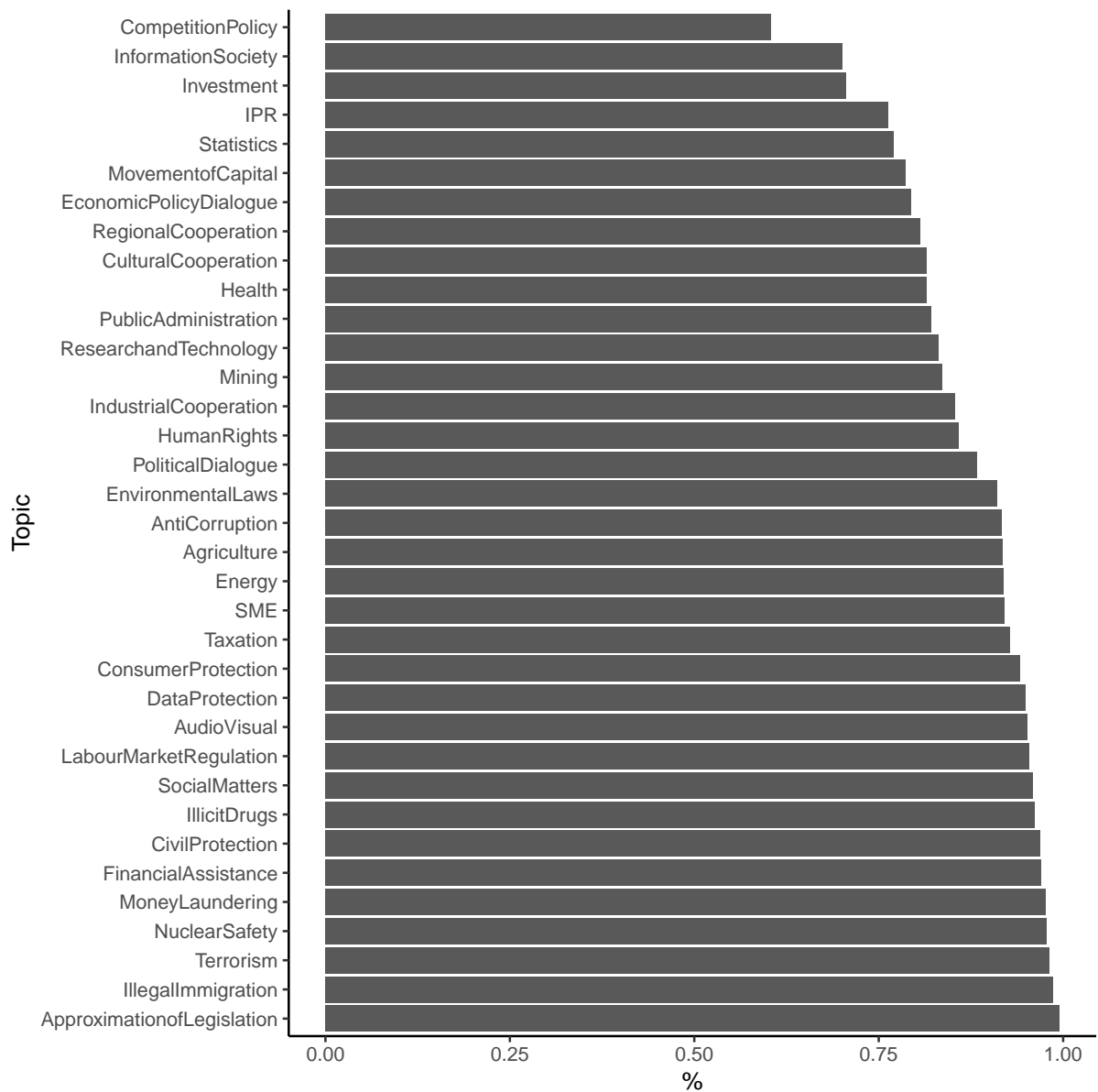


Figure B3: Percentage of agreements identified by FTA coder as not treating a given topic among the agreements coded by WB as not treating that same topic.



C Differences between World Bank's database and the algorithm results for the Nuclear Safety topic

This section lists the differences between World Bank's database and the algorithm results for the Nuclear Safety topic. It illustrates the advantages but also the limitations of the algorithm.

The differences are divided into two categories: FTAs identified by the World Bank as covering the topic but not by the algorithm (subsection C.1) and; FTAs identified by the algorithm as covering the topic but not by the World Bank (subsection C.2). We briefly describe the reasons for these differences and provide the relevant text from the agreements.

C.1 FTAs identified by WB as covering the topic but not by the algorithm

1. Canada - Chile

The agreement does mention nuclear weapons but only in the Exceptions chapter. Therefore, the mention is there only to state that nuclear weapons are not covered by the agreement (Chapter I Telecommunications, article O-02 National Security):

1. Nothing in this Agreement shall be construed: (...) (iii) relating to the implementation of national policies or international agreements respecting the non-proliferation of nuclear weapons or other nuclear explosive devices;

2. Caricom

While CARICOM countries have been very active in advocating for nuclear disarmament and limiting the transport of nuclear materials through the Caribbean Sea, we find no mention of nuclear matters in the agreement.

3. Chile - China

We do not find any mention of nuclear matters in the text of the agreement between Chile and China.

4. EC - FYR Macedonia

The only mention of nuclear matters in the agreement excludes them from the scope of the agreement by specifying that these matters are covered by the Euratom Treaty European Atomic Energy Community. The relevant text is the following:

Chapter I (Industrial Products), article 3:

1. The provisions of this Chapter shall apply to products originating in the Community or the former Yugoslav Republic of Macedonia listed in chapters 25 to 97 of the combined nomenclature, with the exception of the products listed in Annex I paragraph 1, (ii) of the Agreement on agriculture (GATT 1994).
2. The provisions of Articles 4 and 5 shall neither apply to textile products nor to steel products, as specified in Articles 9 and 10.
3. Trade between the Parties in products covered by the Treaty establishing the European Atomic Energy Community shall be conducted in accordance with the provisions of that Treaty.

5. NAFTA

In NAFTA, nuclear matters are mentioned in two different articles. However, these articles do not fall under the definition of nuclear safety:

Article 607: National Security Measures

Subject to Annex 607, no Party may adopt or maintain a measure restricting imports of an energy or basic petrochemical good from, or exports of an energy or basic petrochemical good to, another Party under Article XXI of the GATT or under Article 2102 (National Security), except to the extent necessary to:

- (...) c) implement national policies or international agreements relating to the nonproliferation of nuclear weapons or other nuclear explosive devices; or
- d) respond to direct threats of disruption in the supply of nuclear materials for defense purposes.

Or in the article 2102 (National Security) of the Exceptions chapter:

1. Subject to Articles 607 (Energy - National Security Measures) and 1018 (Government Procurement Exceptions), nothing in this Agreement shall be construed: (...)
 - (iii) relating to the implementation of national policies or international agreements respecting the non-proliferation of nuclear weapons or other nuclear explosive devices;

C.2 FTAs identified by the the algorithm as covering the topic but not by WB

1. COMESA

The agreement mentions nuclear matters in two different articles: Chapter 17, article 128 and Chapter 16, article 122. The latter is the most relevant for the topic of nuclear safety. It states:

Chapter SIXTEEN Co-Operation In The Development Of Natural Resources, Environment And Wildlife, article 122 Scope And Principles Of Co-Operation:
4. The Member States undertake to co-operate and adopt common policies for the control of hazardous waste, nuclear materials, radioactive materials and any other materials used in the development or exploitation of nuclear energy.

2. EU - Albania

The agreement explicitly mentions nuclear safety in the following article:

Article 107: Energy Cooperation shall focus on priority areas related to the Community acquis in the field of energy, including nuclear safety aspects as appropriate. It shall reflect the principles of the market economy and it shall be based on the signed regional Energy Community Treaty with a view to the gradual integration of Albania into Europe's energy markets.

3. EU - Bosnia and Herzegovina

The agreement includes the same article from the EU - Albania agreement:

Article 107 states: Energy Cooperation shall focus on priority areas related to the Community acquis in the field of energy, including nuclear safety aspects as appropriate. It shall reflect the principles of the market economy and it shall be based on the signed regional Energy Community Treaty with a view to the gradual integration of Albania into Europe's energy markets.s.

4. EU - Overseas Countries and Territories

The treaty acknowledges the importance of correctly managing nuclear waste

(21) The OCTs are fragile island environments requiring adequate protection, including in respect of waste management. In respect of radioactive waste, this is provided under Article 198 of the Euratom Treaty and legislation adopted thereunder, except for Greenland, to which the Euratom Treaty does not apply.

For other waste, it should be specified which Community rules are to apply in respect of the OCTs.

5. EU - Central America

The agreement mentions nuclear matters in article 15 (Weapons Of Mass Destruction states) of PART II (Political Dialogue):

1. The Parties consider that the proliferation of nuclear, chemical and biological weapons of mass destruction and their means of delivery, both to State and non-State actors, represents one of the most serious threats to international stability and security.
2. The Parties therefore agree to cooperate and to contribute to countering the proliferation of weapons of mass destruction and their means of delivery, through full compliance with and national implementation of their existing obligations under international disarmament and non-proliferation treaties and agreements and other relevant international obligations.
3. The Parties agree that this provision constitutes an essential element of this Agreement.
4. The Parties furthermore agree to cooperate and to contribute to the objective of non-proliferation by:
 - (a) taking steps to sign, ratify or accede to, as appropriate, and fully implement and comply with all other relevant international instruments;
 - (b) establishing an effective system of national export controls controlling the export as well as transit of weapons of mass destruction related goods, including weapons of mass destruction end-use control on dual-use technologies and containing effective sanctions for breaches of export controls.
5. The Parties agree to establish a regular political dialogue that will accompany and consolidate their cooperation in this area.

It also covers the topic in article 76 (Scientific And Technological Cooperation) of TITLE IX (Knowledge Society):

TITLE IX Knowledge Society, : (j) promotion of training, research, development and applications of nuclear science and technology for medical applications enabling the transfer of technology to the Republics of the CA Party in areas such as health, particularly radiology and nuclear medicine for radiodiagnosis and radiotherapy treatment, and those areas that the Parties mutually agree to establish, in conformity with existing international conventions and regulations and submitting to the jurisdiction of the International Atomic Energy Agency.

6. EU - Ukraine

Given Ukraine's status as a former nuclear power and the fact that it is still a major producer of nuclear energy, the EU-Ukraine agreement contains numerous provisions on nuclear safety and security.

For example, chapter 1 Energy Cooperation, Including Nuclear Issues, article 337, states:

1. The Parties agree to continue and intensify their current cooperation on energy matters for the enhancement of energy security, competitiveness and sustainability, which is crucial for the promotion of economic growth and to making

progress towards market integration, including through gradual approximation in the energy sector and through participation in regional energy cooperation. The regulatory cooperation shall take into account the need to ensure relevant public service obligations, including measures to inform and protect customers from unfair selling practices, and access to affordable energy for consumers, including for the most vulnerable citizens.

2. Such cooperation shall be based on a comprehensive partnership and shall be guided by the principles of mutual interest, reciprocity, transparency and predictability, consistent with the market economy, the Energy Charter Treaty of 1994, the Memorandum of Understanding on cooperation in the field of energy and other multilateral and related bilateral agreements.

7. EU - Serbia

This agreement also includes several mentions of nuclear energy and nuclear safety in particular. Article 110 entitled Nuclear Safety from TITLE VIII (Cooperation Policies), covers the topic:

The Parties shall cooperate in the field of nuclear safety and safeguards. Cooperation could cover the following topics: (a) upgrading the laws and regulations of the Parties on radiation protection, nuclear safety and nuclear materials accountancy and control as well as strengthening the supervisory authorities and their resources; (b) encouraging the promotion of Agreements between Member States, or European Atomic Energy Community and Serbia on early notification and exchange of information in cases of nuclear accidents and on emergency preparedness and on nuclear safety issues in general, if appropriate; (c) promoting the implementation of the Convention on Nuclear Safety

8. East African Community

Article 111 (Environmental Issues And Natural Resources) of chapter NINETEEN (Co-Operation In Environment And Natural Resources Management) explicitly covers the topic:

Chapter NINETEEN Co-Operation In Environment And Natural Resources Management, article 111 Environmental Issues And Natural Resources, states: (c) undertake to co-operate and adopt common policies for control of trans-boundary movement of toxic and hazardous waste including nuclear materials and any other undesirable materials;

D Effect of business visitors provisions estimated using OLS

Table D1: Effect of business visitors provisions: OLS

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.684 ^a (0.036)	0.684 ^a (0.036)	0.283 ^a (0.025)	0.283 ^a (0.025)
Entry of Business Visitors	0.624 ^a (0.131)	0.607 ^b (0.262)	0.193 ^b (0.091)	-0.285 (0.176)
Entry of Business Visitors, disp. settlement		0.020 (0.296)		0.579 ^a (0.200)
Free mobility of persons	-0.844 ^a (0.072)	-0.844 ^a (0.072)	0.680 ^a (0.042)	0.680 ^a (0.042)
Ln. Dist.	-1.444 ^a (0.016)	-1.444 ^a (0.016)		
Common border	0.434 ^a (0.078)	0.434 ^a (0.078)		
Common official language	0.819 ^a (0.030)	0.819 ^a (0.030)		
Common currency	0.778 ^a (0.085)	0.778 ^a (0.085)	0.299 ^a (0.055)	0.299 ^a (0.055)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
R2	0.734	0.734	0.866	0.866
Observations	758141	758141	756345	756345

Note: The dependent variable is the trade flow between origin and destination. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

E EU and NAFTA/CUSFTA additional controls

Table E1: Controlling for EU/NAFTA

	(1)	(2)	(3)	(4)
Panel A: PPML including EU and CUSFTA/NAFTA as controls				
Free Trade Agreement	0.229 ^a (0.055)	0.227 ^a (0.055)	-0.073 (0.051)	-0.075 (0.051)
Entry of Business Visitors	0.203 (0.148)	0.553 ^a (0.123)	0.109 (0.089)	0.220 ^b (0.112)
Entry of Business Visitors, disp. settlement		-0.472 ^b (0.209)		-0.151 (0.149)
Free mobility of persons	0.062 (0.148)	0.061 (0.148)	0.047 (0.062)	0.049 (0.061)
European Union	0.162 (0.143)	0.163 (0.143)	0.433 ^a (0.083)	0.433 ^a (0.083)
CUSFTA/NAFTA	0.553 ^a (0.170)	0.663 ^a (0.195)	0.082 (0.105)	0.118 (0.116)
Pseudo-R2	0.945	0.945	0.989	0.989
Observations	930321	930321	929943	929943
Panel B: OLS including EU and CUSFTA/NAFTA as controls				
Free Trade Agreement	0.683 ^a (0.036)	0.683 ^a (0.036)	0.278 ^a (0.025)	0.279 ^a (0.025)
Entry of Business Visitors	0.782 ^a (0.116)	0.605 ^b (0.263)	0.242 ^b (0.096)	-0.283 (0.176)
Entry of Business Visitors, disp. settlement		0.213 (0.287)		0.649 ^a (0.204)
Free mobility of persons	-0.653 ^a (0.107)	-0.653 ^a (0.107)	0.542 ^a (0.069)	0.541 ^a (0.069)
European Union	-0.247 ^c (0.130)	-0.247 ^c (0.130)	0.197 ^b (0.079)	0.197 ^b (0.079)
CUSFTA/NAFTA	-0.513 (0.429)	-0.548 (0.429)	-0.146 (0.141)	-0.262 ^c (0.146)
R2	0.735	0.735	0.866	0.866
Observations	758141	758141	756345	756345
Panel C: PMML excluding NAFTA countries from the sample				
Free Trade Agreement	0.276 ^a (0.055)	0.276 ^a (0.055)	-0.078 (0.053)	-0.078 (0.053)
Entry of Business Visitors	0.630 ^a (0.131)	0.676 ^a (0.148)	0.209 ^b (0.102)	0.210 ^c (0.122)
Entry of Business Visitors, disp. settlement		-0.173 (0.277)		-0.007 (0.152)
Free mobility of persons	-0.096 (0.154)	-0.097 (0.154)	0.122 ^b (0.062)	0.123 ^b (0.062)
European Union	0.137 (0.153)	0.137 (0.153)	0.383 ^a (0.083)	0.383 ^a (0.083)
Pseudo-R2	0.935	0.935	0.987	0.987
Observations	883484	883484	883107	883107
Panel D: OLS excluding NAFTA countries from the sample				
Free Trade Agreement	0.679 ^a (0.037)	0.679 ^a (0.037)	0.288 ^a (0.026)	0.288 ^a (0.026)
Entry of Business Visitors	1.017 ^a (0.130)	0.901 ^a (0.342)	0.419 ^a (0.119)	-0.296 (0.240)
Entry of Business Visitors, disp. settlement		0.137 (0.365)		0.869 ^a (0.272)
Free mobility of persons	-0.639 ^a (0.108)	-0.639 ^a (0.108)	0.540 ^a (0.070)	0.540 ^a (0.070)
European Union	-0.244 ^c (0.131)	-0.244 ^c (0.131)	0.194 ^b (0.080)	0.194 ^b (0.080)
R2	0.723	0.723	0.860	0.860
Observations	714299	714299	712506	712506
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes

Note: the dependent variable is the trade flow (panels A and C) or the natural logarithm of the trade flow (panels B and D) between origin and destination. Columns (1) and (2) include distance, common border, common official language and common currency controls but are not shown for clarity of the presentation. Similarly, columns (3) and (4) include common currency as a control. Statistically significant at ^c 10% ^b 5% ^a 1%.

F PPML regressions for business trips

Table F1: Effect of business visitors provisions on Business Trips

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.040 (0.087)	-0.013 (0.087)	-0.014 (0.086)	0.166 ^b (0.081)
Entry of Business Visitors		0.221 (0.153)	0.111 (0.171)	0.141 (0.175)
Entry of Business Visitors, disp. settlement			0.118 (0.206)	-0.022 (0.209)
Ln. Dist.	-0.950 ^a (0.053)	-0.944 ^a (0.053)	-0.944 ^a (0.053)	-1.071 ^a (0.065)
Common border	0.089 (0.104)	0.071 (0.109)	0.070 (0.109)	0.012 (0.111)
Common official language	0.545 ^a (0.110)	0.548 ^a (0.111)	0.547 ^a (0.111)	0.529 ^a (0.106)
Common currency	-0.008 (0.110)	0.007 (0.110)	0.007 (0.111)	0.085 (0.110)
Free mobility of persons				-0.678 ^a (0.186)
Pair Fixed Effects	No	No	No	No
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.386	0.386	0.386	0.386
Observations	13105	13105	13105	13105

Note: The dependent variable is the share of the average number of business trips between 2011 and 2016 from country *i* to country *j* as computed in variable as computed in Coscia et al. (2020). All specifications include origin and destination fixed effects. Standard errors in parentheses are robust and clustered at country pair level. All columns include origin and destination fixed effects. Statistically significant at ^c 10% ^b 5% ^a 1%.

Free Trade Agreements and the movement of business people: appendix for online publication

September 3, 2024

Abstract

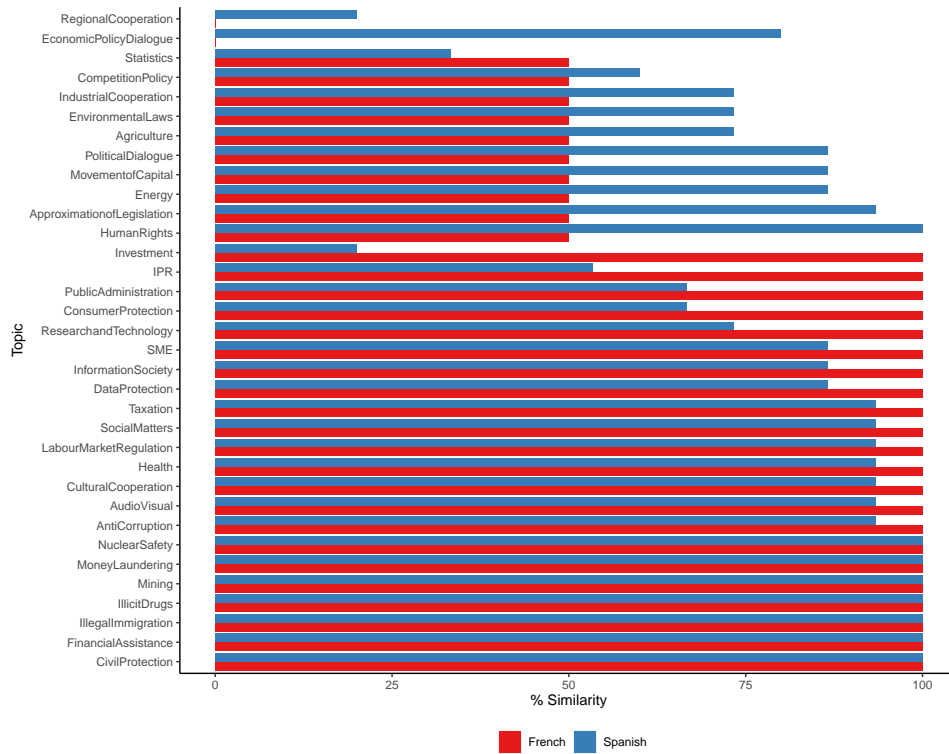
Using provisions to ease the movement of business visitors in trade agreements, we show that removing barriers to the movement of business people promotes trade. We document the increasing complexity of Free Trade Agreements and develop an algorithm that combines machine learning and text analysis techniques to examine the content of FTAs. We use the algorithm to determine which FTAs include provisions to facilitate the movement of business people and whether these are included in dispute settlement mechanisms. We show that provisions facilitating business travel are effective in promoting them and eventually increase bilateral trade flows.

1 Performance of the algorithm for different languages

In this section, we examine the algorithm's performance across different languages. In the original corpus of FTAs, we identified 424 FTAs in English, 23 in Spanish, and only 2 in French. After merging the results of the algorithm with WB's data, we are left with 198 FTAs in English, 15 in Spanish, and 2 in French. To evaluate the algorithm's performance across different languages, we compare the coding results for the 15 FTAs in Spanish and the 2 FTAs in French with the results for the 198 FTAs in English. The comparison is based on the percentage of FTAs coded identically for each topic.

Figure 1 illustrates the very close coding percentages for each topic in Spanish and French. These results can be compared with those for all languages combined, as shown in Figure 2b of the main text. The comparison reveals slightly higher percentages for Spanish at 81% compared to 79% for French. This consistency with the main text demonstrates the algorithm's robustness across different linguistic contexts.

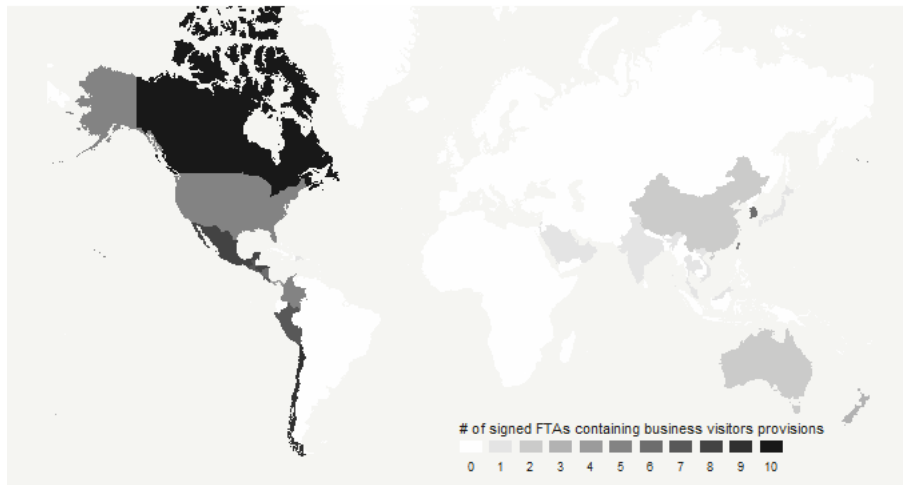
Figure 1: Percentage of FTAs coded identically for each topic: results for FTAs in Spanish and French



2 Geographical distribution of FTAs with business visitors entry provisions

This section presents the geographical distribution of FTAs with business visitors entry provisions. The map in Figure 2 shows which countries have signed FTAs with business visitors entry provisions. Most of these agreements involve countries in North and South America. Some countries in Asia and Oceania have also signed trade agreements with such provisions.

Figure 2: Geographical distribution of FTAs with business visitors entry provisions

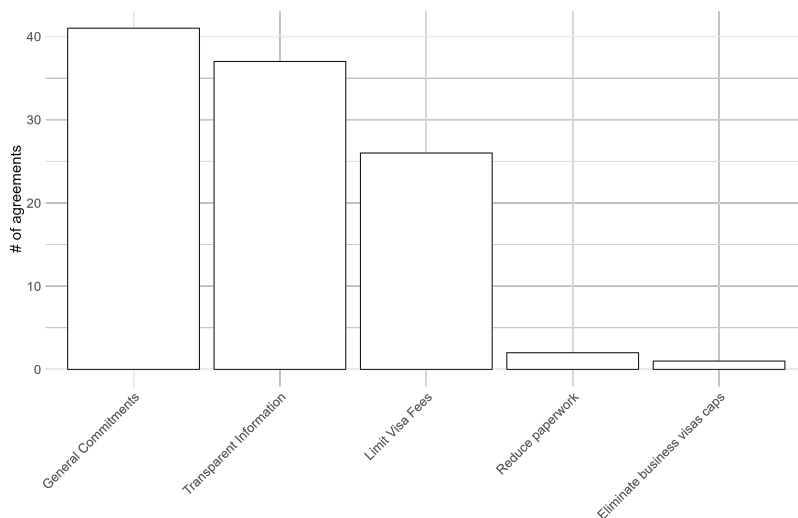


Notes: this map is based on the database obtained using the algorithm described in this paper. The EU is colored white because, despite the free mobility of EU citizens, it has not signed any FTAs including provisions to ease the movement of business people.

3 Categories of Business Visitors Provisions in FTAs

Figure 3 below shows the number of business visitors provisions by type. The figure shows that the most common type of provision is general commitments, followed by providing transparent information. The figure also shows that the least common type of provision is eliminating business visa caps. The figure provides a comprehensive overview of the categories of Business Visitors provisions in FTAs.

Figure 3: Number of business visitors provisions by type



Notes: this figure shows the number of business visitors provisions by type. We use the algorithm to identify FTAs containing business visitors provisions.

Table 1 displays summary statistics for the row sums of the five categories of provisions. The table shows that the minimum number of categories is one, while the maximum is five. The median and mean number of categories are three, with the first and third quartiles also equal to three.

Table 1: Summary of Row Sums for Categories of Business Visitors Provisions in PTAs

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
1	2	3	3	3	5

Finally, Table 2 below presents the categories of Business Visitors provisions by FTA. The table shows that the only FTA with all five categories is the North American Free Trade Agreement (NAFTA). The table also shows that the most common categories are providing transparent information and general commitments. The table provides a comprehensive overview of the categories of Business Visitors provisions in FTAs.

4 PPML in shares excluding the largest shares

Hillrichs and Vannoorenbergh (2022) show that a few very large trade share can drive the results of the PPML in shares. To address this issue, we estimate the PPML in shares excluding the largest shares. Table 3 in excludes trade shares larger than 60% from the estimation sample. The results are very similar to those of Table 2 in the main text both in the magnitude and statistical significance of the coefficients associated with business visitors provisions.

Table 2: Categories of Business Visitors Provisions by FTAs

Name	Reduce paperwork	Transparent Information	Limit Visa Fees	Eliminate business visas caps	General Commitments
Australia - Chile		X	X		X
Canada - Chile		X	X		X
Canada - Colombia		X	X		X
Canada - Honduras					X
Canada - Israel					X
Canada - Panama		X	X		X
Canada - Peru		X	X		X
Canada - Rep. of Korea		X	X		X
Canada - US Free Trade Agreement (CUSFTA)		X	X		X
Chile - Central America		X			X
Chile - Colombia		X	X		X
Chile - Mexico		X	X		X
China - Costa Rica		X			X
Colombia - Mexico		X	X		X
Colombia - Northern Triangle (El Salvador, Guatemala, Honduras)		X			X
Costa Rica - Mexico		X			X
Costa Rica - Peru	X	X			X
Dominican Republic - Central America		X	X		X
El Salvador - Honduras - Chinese Taipei		X			X
Guatemala - Chinese Taipei		X			X
Gulf Cooperation Council (GCC) - Singapore					X
India - Thailand					X
Korea, Republic of - Chile		X			X
Korea, Republic of - Colombia		X	X		X
Korea, Republic of - Singapore		X			X
Mexico - Central America		X	X		X
Mexico - Nicaragua		X	X		X
Mexico - Northern Triangle		X	X		X
New Zealand - Chinese Taipei		X	X		X
Nicaragua - Chinese Taipei		X	X		X
North American Free Trade Agreement (NAFTA)	X	X	X	X	X
Panama - Central America		X	X		X
Panama - Chinese Taipei		X	X		X
Panama - Peru		X			X
Peru - Chile		X	X		X
Peru - China		X	X		X
Peru - Korea, Republic of		X			X
Rep. of Korea - New Zealand		X	X		X
Trans-Pacific Partnership		X	X		X
US - Chile		X	X		X
US - Singapore		X	X		X

Note: The table shows the categories of business visitors provisions by FTA. All FTAs in the text corpus provided by Alschner et al. (2017) were analyzed.

Table 3: Effect of business visitors provisions: PPML in shares

	(1)	(2)	(3)	(4)
Free Trade Agreement	0.382 ^a	0.382 ^a	0.025	0.025
	(0.046)	(0.046)	(0.027)	(0.027)
Entry of Business Visitors	0.163	0.541 ^a	0.210 ^a	0.341 ^a
	(0.100)	(0.164)	(0.065)	(0.123)
Entry of Business Visitors, disp. settlement		-0.430 ^b		-0.156
		(0.186)		(0.132)
Free mobility of persons	-0.580 ^a	-0.580 ^a	0.535 ^a	0.535 ^a
	(0.072)	(0.072)	(0.046)	(0.046)
Ln. Dist.	-1.065 ^a	-1.065 ^a		
	(0.026)	(0.026)		
Common border	0.232 ^a	0.233 ^a		
	(0.060)	(0.060)		
Common official language	0.829 ^a	0.829 ^a		
	(0.059)	(0.059)		
Common currency	0.370 ^a	0.370 ^a	0.272 ^a	0.272 ^a
	(0.099)	(0.099)	(0.041)	(0.041)
Pair Fixed Effects	No	No	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Pseudo-R2	0.302	0.302	0.364	0.364
Min. Dep. Var.	0.000	0.000	0.000	0.000
Max. Dep. Var.	0.600	0.600	0.600	0.600
Mean Dep. Var	0.008	0.008	0.008	0.008
Observations	5	929305	928924	928924

Note: The dependent variable is the trade flow share between origin and destination countries. Trade shares larger than 60% were dropped from the estimation sample. Standard errors in parentheses are robust and clustered at country pair level. Statistically significant at ^c 10% ^b 5% ^a 1%.

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