

Horizontal Depth

A New Database on the Content of Preferential Trade Agreements

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Abstract

Preferential trade agreements are an important feature of the global trade system. Several questions, ranging from the rationale for preferential arrangements to their impact on members, non-members and the broader multilateral trade system, are at the forefront of academic and policy debates in trade policy. This paper contributes to the literature in two ways. First, it presents a new database that offers a detailed assessment of the content of preferential arrangements, examining the coverage and legal enforceability of provisions. The database covers 279 agreements signed by 189 countries between 1958 and 2015, which reflects the entire set of preferential trade agreements in force and notified to the World Trade Organization as of 2015. Second, the paper presents some novel stylized facts on preferential

arrangements based on the analysis of the data. The key insight is that preferential trade agreements became deeper over time. A growing number of these treaties cover an extended set of policy areas, frequently with legally enforceable provisions, in areas under the current World Trade Organization mandate and in four leading areas outside the current World Trade Organization mandate: competition policy, investment, movements of capital, and intellectual property rights protection. Accounting for the changing coverage of preferential trade agreements, that is, their “horizontal depth,” is essential to gain a more complete and accurate understanding of where the global trading system is going and how its governance can be improved.

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Horizontal Depth: A New Database on the Content of Preferential Trade Agreements¹

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1. Introduction

The number of Preferential Trade Agreements (PTAs) has increased dramatically in the last quarter century.² While 50 trade agreements were in force and notified to the WTO in 1990, the number increased to 279 by the end of 2015. This dramatic change has spurred a large debate among researchers and policy makers on the rationale for preferential arrangements, their impact on trade flows, growth and welfare of member and non-member countries, as well as their relationship with the broader system of global trade governance. Many questions have emerged, including the following: Do PTAs allow members to commit their trade policy and internalize cross-border policy spillovers? Do they create more than divert trade? Do they serve as building blocks or stumbling blocks of the multilateral trading system? A large body of literature has been devoted to investigate these and other issues.³

An often overlooked factor in this debate is that, alongside their increasing number, the content of PTAs has changed over time. While before the 1990s trade arrangements mostly focused on tariff reductions, more recent PTAs include a set of provisions covering policy areas that go well beyond this. Specifically, a number of recent studies (e.g. Horn, Mavroidis and Sapir, 2010; WTO, 2011) document how many trade agreements cover regulatory issues, such as services, intellectual property rights protection, investment, and competition policy, among others. Thus, abstracting from the expanding coverage of trade agreements will lead to inaccurate and/or incomplete answers to the questions posed above on the rationale and effects of trade agreements. In particular, the lack of systematic information on the content of PTAs limits the possibility of addressing those questions with the proper tools of economics.

The primary purpose of this study is to analyze in detail the content of PTAs as an essential step to inform the debate on their rationale and impact. Building on the methodology developed by Horn, Mavroidis and Sapir (2010), we collected information for all PTAs in force and notified to the WTO in 2015. Specifically, the database contains information on the inclusion of 52 policy areas and their legal enforceability in 279 PTAs among 189 countries.⁴ To our knowledge, this database offers the most comprehensive data available in terms of the number of trade agreements, countries and policy areas covered.⁵

Some novel stylized facts emerge from the analysis of the new data on PTAs. First, the new database can inform on the changing content of PTAs. In addition to tariff reductions, more than half of the PTAs in the database include legally enforceable regulations in some policy areas that fall under the current mandate of WTO. These provisions (referred to as “WTO plus” or “WTO+” in the literature) include areas such as customs regulations, export taxes, anti-dumping, countervailing measures, technical barriers to trade (TBT), or sanitary and phytosanitary standards (SPS), among others. Provisions outside the WTO mandate (usually called “WTO extra” or “WTO-X”) include a wide-ranging set of policy areas from investment to

² Note that the term PTAs will be used throughout the paper and is preferred to the term ‘regional trade agreements (RTAs)’ since some of these agreements are not necessarily between countries within the same region or in regional proximity.

³ Recent surveys include Freund and Ornelas (2010), WTO (2011), and Limao (2016).

⁴ The full list of provisions and trade agreements are reported in Tables 1 and Appendix Table 3 and discussed in detail in Section 2. The database is freely available on the World Bank website. The data can be accessed at: <http://data.worldbank.org/data-catalog/deep-trade-agreements>.

⁵ There are two main limitations in terms of coverage. First, we have no information on trade agreements no longer in force. Second, PTAs that are not notified to the WTO are not included here. We come back to this and other issues for future research in the Conclusion.

environmental laws, or to nuclear safety. Legally enforceable WTO-X provisions are included in more than one-third of PTAs.

PTA provisions can be disaggregated in different ways depending on the specific question under investigation. In this paper, we divide them into “core” versus “non-core”, border versus non-border, and preferential versus non-discriminatory provisions. Core provisions are the ones that the literature identifies as more meaningful from an economic point of view (e.g. Baldwin, 2008; Damuri, 2012) and include all WTO+ provisions and four WTO-X areas (competition policy, investment, movement of capital and intellectual property rights protection). A key finding of this study is that, along with WTO+ provisions, those four core WTO-X policy areas appear most frequently in PTAs. Almost 90 percent of agreements include at least one of the “core” WTO-X provisions and one-third of PTAs include all “core” WTO-X provisions.

The coverage of both border provisions, such as anti-dumping duties, and behind the border provisions, such as competition policy, has increased over time. On average, 5 border provisions were included in PTAs signed before 2000; while PTAs signed in the last 5 years include on average 9 border provisions. Generally speaking, the average number of behind the border provisions included in PTAs increased from 2 to 4. Provisions can also be classified according to their application on a multilateral or preferential basis. Discriminatory provisions are the ones that apply only to members of PTAs, such as the reduction in tariffs; non-discriminatory provisions are the ones that affect both members and non-members such as a limitation in the use of subsidies. The average number of both Most Favored Nation (MFN) and preferential provisions increased over time from less than 4 before 2000 to more than 8 for PTAs entered into force between 2010 and 2015.

Second, the data can inform on the changing depth of preferential trade agreements. The detailed information that we collected can be aggregated to construct synthetic indexes of “horizontal” depth, which measure the coverage of policy areas (or breadth) in PTAs. The first index of depth, referred to as “total depth”, is the simple count of (legally enforceable) provisions included in a PTA. Total depth increased from an average of around 8 in the 1990s to more than 17 in the last 5 years. An index of “core depth” can be constructed in a similar way by counting how many core provisions are included and legally enforceable in a PTA. Core depth increased from around 7 in the 1990s to almost 14 in the period 2010-2015. Finally, we use Principal Component Analysis (PCA) to obtain a third index of depth, referred to as “PCA depth” that accounts for the variability in the data. PCA depth tripled from around 1 in the 1990s to 2.8 in the 2010-2015 period.

Third, the wide country coverage of the data set allows to analyze the heterogeneity of deep PTAs across regions and income levels. Europe is the region with the highest number of PTAs signed. Moreover, these PTAs are also the deepest mainly because of the EC-Treaty and subsequent enlargements of the EU. The average total depth of EU agreements is 25. Members of EFTA, Japan and the Republic of Korea also tend to sign deep PTAs with an average of 23, 21 and 20 provisions respectively. PTAs signed between developed and developing countries (i.e. North-South PTAs) include on average almost as many provisions as North-North PTAs. The depth of North-North PTAs in force is around 22 while the depth of North-South PTAs is 20. However, legal enforceability especially of WTO-X provisions is generally weaker in North-South PTAs relative to North-North. Finally, South-South trade agreements tend to be shallower than other PTAs with an average total depth of 13. This reflects the fact that most trade agreements among

developing countries mainly focus on more traditional trade policy issues included in the set of WTO+ provisions.

Fourth, the information in the database allows to apply standard economic tools to analyze the impact of deep PTAs on trade and other relevant economic variables. In this paper, we intuitively show that the depth of PTAs is correlated with the intensity of trade flows, measured as goods trade and global value chain (GVC) trade. The data are used in two recent studies (Mattoo, Mulabdic and Ruta, 2016, and Osnago, Rocha and Ruta, 2016), which use a standard gravity approach to carefully look at the impact that deep PTAs have on goods and on global value chains trade, respectively, while controlling for other determinants of trade flows and for endogeneity problems.

The rest of the paper is structured as follows. Section 2 presents the legal background and methodology of the study, including the scope of the analysis and the definition of legal enforceability. Section 3 takes a first look at the data by focusing on the content and depth of PTAs. Section 4 analyzes how deep agreements vary by region and income level, and sheds light on their correlation with trade intensity. The final section discusses knowledge gaps and specific needs for further data mining on the content of PTAs.

2. The new database: Coverage and Legal Issues

This section discusses the scope of the analysis and the key legal issues. We first review previous studies on the content of trade agreements. We then present the policy areas covered in the current database. The last subsection focuses on the notion of legal enforceability used in this paper.

a. Previous studies on the content of PTAs

In 2010, Horn, Mavroidis and Sapir (hereinafter referred to as “HMS”) published a paper on the content of preferential trade agreements. By focusing on the content of 14 US and 14 EU PTAs, HMS’ research developed a methodology to classify the provisions covered by PTAs and to assess their legal enforceability. Specifically, HMS identified a set of 52 reoccurring policy areas in PTAs, that were then further divided into WTO plus or “WTO +” and WTO extra or “WTO-X” provisions. According to HMS, WTO+ stands for those policy areas that fall under the current mandate of the WTO, while WTO-X refers to obligations outside the WTO’s mandate. Furthermore, HMS classified provisions as legally enforceable if the legal language is sufficiently clear and the use of dispute settlement under the PTA has not been excluded. Meanwhile, a provision with no reference to dispute settlement procedures under the Agreement or with weak legal language is considered not legally enforceable.

Building on HMS, in 2011 the WTO conducted an in-depth study on PTAs and their embedment in the multilateral trading system. The research, published in the World Trade Report 2011 (hereinafter referred to as “WTR 2011”), extended the previous database to 100 PTAs signed by 178 countries. The WTO report highlighted potential overlaps between the multilateral trading system and existing PTAs with a central part of it analyzing content, commitments as well as the depth and legal enforceability of provisions. Moreover, the WTR 2011 elaborated on the nature of trade relations, commitments undertaken in PTAs, as well as on countries’ motivations for entering into such trade agreements. In this regard, a key novel finding of the WTR 2011, supported with a background study by Orefice and Rocha (2014), was the positive association between deeper integration and trade in parts and components, a proxy of GVC integration.

In recent years, a number of different studies have picked up on the HMS methodology, either expanding or applying it to a new focus.⁶ Kleimann (2014) used the HMS methodology partly as a basis to study the coverage and depth of the ASEAN agreement as well as of agreements concluded by individual ASEAN members with third countries. In addition, Kleimann (2014) also attempts to analyze the depth of some WTO+ provisions, i.e. to what extent the PTAs create rules that go beyond the WTO legal status quo.⁷ Villalta Puig and Dalke (2016) apply the HMS methodology to analyze the legal enforceability of sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT) provisions in Canada's PTAs. Kohl, Brakman and Garretsen (2016) focus on 13 WTO+ and 4 WTO-X provisions identified by HMS and expand the coverage of preferential trade agreements to 296.⁸ Despite some minor differences in the definition of legal enforceability, the coding strategies in HMS and Kohl et al. (2016) are compatible and provide quite similar results when comparing them across US and EU PTAs.

Nevertheless, the HMS approach to the collection and analysis of the content of PTAs is not the only one. The Design of Trade Agreements Database (DESTA) developed by Dür et al. (2014) looks in more detail at the content and depth of specific provisions in PTAs for a very large sample of trade agreements. While coverage is limited to 10 policy areas, the coding covers a number of aspects for each area ranging from the simple inclusion of a chapter in the PTA to details on national treatment or harmonization of policies.⁹

The new database presented in this paper covers all PTAs notified to the WTO and in force as of December 2015.¹⁰ This amounts to a total of 279 PTAs signed by 189 countries between 1958 and 2015.¹¹ The database helps us to better understand the extent to which countries regulate policy areas covered by the WTO in their PTAs, as well as those aspects not regulated by the latter. The database allows for extended research on the evolution of the content and depth of PTAs over time, by region, and by level of development. The central idea is, hence, to provide a picture on deep integration at the global scale. We use economic intuition and statistical methods to develop new measures on the content and the depth of preferential trade agreements.

b. Areas covered in the database

Our approach covers 52 policy areas that are further divided into two groups of 14 WTO "plus" or WTO+ and 38 WTO "extra" or WTO-X areas.¹² WTO+ provisions in PTAs reconfirm existing commitments and, in some cases, provide for further additional obligations. WTO-X provisions, on the contrary, refer to policy areas that are not yet regulated by the WTO. A policy area is considered as being "covered" by an agreement if the agreement contains an article, chapter or provision, providing for some form of

⁶ The short overview of studies on PTAs is not exhaustive. The interest here is only to show different approaches that have been developed in the literature.

⁷ In deciding whether a policy area is included in the agreement, HMS count provisions that reconfirm existing obligations and/or add substantive new disciplines as being covered. Hence, there is no distinction between the two scenarios in the final results presented, as coverage gives no further indications on the depth of a provision. In this respect, WTO+ provisions could really be defined as "WTO plus or equal".

⁸ The PTA coverage in Kohl et al. (2016) also includes agreements that were not notified to the WTO.

⁹ The policy areas covered in Dür et al (2014) are market access, services, investments, intellectual property rights, competition, public procurement, standards, trade remedies, non-trade issues, and dispute settlement.

¹⁰ The information on notified and in force preferential agreements comes from the WTO, Regional Trade Agreements Information System (RTA-IS); <http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>.

¹¹ The database includes 260 trade agreements and 19 partial scope agreements (PSA).

¹² See Table 1 for a list of the policy areas. See also Annex A Table A 1 for a more detailed description of each policy and what it covers.

undertaking in this field.¹³ The next subsection discusses the methodology for the assessment of legal enforceability of provisions.

Table 1: Categorization of WTO+ and WTO-X provisions

WTO+	WTO-X	
<ul style="list-style-type: none"> • Tariffs Industrial goods • Tariffs agricultural goods • Customs administration • Export taxes • SPS measures • State trading enterprises • TBT measures • Countervailing measures • Anti-dumping • State aid • Public procurement • TRIMS measures • GATS • TRIPS 	<ul style="list-style-type: none"> • Anti-corruption • Competition policy • Environmental laws • IPR • Investment measures • Labour market regulation • Movement of capital • Consumer protection • Data protection • Agriculture • Approximation of legislation • Audiovisual • Civil protection • Innovation policies • Cultural cooperation • Economic policy dialogue • Education and training • Energy 	<ul style="list-style-type: none"> • Financial assistance • Health • Human Rights • Illegal immigration • Illicit drugs • Industrial cooperation • Information society • Mining • Money laundering • Nuclear safety • Political dialogue • Public administration • Regional cooperation • Research and technology • SMEs • Social Matters • Statistics • Taxation • Terrorism • Visa and asylum

The assessment of coverage was done in two steps. First, we looked for the presence of provisions explicitly covering one of the 52 policy areas. Second, if the provisions were missing, we looked for other provisions that are implicitly regulating one of the 52 policy areas. Some areas, such as antidumping or environmental laws, are fairly straightforward and could be easily identified in the first step. During the mapping of PTAs, we noticed that most agreements that cover these two policy areas contain either a clear provision titled “antidumping” or “unfair trade practices”, or – in the case of environment – provisions or chapters on environmental laws and policies. Nevertheless, other policies need more explanation in terms of their coverage and interpretation. Such areas include, *inter alia*, export taxes or state trading enterprises. In the case of export taxes, agreements often refer to “(customs) duties on exports”;¹⁴ state trading enterprises are sometimes referred to as “public undertakings”,¹⁵ and state aid is often disguised as “export subsidies on (agricultural) products”.¹⁶ As a consequence, coverage is not always straightforward, which is why an in-depth analysis of the agreements is needed that goes beyond the traditional search for keywords or provisions.

¹³ This also included policies mentioned more “indirectly”. An example would be the mentioning of cooperation and technical assistance activities in various provisions of the PTA China – Costa Rica, which – in this specific case – leads to conclude that negotiators had some form of regional cooperation in mind. Hence, the policy area of regional cooperation is considered as being covered, although no individual provision titled “regional cooperation” was included in the agreement.

¹⁴ See, for instance, PTA EFTA-Chile Article 10.

¹⁵ See, *inter alia*, PTA Caribbean Community and Common Market (CARICOM) Article 26.

¹⁶ See, for instance, PTA Colombia - Northern Triangle (El Salvador, Guatemala, Honduras) Article 3.15.

In addition, several provisions covered by PTAs on the same policy might be divided into different policy areas. This is the case for investment and intellectual property as two policy areas where commitments have been undertaken in the WTO with regard to some obligations, but not others. Consequently, the policy is divided between WTO+ and WTO-X, which – in the mapping of such areas – requires exact knowledge on the extent of regulation in the WTO. Specifically, the category of TRIMS measures is included in WTO+ and covers anything that reconfirms commitments undertaken in the WTO Agreement on Trade-Related Investment Measures. This includes provisions on requirements for local content and export performance on foreign direct investment, and applies only to measures that affect trade in goods. On the other hand, investment policies are covered by WTO-X if a PTA contains a chapter or provisions on the more general topic of investment such as on the promotion, protection and liberalization of investment measures or common investment policies. Similarly, the policy area of TRIPS in WTO+ covers anything that reconfirms commitments undertaken in the WTO. This includes, inter alia, harmonization of standards, enforcement of intellectual property rights, national treatment or most-favored nation treatment in areas of intellectual property covered by the Agreement. The policy area of IPRs included in the WTO-X category covers anything that goes beyond commitments undertaken in TRIPS (e.g. reconfirmation of adherence to Intellectual Property treaties not cited in TRIPS).

Moreover, in some policy areas, the distinction between WTO+ and WTO-X imposes some limitations to the analysis. This is most clearly the case for services trade. The area of services is considered as a whole and covered under GATS in WTO+, although it could have further been divided into different services sectors each one allocated to either WTO+ or WTO-X. In order to broadly follow HMS' approach, we consider services as a single policy area included which may or may not be included in a PTA. Nonetheless, several of the PTAs in our database contain provisions on services that go beyond GATS, breaking new ground such as transport services, e-commerce, air services, telecommunication services, or financial services, just to name a few. For instance, e-commerce provisions in PTAs have largely increased after 2000, most likely in response to the growing importance of digital trade. The current categorization does not provide the level of granularity that would allow to highlight these developments.

Another important issue to consider is that there are significant differences in the drafting and structuring of PTAs depending on whether these are Free Trade Agreements (FTAs) between two or more countries, customs unions, or enlargement and accession agreements. We analyze all these agreements with the same parameters, even though this approach presents difficulties as each individual type of PTA has its own particularities. An example is the coding of accession agreements. These agreements usually confirm, amend or modify what has been agreed upon in the original PTA by adding a few specifics for the acceding country. However, sometimes the accession agreement as such does not repeat explicitly all areas covered in the original PTA and is drafted and structured in a different way. Hence, an area covered by the agreement that a country is acceding to might not specifically appear in the text of the accession documents of the acceding country. Thus, there is a need to evaluate the content of these agreements in conjunction with the original text of the PTA the country is acceding to.

c. Considerations on the notion of legal enforceability

In a second step, we analyze and define the legal content of an obligation. An area that is covered might still not be legally enforceable due to unclear or loosely formulated legal language. In general terms, an area is considered as legally enforceable if the language used is sufficiently precise and committing and if it has not been excluded from dispute settlement procedures under the PTA. Our database allows distinguishing between the different scenarios.

While a complete classification is not possible, below we provide examples of language that we consider characterize legally enforceable provisions.

- “Control, inspection and approval procedures *shall* be carried out in accordance with the provisions of Article 8 and Annex C of the SPS Agreement.” (PTA China – Costa Rica, Article 64, Chapter 6 on Sanitary and Phytosanitary Measures) [emphasis added]
- “*Neither Party may maintain* or institute any duties, taxes or other fees and charges imposed on, or in connection with, the exportation of goods to the other Party, or any internal taxes, fees and charges on goods exported to the other Party that are in excess of those imposed on like goods destined for internal sale.” (PTA EU – Republic of Korea, Article 2.11, Section C on Non-Tariff Measures) [emphasis added]
- “*Panama shall adhere to* the Patent Cooperation Treaty (Washington 1970, last modified in 2001) within a period no longer than two years, beginning on the date of entry into force of this Agreement.” (PTA EU – Central America, Article 276, Title VI Intellectual Property) [emphasis added]

Similarly, the following examples offer an idea of provisions that contain language we classified as not being legally enforceable.

- “Each Party *should encourage* enterprises operating within its territory or subject to its jurisdiction *to voluntarily incorporate* internationally recognized standards of corporate social responsibility in their practices and their internal policies, including statements of principle[s] (...) such as (...) anti-corruption.” (PTA Canada – Republic of Korea, Article 8.16 on Corporate Social Responsibility and corruption in investment measures.) [emphasis added]
- “The Parties *shall strengthen their co-operation* in the field of technical regulations, standards and conformity assessment, with a view to increasing the mutual understanding of their respective systems and facilitating access to their respective markets.” (PTA EFTA – Chile, Article 17 on technical regulations). [emphasis added]
- “The Parties *recognize the importance* of regional and multilateral initiatives to eliminate bribery and corruption in international trade and investment. The Parties *shall work jointly* to encourage and support appropriate initiatives in relevant international fora. (PTA US – Panama, Article 18.9 on cooperation in international fora) [emphasis added]

The current study bases its consideration on whether a provision is legally enforceable or not on the drafting of the legal language as well as on the availability of dispute settlement under the PTA. Nonetheless, there is more to this. Several PTAs foresee the exhaustion of other means of redress or internal legal remedies within a reasonable period of time before dispute settlement under the PTA becomes available. This does not explicitly exclude them from the use of dispute settlement, nevertheless implies a “weaker” mechanism to solve disputes and has also been coded as such in this study.¹⁷ This procedure might be less strong than direct referral to a fully developed dispute settlement mechanism with thorough processes, but it is also a means to resolve the issue peacefully and in a cost-effective manner.

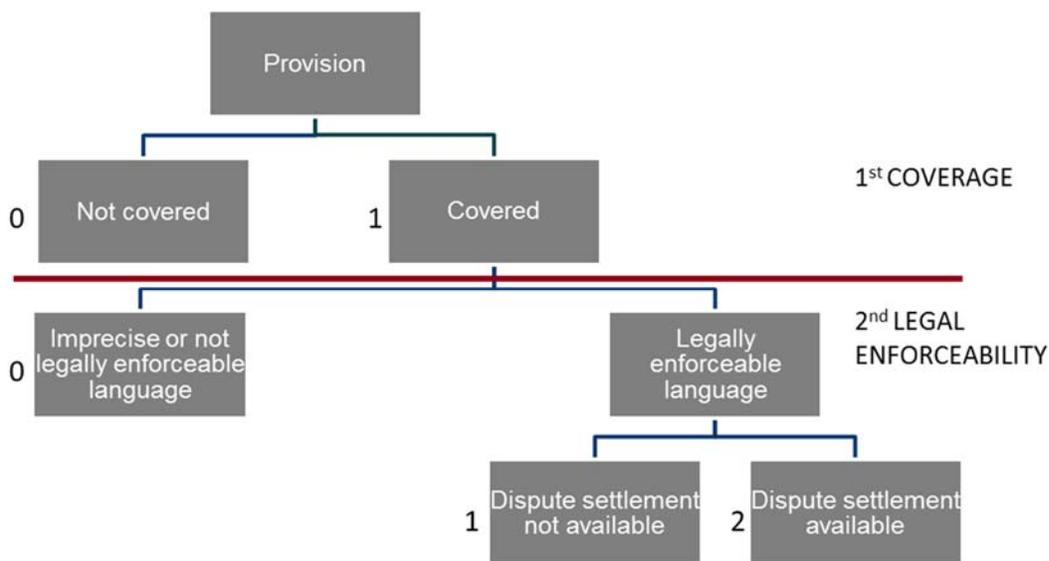
¹⁷ The described scenarios have been coded with “1”. Reasons for this include the timeframes and procedures prior consultations might involve, leading to a presumably longer process and maybe lengthier solution.

Dispute settlement in this study focuses on the settlement of disputes *under* the PTA. Hence, it has to be taken into consideration that if dispute settlement is not made available under the PTA or if reference is made to national or international legislation to solve trade quarrels, a provision or policy area is not necessarily less likely to be implemented in practice. Moreover, even though in some cases recourse to dispute resolution under the PTA is excluded, the drafting and preciseness of some of the provisions might still lead to the impression of an area being enforceable. While some of the agreements contain elaborate procedures in the form of a whole chapter on dispute settlement, others rather restrict their consideration of settling disputes to one provision of general nature. Hence, there are quite some differences as regards the structure, drafting and enforceability of dispute settlement itself – even if made available for a particular provision.

In addition, some PTAs further regulate the manner in which dispute settlement is available for particular provisions and go beyond the clear-cut distinction that is looked at in this study. In the PTA ‘Mexico – Uruguay’, specific distinctions are made for invoking dispute settlement for, *inter alia*, cases of nullification or impairment of benefits. In other words, a Party is allowed to refer a specific case to dispute settlement under the PTA even if the Agreement as such has not been violated, but it is felt that one Party is deprived of a benefit due to the other Party’s actions. This scenario – referred to as the nullification or impairment of benefits – is only available for certain policy areas under the PTA. However, violation complaints regarding the specific infringement of a provision can be made with regard to any possible scenario under the agreement. Moreover, as a second observation, some PTAs also specify those measures subject to the General Exceptions. In other words, not all provisions can be justified under the General Exceptions provisions, which is restricted to certain policies only. In this regard, it has to be kept in mind that the research undertaken is solely based on whether dispute settlement is available in general terms and does not go into the depth of specific dispute settlement procedures as such under the PTA as demonstrated in this paragraph.

Finally, the use of different legal language depending on the year in which the PTAs were drafted poses an additional challenge to the construction of the database. PTAs that were negotiated more than 20 years ago were generally drafted in a different and simpler way than recent ones. This difference in style, however, does not necessarily mean that only recent provisions based on more complex language are legally enforceable. Hence, the question of enforceability has to be considered as well in its historical context, which includes another degree of discretion. Keeping all the caveats in mind, Figure 1 illustrates the procedure used to assess legal enforceability in a schematic way.

Figure 1: Assessment of legal enforceability



3. The depth and content of PTAs

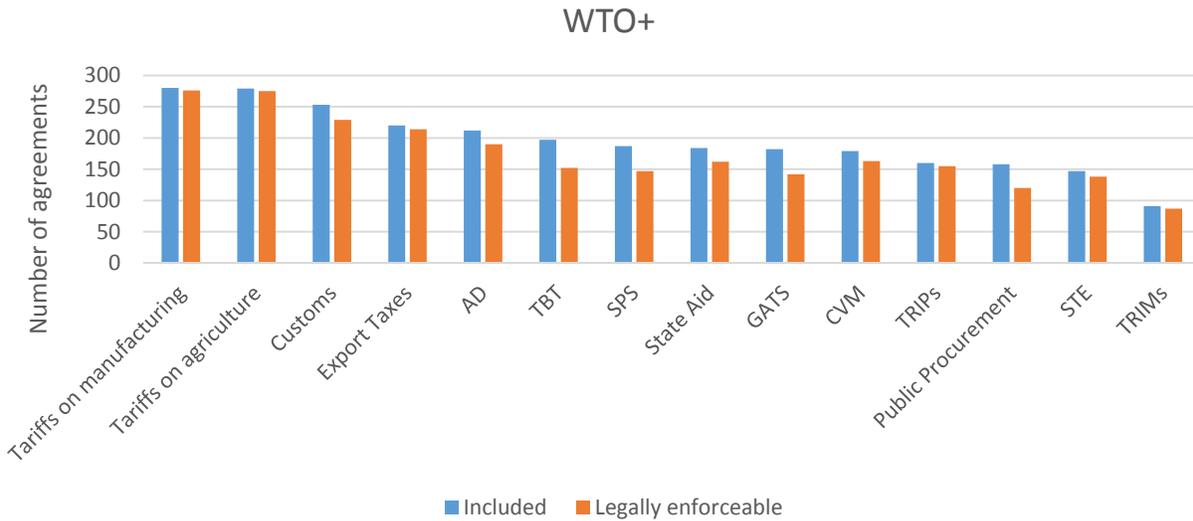
This section takes a first look at the new data. Our focus is on the content and depth of the preferential trade agreements covered in our sample. Specifically, we propose different classifications of the content of trade agreements and develop new measures of the depth of PTAs.

a. The content of PTAs

The large number of provisions identified and coded in the data set allows to analyze in detail the content of each PTA. Provisions can be divided into different categories that shed light on different aspects of the disciplines included in PTAs. From a legal perspective, provisions can be split into areas that are already covered by the WTO (WTO+ provisions) and those that go beyond the current WTO mandate (WTO-X). Furthermore, some provisions are more economically relevant than others and form a set of “core” rules for market access and for the smooth functioning of global value chains (Baldwin, 2008; Damuri, 2012). These “core” provisions can be analyzed using two different lenses. The first categorization reflects whether core provisions are implemented at the border or behind the border. Alternatively, some core provisions are intrinsically discriminatory (or preferential) while others cannot be applied bilaterally and are therefore applied on a non-discriminatory (or MFN, for Most Favored Nation) basis.

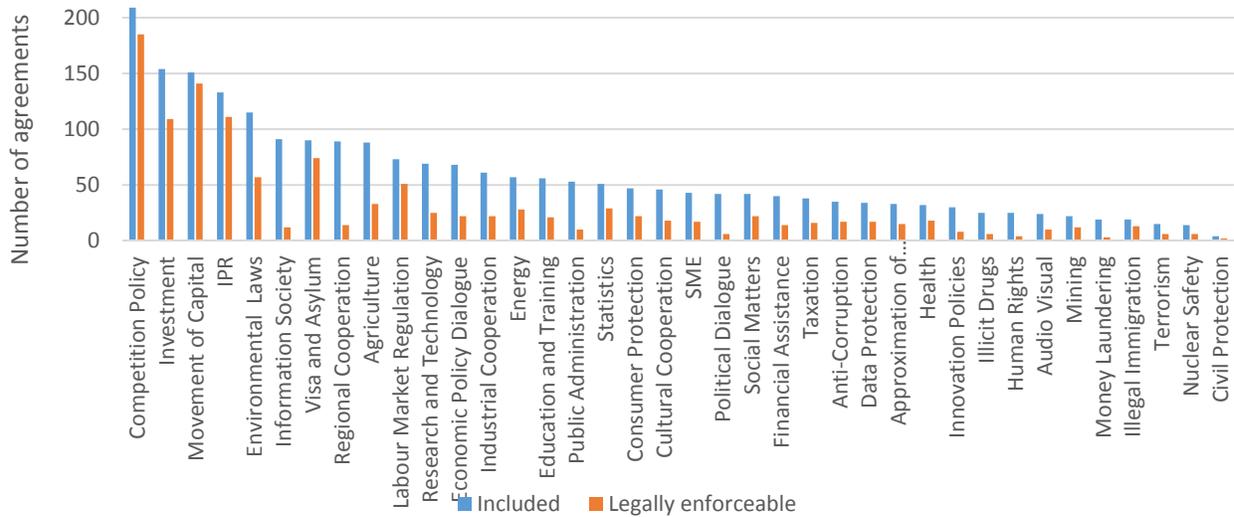
A large number of PTAs cover policy areas that fall under the current mandate of the WTO and go beyond tariff reductions (see Figure 2). All PTAs in force in 2015 include tariff reductions on manufactured goods. More than 200 PTAs include customs, export taxes and anti-dumping provisions. All other WTO+ provisions except TRIMS are included in more than half of the PTAs. Moreover, customs, export taxes, anti-dumping, state-aid provisions and countervailing measures are legally enforceable in more than 160 PTAs. Technical barriers to trade (TBT) and sanitary and phytosanitary standards (SPS) are legally enforceable in 152 and 147 PTAs respectively.

Figure 2: Number of PTAs covering each WTO+ provision



Only a few WTO-X provisions, such as competition policy, movement of capital, investment rules and IPR, are included and legally enforceable in a relevant number of trade agreements (see Figure 3). Competition policies are included in more than 200 PTAs and are enforceable in 185. Movement of capital and investment are included in more than 150 PTAs but legal enforceability differs: almost all provisions on movement of capital are legally enforceable (141) while fewer PTAs have legally enforceable investment provisions (109). IPR is also enforceable in only 111 PTAs. All other WTO-X provisions are legally enforceable in less than ¼ of PTAs.¹⁸ In this set, the policy areas that are most often covered and legally enforceable are environmental laws, visa and asylum disciplines and labor market regulations.

Figure 3: Number of PTAs covering each WTO-X provision



¹⁸ The only exception is the visa and asylum provision that is enforceable in 74 PTAs.

Many of the 52 provisions covered in our database go beyond trade issues. Identifying the set of “core” provisions is an exercise that is inevitably subject to judgment. We follow Damuri (2012) and define as core provisions the ones that are part of the WTO mandate (WTO+ provisions) and four of the WTO extra provisions: competition policy, investment, movement of capital and intellectual property rights. These 18 provisions define a basic set of rules for market access and for the smooth functioning of global value chains (Baldwin, 2008).

Not only “core” provisions are relevant from an economic theory perspective, but they are also the provisions that are more often included in trade agreements. Table 2 lists the 18 “core” policy areas with the share of agreements that cover them with and without legally enforceable provisions. One-third of PTAs in force include legally enforceable provisions covering all the core policy areas. The most common provisions are, as expected, tariff reductions in manufacturing and agricultural goods. With the exception of STE, public procurement, IPR, investment and TRIMS, all core provisions are included and legally enforceable in at least half of the PTAs. Particularly important are custom procedures, export taxes, anti-dumping and competition policies, which are legally enforceable in at least two-thirds of the PTAs.

Along with WTO + provisions, the four core WTO-X policy areas, namely competition policy, investment, movement of capital and intellectual property rights, are important features of deep PTAs. Almost 90 percent of agreements include at least one of the "core" WTO-X provisions and one-third of PTAs include all "core" WTO-X provisions. When taking into consideration legal enforceability, these shares are respectively 83.5 percent and around 15 percent of the PTAs in the sample.

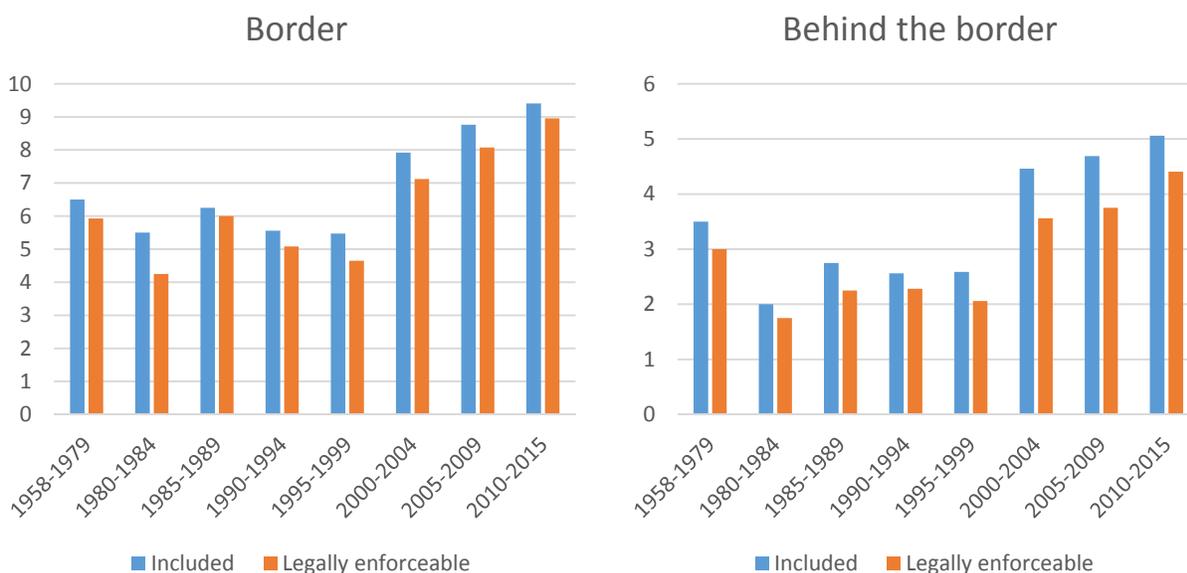
Table 2: Core provisions

Core provision	Included	Legally enforceable
FTA industrial	100.0%	98.6%
FTA agriculture	99.6%	98.2%
Customs	90.4%	81.8%
Export taxes	78.6%	76.4%
Anti-dumping	75.7%	67.9%
Competition policy	74.6%	66.1%
TBT	70.4%	54.3%
SPS	66.8%	52.5%
State aid	65.7%	57.9%
GATS	65.0%	50.7%
CVM	63.9%	58.2%
TRIPS	57.1%	55.4%
Public procurement	56.4%	42.9%
Investment	55.0%	38.9%
Movement of capital	53.9%	50.4%
STE	52.5%	49.3%
IPR	47.5%	39.6%
TRIMS	32.5%	31.1%

Core provisions in our data set can be also classified as border and behind-the-border provisions, depending on whether the policy that the provision regulates is applied at the border or not. Provisions on tariff reduction in manufacturing and agriculture, anti-dumping, countervailing measures, TRIMS, TRIPS, customs, export taxes, SPS, TBT and movement of capital are mostly border provisions. State enterprise, state aid, competition policy, IPR, investment, public procurement and GATS are to a larger extent behind the border provisions.

The depth of PTAs increased thanks to the inclusion of a higher number of both border and behind the border measures. Figure 4 shows the evolution of the average number of border and behind the border provisions included in PTAs. The average number of both border and behind the border provisions remained roughly constant until the end of the 1990s. Around 5 border and 2 behind the border provisions were included on average in PTAs signed before 2000. These numbers steadily increased to 9 and almost 5 respectively in the last fifteen years.

Figure 4: Average number of border and behind the border measures over time

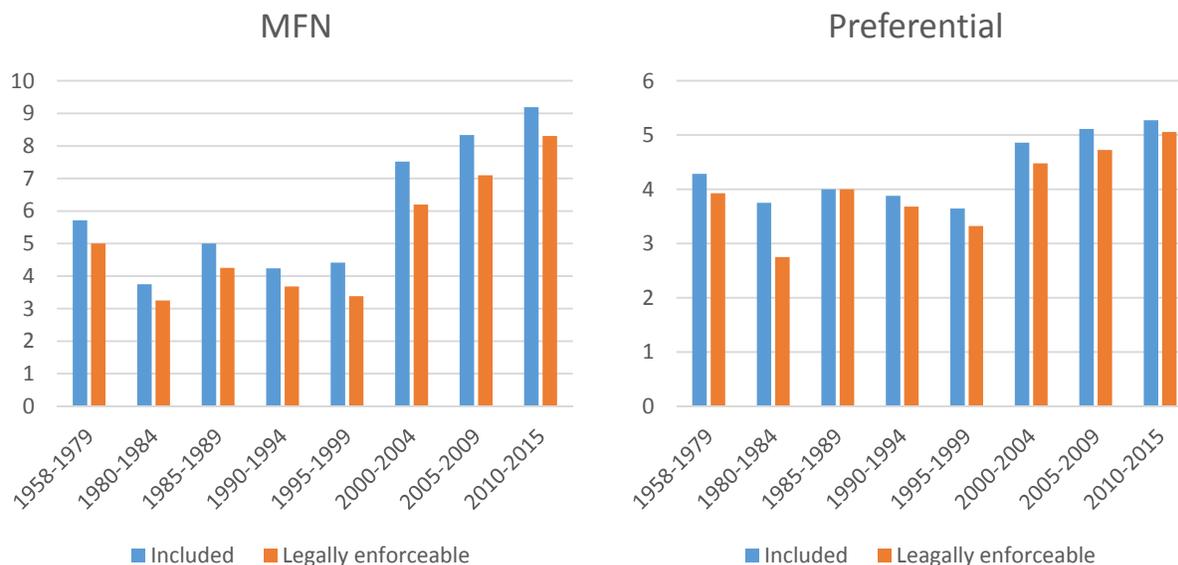


Another possible categorization of core provisions is between preferential and non-discriminatory provisions. Preferential provisions are those that apply only to the countries that signed the PTA. This category includes tariffs on manufacturing and agricultural goods, public procurement, export taxes, anti-dumping and countervailing measures. Other provisions have for the most part a non-discriminatory nature and, when included in a PTA, the presumption is that they can only be applied on an MFN basis. Customs, SPS, TBT, TRIMS, GATS, TRIPS, movement of capital, state-owned enterprises, state aid, competition policy, IPR and investment are classified as MFN provisions.

PTAs became deeper over time by including more policy areas that are both MFN and preferential. Figure 5 shows that the number of both types of provisions increased over time, especially after 2000. The average number of MFN provisions more than doubled between the period 1980-1984 and 2010-2015 going from less than 4 to more than 9. The same happened for legally enforceable MFN provisions. The increase in the number of preferential provisions has been less remarkable. The number of provisions

remained quite stable around 4 for all the periods before 2000 and it slowly increased in the last fifteen years reaching slightly more than 5 provisions on average. Legal enforceability of preferential provisions seems to be quite strong and the pattern is very similar as expected.

Figure 5: Average number of MFN and preferential provisions



b. The depth of PTAs

The information extracted from the texts of the agreements can be systematized and used to construct synthetic indices capturing the depth of PTAs. Since the data detail the policy coverage (or breadth) of trade agreements, we refer to this specific notion of depth as “horizontal”. Specifically, we construct three different indexes. The first measure is a simple count of provisions in PTAs, we refer to this as “total depth”. We then look at the subset of economically relevant, or core, provisions and develop a second measure of depth based on the count of these provisions. We refer to this second measure as “core depth”. Finally, we take a statistical approach based on a Principal Component Analysis (PCA) and let the data define the more relevant provisions from a statistical point of view. We use this analysis to build a third measure of depth referred to as “PCA depth”.

The most obvious measure of depth of PTAs is the number of provisions (legally enforceable or not) contained in an agreement. Formally, total depth is defined as the simple sum of provisions (k) included in the PTA:

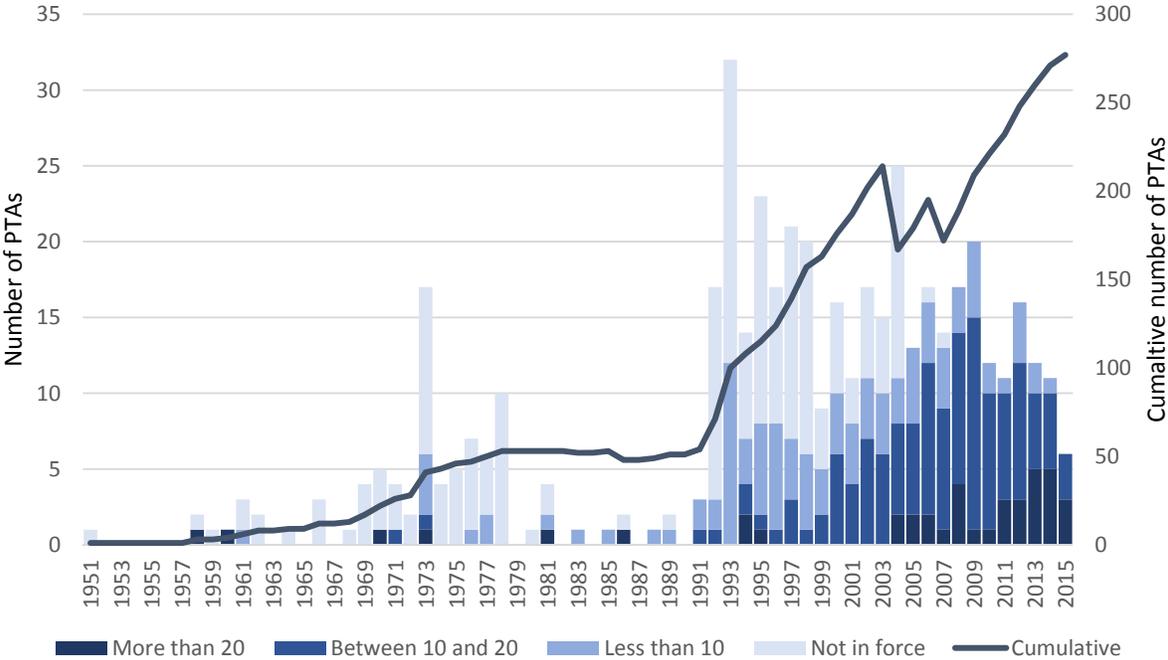
$$TotalDepth = \sum_{k=1}^{52} Provision_k$$

Agreements signed in more recent years tend to be deeper (i.e. include more policy areas) than traditional (shallow) agreements (see Figure 6).¹⁹ Average depth increased steadily starting from 1990 going from an

¹⁹ A caveat is that, as shown in Figure 2, a majority of PTAs signed in the 1990s were no longer in force in 2015 and are not covered by the database. We therefore have no information regarding the depth of those agreements.

average of 11 provisions for PTAs signed between 1990 and 1994 to 23 provisions for PTAs signed between 2010 and 2015. On average, PTAs signed before 1990 included around 15 provisions. The relatively high depth in these periods is mainly due to the EC Treaty and successive enlargements of the European Union (at the time, European Community).²⁰ If legal enforceability is taken into account, the level of depth declines slightly but the general pattern is consistent with the one above. The average number of legally enforceable provisions in the 1990s was between 8 and 9 while PTAs signed in the last 5 years include more than 17 legally enforceable provisions. The plot in Figure 7 provides additional details on the distribution of total depth in each period and it identifies "outlier PTAs".²¹ The enlargement of the EU, NAFTA and the European Economic Association (EEA) are substantially deeper than other PTAs signed in the same periods.

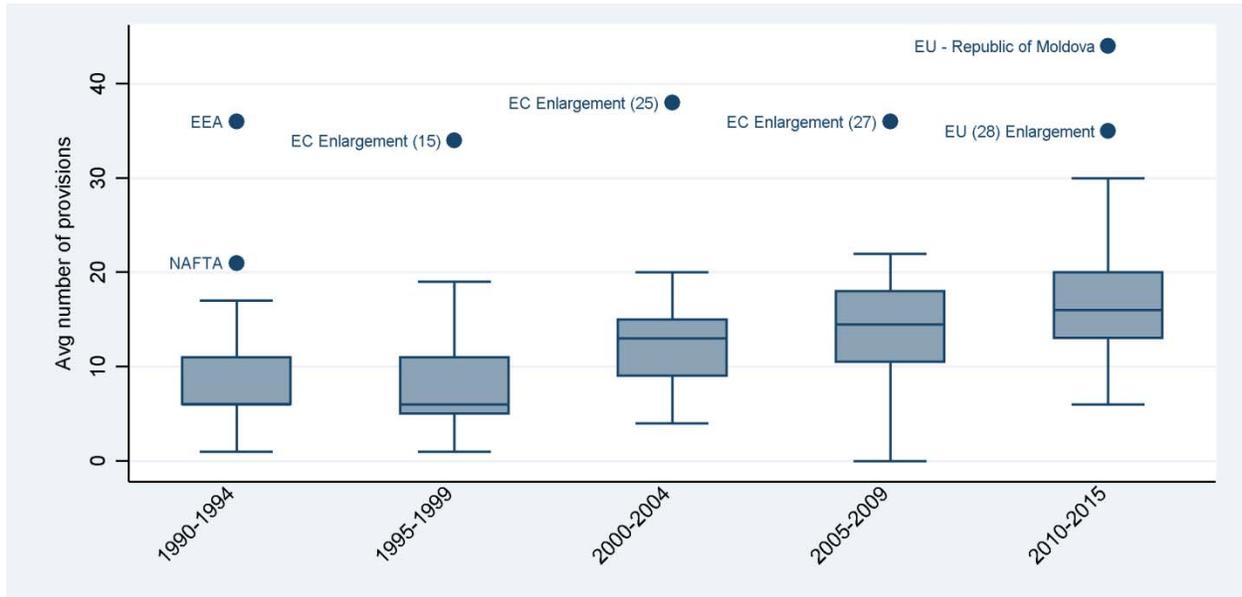
Figure 6: Number of trade agreements over time and depth



²⁰ Two EU enlargements in the 1980s included 20 provisions each. The other 3 agreements signed in that period are ANZCERTA (7 provisions), US-Israel (10) and the Andean Community (6).

²¹ The figure uses total depth constructed only with legally enforceable provisions. The boxplot presented is a convenient way to graphically represent the quartiles of a distribution and it is useful to identify the outliers. The small number of observations available before 1990 prevents us to construct a meaningful graph for that period, hence we restrict the time period in the figure.

Figure 7: Boxplot of average number of provisions in PTAs over time



As discussed in the previous section, a subset of 18 core provisions can be identified in the data set. We construct an alternative measure of depth based on this subset of provisions. Core depth is defined as the simple sum of core provisions (c) included in a PTA:

$$CoreDepth = \sum_{c=1}^{18} Provision_c$$

The evolution of core depth over time is very similar to total depth suggesting that many PTAs share some sort of minimal common ground in terms of relevant provisions included. The average number of core provisions included in PTAs increased steadily after 1990. In addition, the legal enforceability of provisions in core policy areas is quite common. Before 2000, the average number of legally enforceable core provisions included in PTAs was less than 10. Agreements signed between 2010 and 2015 include on average close to 14 core provisions.

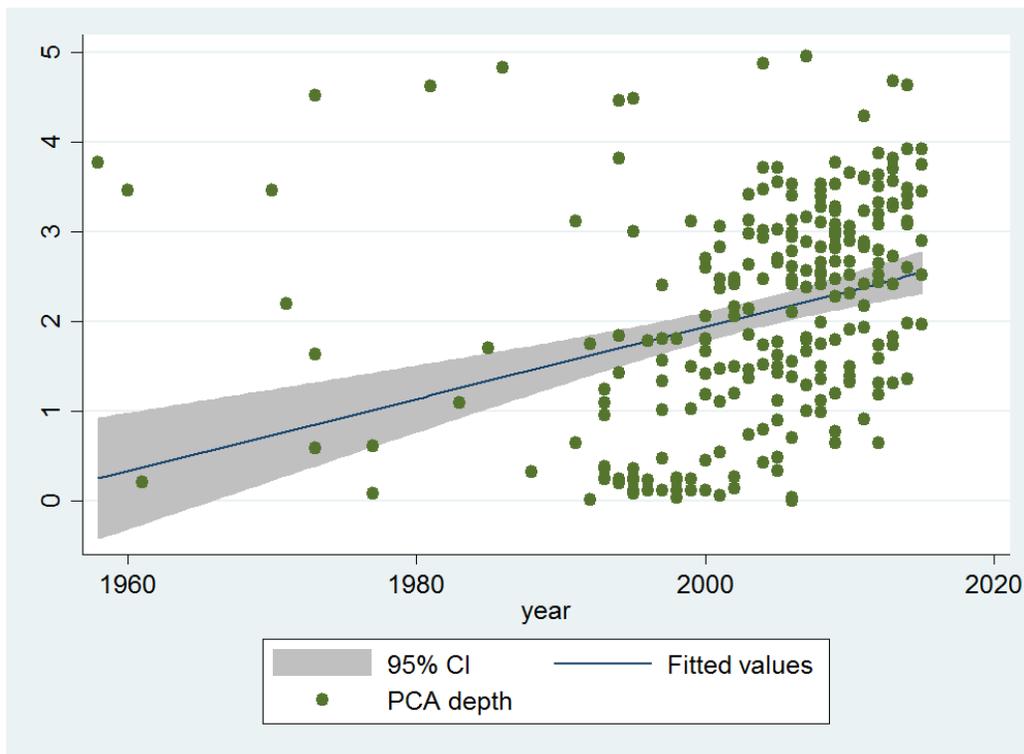
Statistical methods can be used to analyze the content of PTAs and construct alternative indexes of depth. Principal component analysis (PCA) is one of these methods. We use PCA to reduce the dimensionality of our data set from 52 variables to one index that accounts for as much of the variability in the data as possible. Annex B illustrates more in detail the methodology and the results for our data set. In essence, PCA transforms the 52 provisions into a set of orthogonal variables called components. The first component is a weighted average of the provisions that takes into account around 27 percent of the variation in the data.²² We then define PCA depth as the weighted average of provisions using the coefficients of the first component as weights (ω_k):

²² The components are not weighted averages of the variables in a strict sense since the coefficients (or loadings) associated to each variable in each component can also be negative and do not sum to one.

$$PCADepth = \sum_{k=1}^{52} \omega_k Provision_k$$

In our sample, PCA depth ranges from 0 to almost 5. Figure 8 shows the evolution of PCA depth associated to each agreement over time. The vertical axis reports the depth of a PTA –i.e. the value of the first component of the PCA. The horizontal axis reports the year in which a PTA was signed. The linear fit in the figure clearly illustrates that PTAs signed more recently tend to be deeper than early agreements. On average, PCA depth increased from around 1 in the 1990s to 2.8 in the 2010-2015 period.²³

Figure 8: PCA depth over time



4. Deep PTAs, geography, income levels and trade

The patterns outlined above are average trends in the depth and content of preferential trade agreements. However, modern PTAs are not the same across countries and regions. Countries in Europe tend to sign much deeper PTAs relative to those signed in other regions such as South Asia. The depth of integration is therefore heterogeneous across the world. Moreover, the content of trade agreements varies widely. In particular, the underlying objectives of PTAs signed between developed countries may not be the same as those of PTAs signed between developed and developing countries or among developing countries. In this section we provide evidence of such heterogeneity across regions and income levels. Finally, we document the relationship between deep PTAs and international trade.

²³ Relying on the new data, other indicators of depth can be built. For instance, it would be possible to break off the FTA industrial and FTA agriculture variables from the rest of the provisions, since these variables correspond to the tariff component of the PTA. A new indicator could combine information on the tariff component of PTAs (e.g. average tariff of PTA members) and a non-tariff component (such as the PCA index of the rest of the provisions).

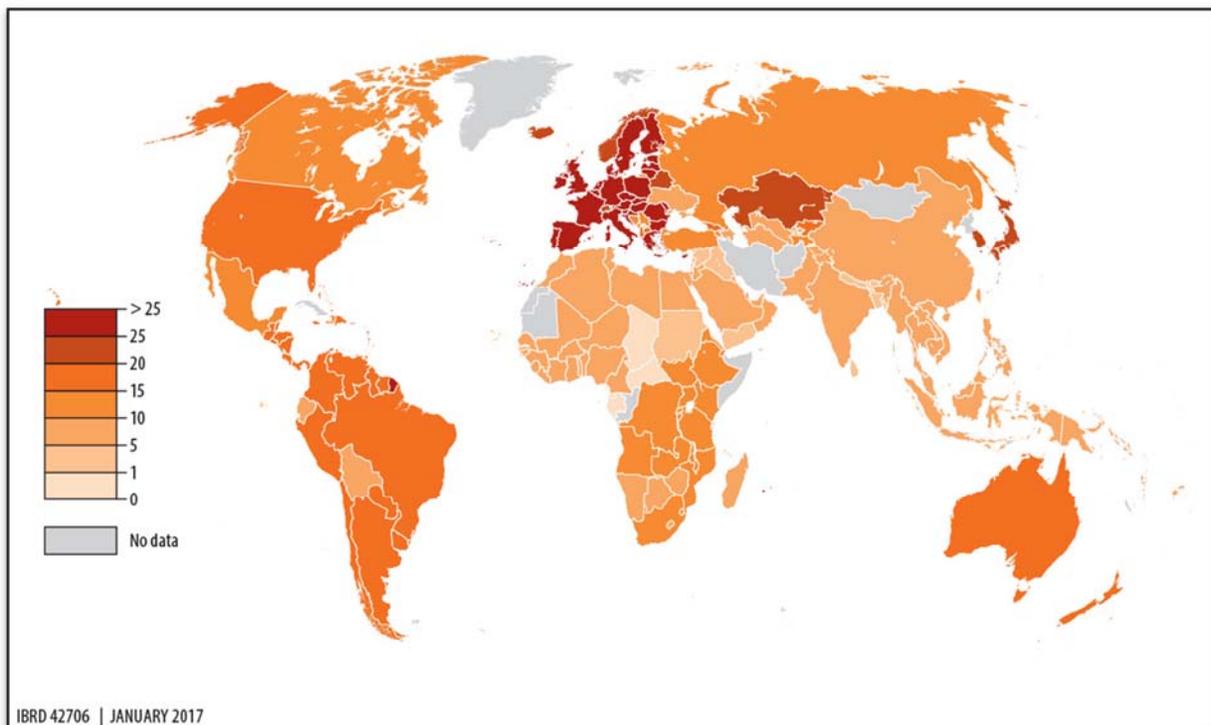
a. Heterogeneity of deep PTAs across countries

Geography

European countries are the most engaged in trade agreements. At the end of 2015, the EU was involved in 43 trade agreements including the EC-Treaty, 6 EU enlargements and 36 PTAs with third countries. Each EFTA country (Iceland, Liechtenstein, Norway and Switzerland) has around 30 agreements in force in 2015. Other countries with more than 15 agreements in force are Chile (22), Singapore (21), Turkey and the Russian Federation (18) and Ukraine (15). Africa and part of South America are lagging behind in terms of the number of agreements in which they are involved.

European countries are also the group of countries with the deepest agreements, largely thanks to EU membership. Agreements signed by the EU in force in 2015 include on average more than 25 provisions (see Figure 9). The deepest relationship is that among EU members including 44 legally enforceable provisions.²⁴ Agreements signed by members of EFTA include around 23 provisions on average. Also PTAs signed by Japan and Korea are quite deep and include on average 21 and 20 provisions respectively. Other high income countries such as the United States and Australia; Taiwan, China; and most Latin American countries established relatively deep relationships with their partners. On the other hand, South East Asian countries do not seem to be involved in very deep agreements.

Figure 9: Average number of provisions by country, 2015



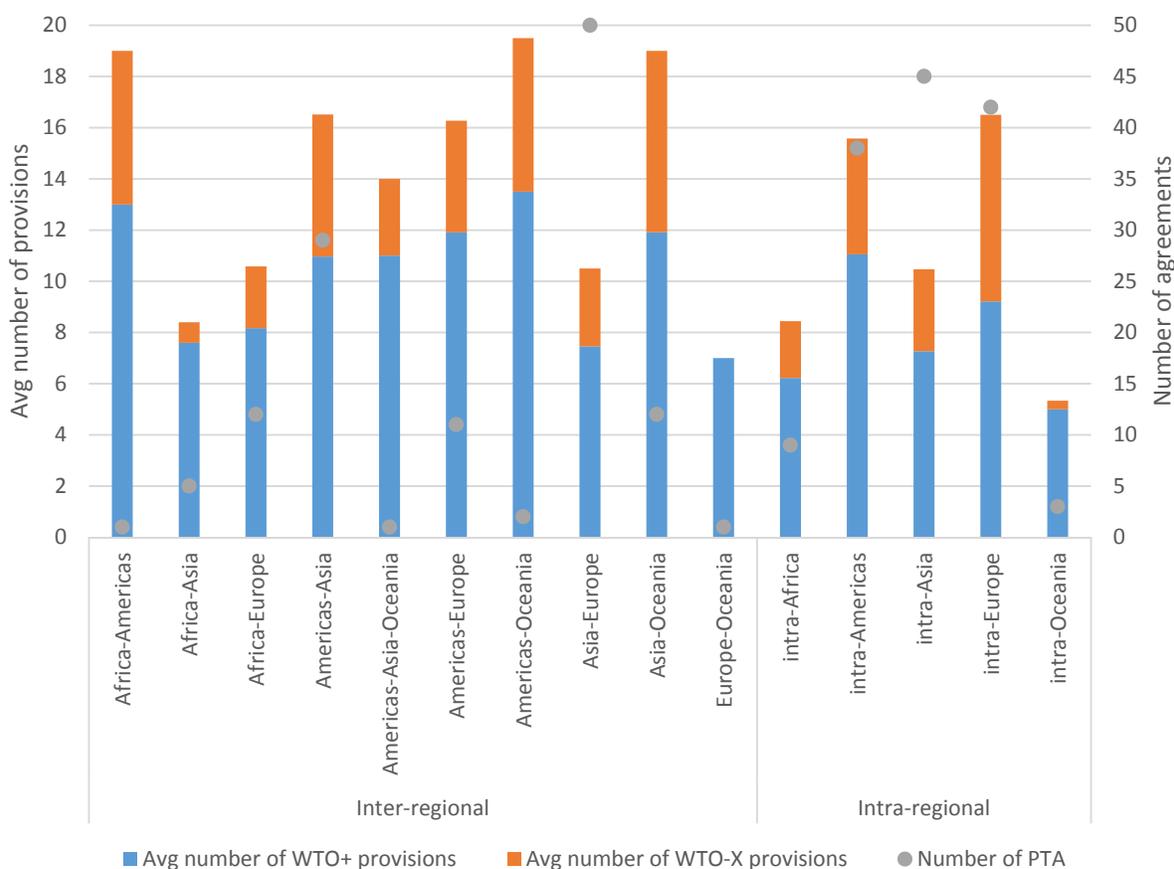
A large number of PTAs are signed by countries in the same region. Asia and Europe signed the highest number of intra-regional agreements: there are 45 intra-Asia and 41 intra-Europe PTAs. The Americas are

²⁴ Also the agreement between EU countries and Moldova includes 44 provisions.

also very involved in PTAs with 38 intra-regional agreements. Among intra-regional agreements, those signed by European countries are the deepest with on average 9 WTO plus provisions and 7 WTO-X provisions (see Figure 10). Agreements signed between American countries are also relatively deep with 11 WTO plus and 4 WTO-X provisions.

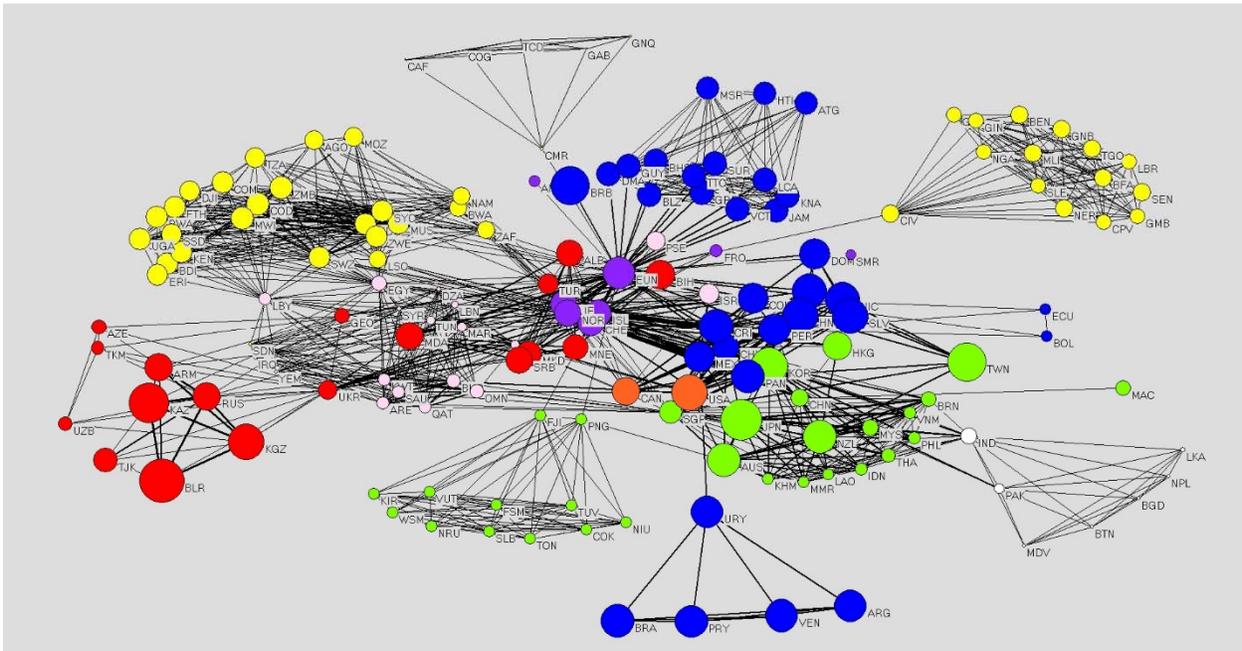
The number of inter-regional PTAs is in general lower with the exception of agreements signed between European and Asian countries (50 PTAs). Almost 30 inter-regional PTAs have also been signed between America and Asia. However, Asian-American agreements are deeper (more than 16 provisions on average) than Asian-European agreements (almost 11 provisions on average). The very few agreements signed between the Americas and Africa and Oceania seem to be the deepest inter-regional PTAs. Given the very small number of agreements involved, the interpretation of the average depth for these inter-regional agreements should be taken with caution.

Figure 10: Number of PTAs and average depth across regions



Once transformed into a bilateral data set, the network structure of PTAs can be studied. The network of PTAs dramatically changed in the last 20-25 years. Figure 11 shows the network of PTAs in 1990 while Figure 12 shows the network in 2015. The color of the nodes identifies geographical regions. The size of

Figure 12: Network of PTAs in 2015

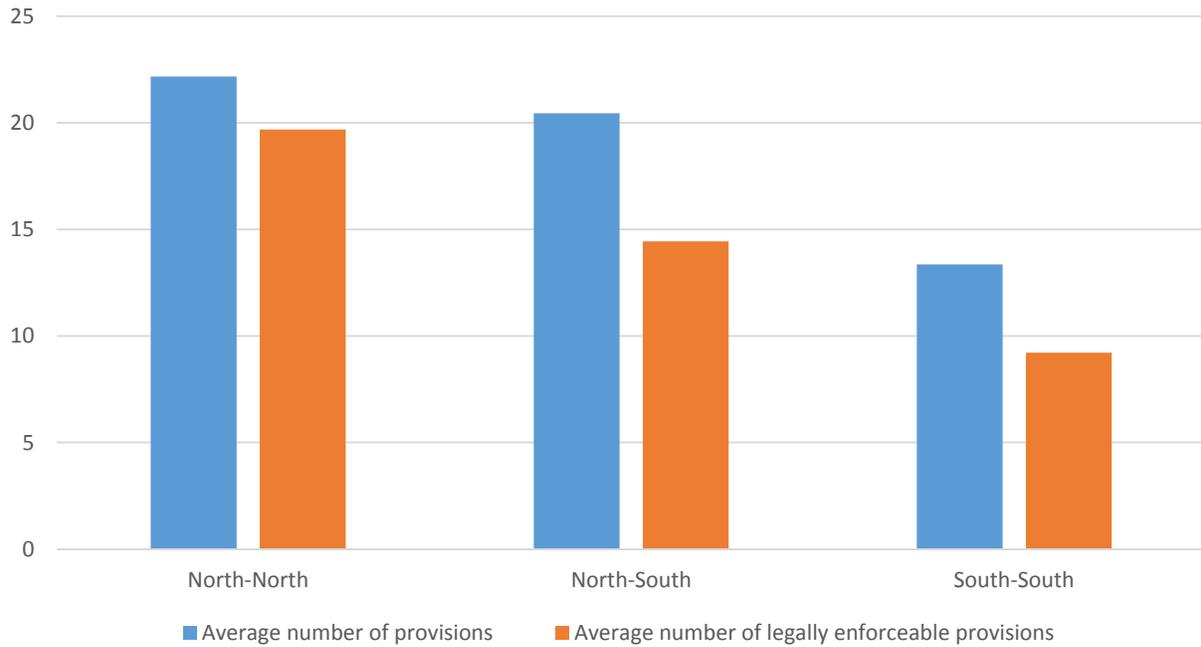


Income levels

A second issue is whether PTAs differ depending on the level of development of PTA partners. The reason for signing trade agreements could be different depending on the countries involved and on the level of liberalization already achieved. For example, since MFN tariffs are already low in developed/North countries, an agreement between two or more developed countries may seek further liberalization that goes beyond tariff reduction. We would expect then that North-North PTAs are relatively deep. Also North-South PTAs are expected to be relatively deep but for different reasons. Agreements between developing countries still focus instead on tariff liberalization and are less deep.

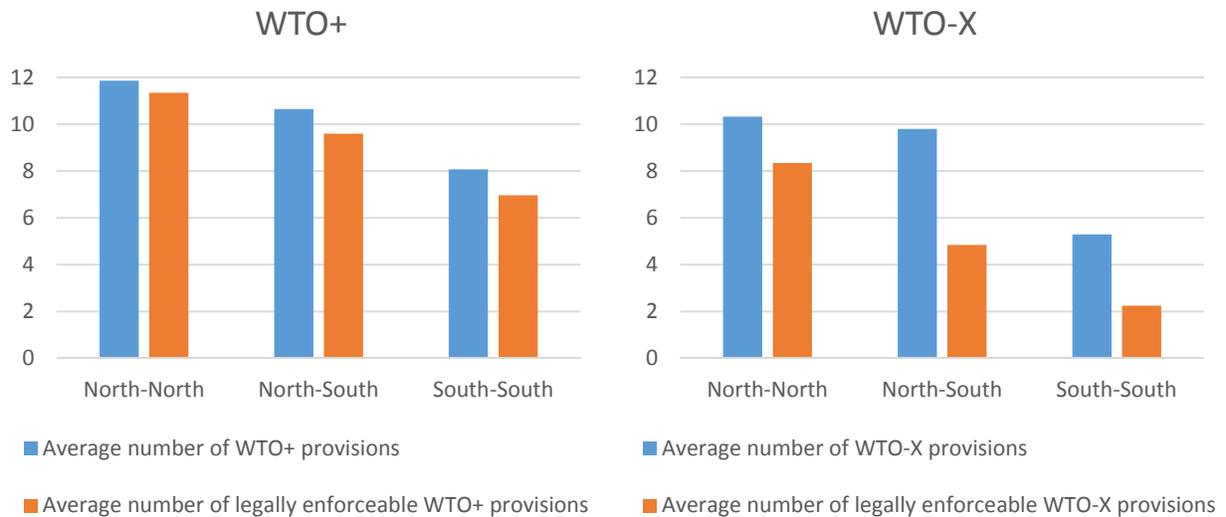
Agreements signed between developed countries tend to be deeper than agreements signed between developed and developing countries and agreements between developing countries only. When looking at the number of provisions included in PTAs, North-North agreements are the deepest with around 22 provisions (see Figure 13). North-South PTAs include on average almost 20 provisions, while PTAs among developing countries contain only 13 provisions on average. When taking into consideration legal enforceability, North-North agreements are still the deepest with almost 20 legally enforceable provisions on average. North-South PTAs have less than 15 legally enforceable areas and South-South PTAs have only 9.

Figure 13: Areas covered vs legal enforceability by development level



North-North PTAs are the deepest also when dividing provisions into WTO+ and WTO-X. The ranking of PTAs according to the number of legally enforceable provisions is identical for WTO+ and WTO-X provisions (see Figure 14). However, interestingly, North-South PTAs include almost the same number of WTO-X provisions as North-North PTAs but legal enforceability is weaker.

Figure 14: WTO+ and WTO-X provisions by development level



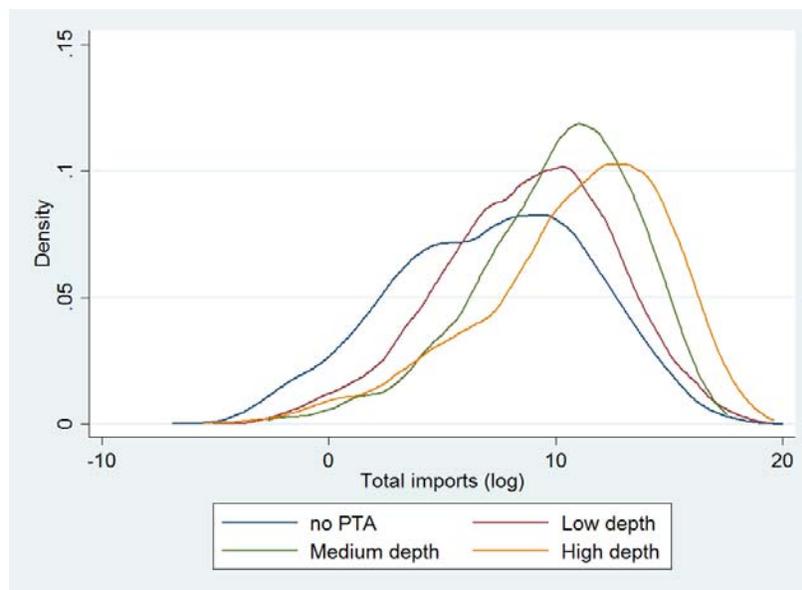
b. Trade and deep PTAs

The share of trade under PTAs increased constantly over the last quarter century. In 1996, only 24 percent of world trade was done under PTAs. This share increased up to 37 percent in 2013. Despite the high number of PTAs in force, the share of trade under PTAs is less than half. This is mainly due to the fact that the biggest traders in the world, namely the US, China, the EU and Japan, do not have signed PTAs with each other yet. In this subsection, we take a first look at the relationship between trade and the horizontal depth of trade agreements.

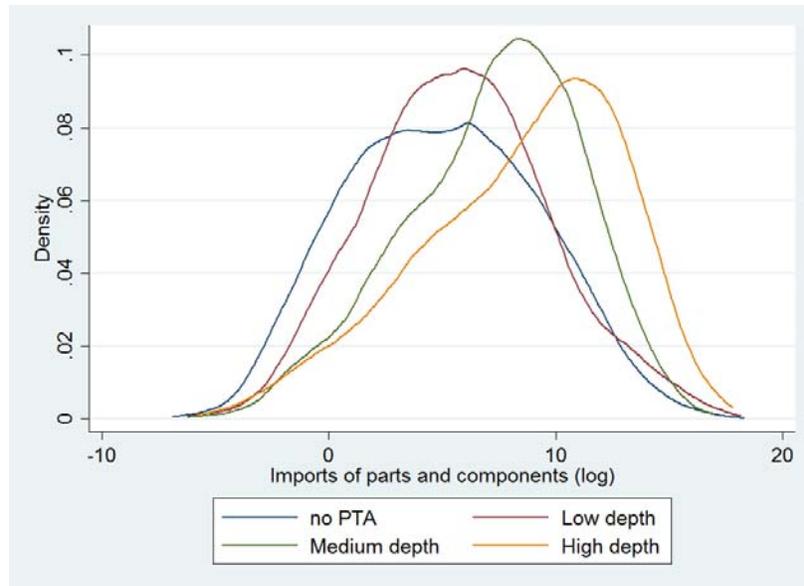
Deep trade agreements tend to increase trade more than shallow trade agreements. Panel (a) of Figure 15 plots the distribution of (log) total imports for country-pairs with no PTA, low (less than 10 legally enforceable provision), medium (between 10 and 20 legally enforceable provisions) and high depth (more than 20 legally enforceable provisions). The distribution of imports clearly shifts to the right when depth increases. This suggests that country-pairs that signed deeper PTAs have higher levels of bilateral trade. Mattoo et al. (2017) use a gravity framework to evaluate the impact of deep agreements on trade flows, confirming the role of depth in promoting trade among PTA partners.

The deepening of trade agreements is also related to another recent phenomenon in the global economy: the internationalization of production. The increase in average depth of PTAs over time goes together with the increase in trade of parts and components in the world. Country pairs involved in deeper agreements tend to have higher levels of trade in parts and components than country pairs that signed PTAs with fewer provisions. As for total trade, the distribution of imports of parts and components between countries with deeper PTAs lies to the right of the distribution of shallower PTAs. This indicates that deeper agreements are associated with more trade in parts and components. Osnago et al. (2017) explore this relationship in a gravity framework. They show that signing deeper agreements increases GVC-related trade measured as trade in parts and components or using trade in value added flows.

Figure 15: Distribution of imports over levels of depth



(a) – Total trade



(b) – Trade in parts and components

5. Conclusion

The topic of PTAs has gained momentum over the last decades. Various important recent developments, notably the negotiation of new megaregional initiatives such as the Trans-Pacific Partnership, justify the need to further develop and extend the existing data. The primary goal of this paper is to provide detailed information on the content and depth of preferential trade agreements as a first and indispensable step to develop systematic evidence of their rationale and impact on trade and other relevant economic variables. The information contained in the new database presented here also helps government officials, trade scholars and market participants to better understand the type of commitments undertaken in these agreements, as well as to get an indication on their legal enforceability. This paper finally presents a preliminary analysis of the new data, offering some novel stylized facts. Specifically, we find that preferential arrangements are deepening especially in areas that are already covered by the WTO and in core WTO extra areas, that the depth and content of PTAs vary by region and by income level of participants and that they correlate with the goods trade and GVC intensity of members.

In this final section, we want to stress three limitations of the current approach as a caveat to users and an indication for future research in this field. First, the data reveal the policy areas covered in PTAs and whether they are legally enforceable or not. But the analysis does not look at the stringency of specific provisions in one agreement relative to others – something we can call “vertical depth” as opposed to the horizontal depth analyzed in this paper. Specifically, the database cannot uncover whether a provision on investment in one PTA is actually deeper than in another. The latter would imply an investigation and comparison of the specific content a selected provision contains, something that we leave for future work.

Secondly, the study does not intend to draw any conclusions with regard to the actual policies and the implementation of PTAs. In some cases, deep commitments in trade agreements may just codify an already existing policy reality. In this case, the impact of a trade agreement is just to limit the use of discretionary policy in the future, but does not change the actual policies in the present. In other cases, deep commitments may impose constraints on actual policies, but with the present information we cannot draw any conclusions on the final enforcement of PTAs. Some provisions may be legally

enforceable, but might never be applied in practice. For instance, a provision prescribing the change of national laws on investment or competition policies might seem strong on paper, but in practice a country might still not change its domestic laws. On the contrary, provisions that have weaker language may lead the way to stronger legal language and enforceability in the future.

Finally, we need to acknowledge existing gaps in the coverage of our database. First, we have no information on trade agreements that were in force at some point in the past but are no longer in force in 2015. Not surprisingly, this lack of information is more pronounced as we move back in time so that our data for the 2000s tends to be more complete relative to earlier decades. Second, we have no information on trade agreements that are in force but have not been notified to the WTO. This could be either because signatories are not members of the WTO or just result from a failure to abide to the WTO notification requirements. WTO (2011) estimated that around 100 PTAs in force were not notified to the WTO and that these mostly involved agreements among developing countries. Both data limitations have implications for empirical analyses based on this database and should be kept in mind by researchers.

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Annex A

Table A 1: Description of policy areas and coverage

<i>WTO-plus areas</i>	
FTA Industrial or Customs	Tariff liberalization with regard to industrial goods; elimination of non-tariff measures.
FTA Agriculture	Tariff liberalization with regard to agriculture goods; elimination of non-tariff measures.
Customs	Provision of information; publication on the internet of new laws and regulations; training. Incl. provisions on trade facilitation.
Export Taxes	Elimination of export taxes. Examples: Elimination of customs duties on exports, elimination of duties, taxes or other charges on exports.
SPS	Affirmation of rights and obligations under the WTO Agreement on SPS; harmonization of SPS measures.
TBT	Affirmation of rights and obligations under WTO Agreement on TBT; provision of information; harmonization of regulations; mutual recognition agreements.
STE	GATT Art. XVII. Establishment or maintenance of a state enterprise in accordance with and affirming provisions of GATT. Non-discrimination regarding production and marketing condition; provision of information.
AD	Retention of antidumping rights and obligations under the WTO Agreement (Art. VI GATT).
CVM	Retention of countervailing measures rights and obligations under the WTO Agreement (Art VI GATT).
State Aid	Assessment of anticompetitive behavior; annual reporting on the value and distribution of state aid given; provision of information.
Public Procurement	Progressive liberalization; national treatment and/or non-discrimination principle; publication of laws and regulations on the internet; specification on public procurement regime.
TRIMs	Provisions concerning requirements for local content and export performance on FDI. Applies only to measures that affect trade in goods.
GATS	Liberalization of trade in services.
TRIPs	Harmonization of standards; enforcement; national treatment, most-favored nation treatment. International treaties referenced in TRIPs: Paris Convention, Berne Convention, Rome Convention, IPIC Treaty.
<i>WTO-X areas</i>	
Anti-Corruption	Regulations concerning criminal offence measures in matters affecting international trade and investment.
Competition Policy	Chapter/provision on competition policy in general, could include prescriptions as regards anticompetitive business conduct; harmonization of competition laws; establishment or maintenance of an independent competition authority, among others.
Environmental Laws	Development of environmental standards; enforcement of national environmental laws; establishment of sanctions for violation of environmental laws; publications of laws and regulation.

IPR	Accession to international treaties not referenced in the TRIPs Agreement.
Investment	Information exchange; Development of legal frameworks; Harmonization and simplification of procedures; National treatment; Establishment of mechanism for the settlement of disputes.
Labour Market Regulation	Regulation of the national labour market; affirmation of International Labour Organization (ILO) commitments; enforcement.
Movement of Capital	Liberalization of capital movement; prohibition of new restrictions.
Consumer Protection	Harmonization of consumer protection laws; exchange of information and experts; training.
Data Protection	Exchange of information and experts; joint projects.
Agriculture	Technical assistance to conduct modernization projects; exchange of information.
Approximation of Legislation	Application of international legislation in national legislation. Any form of legislation that provides for approximation of laws. [Appears mainly in customs unions.]
Audio Visual	Promotion of the industry; encouragement of co-production.
Civil Protection	Implementation of harmonized rules.
Innovation Policies	Participation in framework programmes; promotion of technology transfers.
Cultural Cooperation	Promotion of joint initiatives and local culture.
Economic Policy Dialogue	Exchange of ideas and opinions; joint studies.
Education and Training	Measures to improve the general level of education.
Energy	Exchange of information; technology transfer; joint studies.
Financial Assistance	Set of rules guiding the granting and administration of financial assistance.
Health	Monitoring of diseases; development of health information systems; exchange of information.
Human Rights	Respect for human rights.
Illegal Immigration	Conclusion of re-admission agreements; prevention and control of illegal immigration.
Illicit Drugs	Treatment and rehabilitation of drug addicts; joint projects on prevention of consumption; reduction of drug supply; information exchange.
Industrial Cooperation	Assistance in conducting modernization projects; facilitation and access to credit to finance.
Information Society	Exchange of information; dissemination of new technologies; training. Cooperation and exchange of information (often in the context of other policies).
Mining	Exchange of information and experience; development of joint initiatives.
Money Laundering	Harmonization of standards; technical and administrative assistance.
Nuclear Safety	Development of laws and regulations; supervision of the transportation of radioactive materials.
Political Dialogue	Convergence of the parties' positions on international issues.

Public Administration	Technical assistance; exchange of information; joint projects; training.
Regional Cooperation	Promotion of regional cooperation; technical assistance programmes.
Research and Technology	Joint research projects; exchange of researchers; development of public-private partnership.
SMEs	Technical assistance; facilitation of access to finance.
Social Matters	Coordination of social security systems; non-discrimination regarding working conditions.
Statistics	Harmonization and/or development of statistical methods; training.
Taxation	Assistance in conducting fiscal system reforms.
Terrorism	Exchange of information and experience; joint research and studies.
Visa and Asylum	Exchange of information; drafting legislation; training. Incl. international movement of persons.

Table A 2: List of agreements

Agreement	Date	Agreement	Date
Armenia - Kazakhstan	25-Dec-01	Eurasian Economic Union (EAEU) - Accession of Kyrgyz Republic	12-Aug-15
Armenia - Moldova	21-Dec-95	European Free Trade Association (EFTA)	3-May-60
Armenia - Russian Federation	25-Mar-93	EU-San Marino	1-Apr-02
Armenia - Turkmenistan	7-Jul-96	EU-Serbia	1-Feb-10
Armenia - Ukraine	18-Dec-96	Faroe Islands - Norway	1-Jul-93
ASEAN free trade area	28-Jan-92	Faroe Islands - Switzerland	1-Mar-95
ASEAN-Australia-New Zealand	1-Jan-10	GCC	1-Jan-03
ASEAN-India	1-Jan-10	Georgia - Armenia	11-Nov-98
ASEAN-Korea, Rep.	1-Jan-10	Georgia - Azerbaijan	10-Jul-96
Asia Pacific Trade Agreement (APTA)	17-Jun-76	Georgia - Kazakhstan	16-Jul-99
Asia Pacific Trade Agreement (APTA) - Accession of China	1-Jan-02	Georgia - Russian Federation	10-May-94
Australia - Papua New Guinea (PATCRA)	1-Feb-77	Georgia - Turkmenistan	1-Jan-00
Australia-New Zealand (ANZCERTA)	1-Jan-83	Georgia - Ukraine	4-Jun-96
Australia-Singapore	28-Jul-03	Global System of Trade Preferences among developing countries (GSTP)	19-Apr-89
Australia-Thailand	1-Jan-05	Guatemala - Chinese Taipei	1-Jul-06
Brunei Darussalam - Japan	31-Jul-08	Gulf Cooperation Council (GCC) - Singapore	1-Sep-13
CAFTA-DR	1-Mar-06	Hong Kong SAR, China - Chile	9-Oct-14
CAN	25-May-88	Hong Kong SAR, China - New Zealand	1-Jan-11
Canada - Chile	5-Jul-97	Iceland - China	1-Jul-14
Canada - Colombia	15-Aug-11	Iceland - Faroe Islands	1-Nov-06
Canada - Costa Rica	1-Nov-02	India - Afghanistan	13-May-03
Canada - Honduras	1-Oct-14	India - Bhutan	29-Jul-06
Canada - Israel	1-Jan-97	India - Nepal	27-Oct-09
Canada - Jordan	1-Oct-12	India-Japan	1-Aug-11
Canada - Panama	1-Apr-13	India-Malaysia	1-Jul-11
Canada - Rep. of Korea	1-Jan-15	India-Singapore	1-Aug-05
Canada-EFTA	1-Jul-09	India-Sri Lanka	15-Dec-01
Canada-Peru	1-Aug-09	Israel - Mexico	1-Jul-00
Caribbean Community and Community Market (CARICOM)	1-Aug-73	Japan - Australia	15-Jan-15
CEFTA	1-May-07	Japan - Peru	1-Mar-12
Central American Common Market (CACM)	4-Jun-61	Japan-ASEAN	1-Dec-08

CEZ	20-May-04	Japan-Indonesia	1-Jul-08
Chile - Colombia	8-May-09	Japan-Malaysia	13-Jul-06
Chile - Costa Rica (Chile - Central America)	15-Feb-02	Japan-Mexico	1-Apr-05
Chile - El Salvador (Chile - Central America)	1-Jun-02	Japan-Philippines	11-Dec-08
Chile - Guatemala (Chile - Central America)	23-Mar-10	Japan-Singapore	30-Nov-02
Chile - Honduras (Chile - Central America)	19-Jul-08	Japan-Switzerland	1-Sep-09
Chile - India	17-Aug-07	Japan-Thailand	1-Nov-07
Chile - Malaysia	25-Feb-12	Japan-Viet Nam	1-Oct-09
Chile - Mexico	1-Aug-99	Jordan - Singapore	22-Aug-05
Chile - Nicaragua (Chile - Central America)	19-Oct-12	Korea, Republic of - Australia	12-Dec-14
Chile - Vietnam	1-Jan-14	Korea, Republic of - Turkey	1-May-13
Chile-Australia	6-Mar-09	Korea, Republic of - US	15-Mar-12
Chile-China	1-Oct-06	Korea, Republic of-India	1-Jan-10
Chile-Japan	3-Sep-07	Korea, Republic of-Singapore	2-Mar-06
Chile-Korea, Rep.	1-Apr-04	Kyrgyz Republic - Armenia	27-Oct-95
China - Costa Rica	1-Aug-11	Kyrgyz Republic - Kazakhstan	11-Nov-95
China - Macao, China	17-Oct-03	Kyrgyz Republic - Moldova	21-Nov-96
China-ASEAN	1-Jan-05	Kyrgyz Republic - Russian Federation	24-Apr-93
China-Hong Kong SAR, China	1-Jan-04	Kyrgyz Republic - Ukraine	19-Jan-98
China-New Zealand	10-Oct-08	Kyrgyz Republic - Uzbekistan	20-Mar-98
China-Pakistan	1-Jul-07	Lao People's Democratic Republic - Thailand	20-Jun-91
China-Peru	1-Mar-10	Latin American Integration Association (LAIA)	18-Mar-81
China-Singapore	1-Jan-09	Malaysia - Australia	1-Jan-13
CIS	30-Dec-94	Mauritius - Pakistan	30-Nov-07
Colombia - Mexico	1-Jan-95	Melanesian Spearhead Group (MSG)	1-Jan-94
Colombia - Northern Triangle (El Salvador, Guatemala, Honduras)	12-Nov-09	MERCOSUR	29-Nov-91
COMESA	8-Dec-94	MERCOSUR-India	1-Jun-09
Costa Rica - Peru	1-Jun-13	Mexico - Central America	1-Sep-12
Costa Rica - Singapore	1-Jul-13	Mexico - Uruguay	15-Jul-04
Dominican Republic - Central America	4-Oct-01	NAFTA	1-Jan-94
EAEU	8-Oct-97	New Zealand - Chinese Taipei	1-Dec-13
East African Community (EAC)	7-Jul-00	New Zealand - Malaysia	1-Aug-10
East African Community (EAC) - Accession of Burundi	1-Jul-07	New Zealand - Singapore	1-Jan-01
East African Community (EAC) - Accession of Rwanda	1-Jul-07	Nicaragua - Chinese Taipei	1-Jan-08
EC (10) Enlargement	1-Jan-81	Pacific Island Countries Trade Agreement (PICTA)	13-Apr-03
EC (9) Enlargement	1-Jan-73	PAFTA	1-Jan-98
EC Enlargement (12)	1-Jan-86	Pakistan - Malaysia	1-Jan-08
EC Enlargement (15)	1-Jan-95	Pakistan - Sri Lanka	12-Jun-05
EC Enlargement (25)	1-May-04	Panama - Chile	7-Mar-08
EC Enlargement (27)	1-Jan-07	Panama - Chinese Taipei	1-Jan-04
EC Treaty	1-Jan-58	Panama - Costa Rica (Panama - Central America)	23-Nov-08
EC-Albania	1-Dec-06	Panama - El Salvador (Panama - Central America)	11-Apr-03
EC-Algeria	1-Sep-05	Panama - Guatemala (Panama - Central America)	20-Jun-09
EC-Bosnia Herzegovina	1-Jul-08	Panama - Honduras (Panama - Central America)	9-Jan-09
EC-Cameroon	1-Oct-09	Panama - Nicaragua (Panama - Central America)	21-Nov-09
EC-CARIFORUM	1-Nov-08	Panama - Peru	1-May-12
EC-Chile	1-Feb-03	Panama - Singapore	24-Jul-06
EC-Côte d'Ivoire	1-Jan-09	Peru - Chile	1-Mar-09

EC-Croatia	1-Mar-02	Peru - Korea, Republic of	1-Aug-11
EC-Arab Republic of Egypt	1-Jun-04	Peru - Mexico	1-Feb-12
EC-Faroe Islands	1-Jan-97	Peru - Singapore	1-Aug-09
EC-FYR Macedonia	1-Jun-01	Protocol on Trade Negotiations (PTN)	11-Feb-73
EC-Iceland	1-Apr-73	Russian Federation - Azerbaijan	17-Feb-93
EC-Israel	1-Jun-00	Russian Federation - Belarus	20-Apr-93
EC-Jordan	1-May-02	Russian Federation - Belarus - Kazakhstan	3-Dec-97
EC-Lebanon	1-Mar-03	Russian Federation - Kazakhstan	7-Jun-93
EC-Mexico	1-Jul-00	Russian Federation - Republic of Moldova	30-Mar-93
EC-Montenegro	1-Jan-08	Russian Federation - Serbia	3-Jun-06
EC-Morocco	1-Mar-00	Russian Federation - Tajikistan	8-Apr-93
EC-Norway	1-Jul-73	Russian Federation - Turkmenistan	6-Apr-93
Economic and Monetary Community of Central Africa (CEMAC)	24-Jun-99	Russian Federation - Uzbekistan	25-Mar-93
Economic Cooperation Organization (ECO)	17-Feb-92	Russian Federation-Ukraine	21-Feb-94
EC-Overseas Territories	1-Jan-71	SACU	15-Jul-04
ECOWAS	24-Jul-93	SAFTA	1-Jan-06
EC-Palestinian Authority	1-Jul-97	Singapore - Chinese Taipei	19-Apr-14
EC-South Africa	1-Jan-00	South Asian Preferential Trade Agreement (SAPTA)	7-Dec-95
EC-Switzerland Liechtenst0	1-Jan-73	South Pacific Regional Trade and Economic Cooperation Agreement (SPARTEC)	1-Jan-81
EC-Syrian Arab Republic	1-Jul-77	Southern African Development Community	1-Sep-00
EC-Tunisia	1-Mar-98	Switzerland - China	1-Jul-14
EC-Turkey	1-Jan-96	Thailand - New Zealand	1-Jul-05
EEA	1-Jan-94	Trans-Pacific Partnership (TPP) Agreement	-
EFTA - Accession of Iceland	1-Mar-70	Trans-Pacific Strategic Economic Partnership	28-May-06
EFTA - Albania	1-Nov-10	Treaty on a Free Trade Area between members of the Commonwealth of Independent States (CIS)	20-Sep-12
EFTA - Bosnia and Herzegovina	1-Jan-15	Turkey - Albania	1-May-08
EFTA - Central America (Costa Rica and Panama)	19-Aug-14	Turkey - Bosnia and Herzegovina	1-Jul-03
EFTA - Chile	1-Dec-04	Turkey - Chile	1-Mar-11
EFTA - Colombia	1-Jul-11	Turkey - Former Yugoslav Republic of Macedonia	1-Sep-00
EFTA - Arab Republic of Egypt	1-Aug-07	Turkey - Georgia	1-Nov-08
EFTA - Former Yugoslav Republic of Macedonia	1-May-02	Turkey - Israel	1-May-97
EFTA - Hong Kong SAR, China	1-Oct-12	Turkey - Jordan	1-Mar-11
EFTA - Jordan	1-Sep-02	Turkey - Mauritius	1-Jun-13
EFTA - Lebanon	1-Jan-07	Turkey - Montenegro	1-Mar-10
EFTA - Mexico	1-Jul-01	Turkey - Morocco	1-Jan-06
EFTA - Montenegro	1-Sep-12	Turkey - Palestinian Authority	1-Jun-05
EFTA - Morocco	1-Dec-99	Turkey - Serbia	1-Sep-10
EFTA - Palestinian Authority	1-Jul-99	Turkey - Syria	1-Jan-07
EFTA - Peru	1-Jul-11	Turkey - Tunisia	1-Jul-05
EFTA - SACU	1-May-08	Turkey-EFTA	1-Apr-92
EFTA - Serbia	1-Oct-10	Ukraine - Azerbaijan	2-Sep-96
EFTA - Singapore	1-Jan-03	Ukraine - Former Yugoslav Republic of Macedonia	5-Jul-01
EFTA - Tunisia	1-Jun-05	Ukraine - Moldova	19-May-05
EFTA - Ukraine	1-Jun-12	Ukraine - Montenegro	1-Jan-13
EFTA-Israel	1-Jan-93	Ukraine - Uzbekistan	1-Jan-96
EFTA-Korea, Rep.	1-Sep-06	Ukraine Tajikistan	11-Jul-02
Egypt - Turkey	1-Mar-07	Ukraine-Belarus	11-Nov-06
El Salvador - Cuba	1-Aug-12	Ukraine-Kazakhstan	19-Oct-98
El Salvador - Honduras - Chinese Taipei	1-Mar-08	Ukraine-Turkmenistan	4-Nov-95

EU - Andorra	1-Jul-91	US - Colombia	15-May-12
EU - Central America	1-Aug-13	US - Panama	31-Oct-12
EU - Colombia and Peru	1-Mar-13	US-Australia	1-Jan-05
EU - Eastern and Southern Africa States Interim EPA	14-May-12	US-Bahrain	1-Aug-06
EU - Georgia	1-Sep-14	US-Chile	1-Jan-04
EU - Korea, Republic of	1-Jul-11	US-Israel	19-Aug-85
EU - Papua New Guinea/Fiji	20-Dec-09	US-Jordan	17-Dec-01
EU - Republic of Moldova	1-Sep-14	US-Morocco	1-Jan-06
EU - Ukraine	23-Apr-14	US-Oman	1-Feb-09
EU (28) Enlargement	1-Jul-13	US-Peru	1-Feb-09
Eurasian Economic Union (EAEU)	1-Jan-15	US-Singapore	1-Jan-04
Eurasian Economic Union (EAEU) - Accession of Armenia	2-Jan-15	West African Economic and Monetary Union (WAEMU)	1-Jan-00

Annex B – Principal component analysis

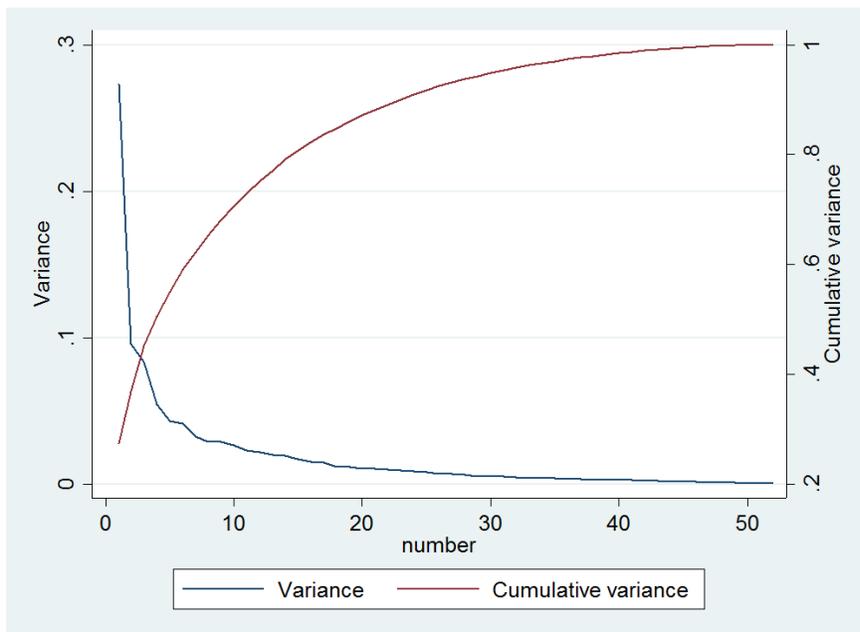
The principal component analysis (PCA) is a procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components. The transformation is defined such that the first principal component has the largest possible variance and each succeeding component has the highest variance conditional on being orthogonal to the preceding components.²⁶

We perform a PCA of the covariance matrix of 52 provisions and a sample of 263 trade agreements in force in 2015.²⁷ We decided to use the covariance matrix since all variables are measured on the same scale (i.e. they are all dummy variables). Figure A1 shows the share of variation in the data taken into account by the components. The blue line indicates that the first component accounts for around 27 percent of the variation in the data while the second component accounts for only 9 percent. The cumulative variation in red indicates that the first 4 components account for more than half the variation and the first 15 components account for 80 percent of variation.

²⁶ See Jolliffe (2002) for the explanation of principal component analysis and the methods to select components and variables.

²⁷ We exclude from the analysis all Partial Scope Agreements (PSA) and the Trans-Pacific Partnership. The results including PSAs are very similar.

Figure A1: Variation taken into account by components



One advantage of PCA is that it reduces a large number of variables to a smaller subset of orthogonal components. However, there is not a well-defined objective methodology to select the number of important components; therefore, we present the results of different selection methods.

An intuitive method for choosing the number of relevant components is to look at the cumulative percentage of total variation.²⁸ After defining a threshold, the smallest number of principal components that reach such threshold are maintained. A threshold between 70 and 90 percent is usually chosen but there may be cases in which a lower threshold is more suitable. Such threshold is generally smaller as the number of variables in the data set or the number of observations increases. In our case, 80 percent of total variation would retain 15 components while a cutoff of 50 percent would further shrink the number of components to 4. For our purposes and given the large number of variables in the data set, we opt for an even smaller threshold of one-third of the variation, which leaves us with only the first component.

The choice of this threshold simplifies the interpretation and the analysis. In fact, the inspection of the loadings of the first component suggests that the first component can be interpreted as a measure of the "size" of PTAs and so it can be used as a statistical measure of depth. Table A3 reports the coefficients of the first 4 principal components. To simplify the exposition and help the intuition, we only show the variables whose loadings are above the median in absolute terms for each of the first 4 components.

²⁸ An alternative method for the selection of relevant principal components is the so-called scree plot. The scree plot is essentially a plot of the eigenvalues associated to each component. The number of relevant PCs is determined by the point at which the slope of the graph becomes substantially flatter.

Table A3: Loadings of the first 4 components

Provision	Comp1	Comp2	Comp3	Comp4
GATS	0.309523		-0.25487	
SPS	0.295196			
TBT	0.279714	-0.15021		
TRIPs	0.264802		0.282709	
Investment	0.253577	-0.24482		
Public Procurement	0.251065			0.269469
Movement of Capital	0.249251			0.292694
CVM	0.240054			-0.43526
TRIMs	0.236619		-0.24611	
IPR	0.208566		0.278263	-0.22721
AD	0.206473			-0.35434
Visa and Asylum	0.192539		-0.2631	0.239937
STE	0.186338		0.314532	
Environmental Laws	0.184918	0.196908		
Labor Market Regulation	0.163874	0.184378		
Export Taxes			0.207927	0.232831
State Aid			0.414746	
Competition Policy			0.4093	0.355797
Agriculture		0.21316		
Approximation of Legislation		0.208855		
Cultural Cooperation		0.232448		
Economic Policy Dialogue		0.237615		
Education and Training		0.2534		
Energy		0.195315		
Financial Assistance		0.18116		
Health		0.211387		
Illegal Immigration		0.147711		
Industrial Cooperation		0.232839		
Research and Technology		0.259943		
Social Matters		0.203275		
Statistics		0.258488		
Taxation		0.193677		