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Hold the line: The evolution of telecommunications provisions in regional trade agreements

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World Trade Organization

Economic Research and Statistics Division

**HOLD THE LINE:
THE EVOLUTION OF TELECOMMUNICATIONS PROVISIONS
IN REGIONAL TRADE AGREEMENTS**

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Manuscript date: January 2021

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ABSTRACT: Based on the first comprehensive mapping of telecommunications provisions in regional trade agreements (RTAs), this paper shows that telecommunications provisions in RTAs have evolved and expanded significantly over the years. While some provisions focus on information and communications technologies (ICT) infrastructure, policy and investment, other provisions address telecommunications services as well as standards and conformity assessment procedures of ICT equipment. The most detailed and comprehensive telecommunications provisions are found in stand-alone chapters, sections or annexes on telecommunications services. A network analysis further reveals that telecommunications provisions remain highly heterogeneous. Only a limited number of, mostly advanced economies, tend to negotiate very detailed and comprehensive provisions on telecommunications in their respective RTAs. While many telecommunications provisions found in RTAs draw on existing WTO rules, including the Annex on Telecommunications to the General Agreement on Trade in Services (GATS), some GATS provisions, the Reference Paper on Regulatory Principles on Basic Telecommunications and the Agreement on Technical Barriers to Trade, an increasing number of RTAs incorporate explicit provisions that expand existing WTO disciplines and address new regulatory topics related to telecommunications services, such as international roaming, net neutrality, and stolen or lost mobile terminal equipment.

KEYWORDS: World Trade Organization; Regional Trade Agreements, Telecommunications, Digital economy, Network Analysis.

JEL CLASSIFICATIONS: F13, F15

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1 INTRODUCTION

Telecommunications services, including the internet, mobile telephony and data transmission services, provide basic information telecommunication hardware and transmission capacity that play a vital role in the economy. Telecommunications services represent a global market worth over USD 1.74 trillion in revenue in 2019 and is expected to grow further in coming years.¹

Over the past three decades, the telecommunications sector has undergone a series of major technological and regulatory transformations. The sector has shifted from a monopoly structure to a more competitive industry. The deployment of mobile phone services and internet has also changed the way in which individuals and firms communicate and trade. The role of national regulators has also changed in response to these new market dynamics and evolving technologies.

Part of the significant telecommunications market reforms that took place in the early to mid-1990s have been reflected in binding market access commitments in the World Trade Organization (WTO). The 1994 General Agreement on Trade in Services (GATS), negotiated during the Uruguay Round, is the first multilateral framework to cover services trade, including telecommunications services. Its Annex on Telecommunications (GATS Annex) establishes disciplines on the access to and use of public telecommunications transport networks and services (PTTNS). Following the Uruguay Round, WTO members concluded negotiations on basic telecommunications in 1997 with additional market access commitments and the publication of the Reference Paper on Regulatory Principles on Basic Telecommunications (Reference Paper) establishing legally binding sector regulatory principles.²

At present, a majority of WTO members have made market access commitments on telecommunications services, and most of these members have inscribed a version of the Reference Paper in their schedules. Many WTO members have committed, in whole or with some modifications, to the Reference Paper. Alongside these commitments negotiated in the WTO, some of these WTO members have over the years negotiated specific provisions on telecommunications services and more generally on information and communications technologies (ICT) in their regional trade agreements (RTAs).

Although some papers have analysed provisions on telecommunications included in selected RTAs (Tuthill and Sherman, 2008; Burri, 2020), the literature does not provide a comprehensive quantitative analysis of the evolution of telecommunications provisions found in RTAs. This paper fills this gap by providing a quantitative and network analysis of all explicit telecommunications provisions included in RTAs.

A detailed analysis of 501 RTAs notified to the WTO, of which 306 are currently in force, confirms the increasing number of RTAs with specific provisions on telecommunications. As of December 2020, 167 RTAs include at least one provision mentioning explicitly telecommunications. These telecommunications provisions cover various issues, from information and communications technologies (ICT), including telecommunications infrastructure and policy, to ICT equipment standards and trade in telecommunications services. Most detailed telecommunications provisions are found in stand-alone chapters or annexes on telecommunications services. In addition to the increasing number of RTAs with a dedicated chapter or annex on telecommunications services, the number of detailed provisions on telecommunications services included in a given agreement has also increased.

As highlighted in Monteiro et al. (forthcoming), many provisions on telecommunications services found in RTAs build on the provisions of the GATS Annex and Reference Paper. These provisions, like other types of provisions in RTAs, remain, however, highly heterogeneous across agreements. They often differ in terms of language and scope. Some RTAs provide clarity over existing GATS disciplines, while others extend the scope of obligations by addressing new issues. Some of the most recent regulatory issues explicitly addressed include international roaming, net neutrality, stolen or lost mobile terminal equipment and emergency situations.

¹ Grand View Research (2020), <https://www.grandviewresearch.com/industry-analysis/global-telecom-services-market>.

² The term "basic telecommunications" refers to all basic networks and services and use, while the term "public telecommunications transport networks and services" (PTTNS) refers to the specific subset of basic services that are required to be offered to the public generally. See Monteiro et al. (forthcoming) for a detail discussion.

The rest of paper is organized as follows. Section 2 describes the methodology used to map telecommunications provisions in RTAs. Section 3 provides an overview of the evolution of telecommunications provisions in RTAs. Section 4 reviews the structure, location and heterogeneity of telecommunications provisions in RTAs, while section 5 concludes.

2 MAPPING METHODOLOGY

Telecommunications is a broad term that represents the exchange of information over distances through data, voice, and video transmission. It covers a wide range of information and communication technologies (ICT), including telegraph, wired and wireless telephone, satellite, and the internet. Despite the significant role of telecommunications in the economy and the increasing number of RTAs with telecommunications provisions, there are still important gaps in the collection and systematization of information on telecommunications provisions in RTAs for the purpose of policy analysis. An important objective of this paper is to establish for the first time a comprehensive mapping of provisions related to telecommunications incorporated in RTAs. This mapping and quantitative analysis complement the mapping and analysis of provisions on electronic commerce and digital trade (Monteiro and Teh, 2017; WTO, 2018).³

Unless specified otherwise, telecommunications provisions are defined as any provisions explicitly mentioning and referring to telecommunications. The following keywords have been used to identify telecommunications provisions: communication, computerized, cyber, digital, information and communication, ICT, internet, mobile, online and telecommunication.⁴ The identification of the main types of telecommunications provisions follows a bottom-up approach, where each provision identified in a given RTA is compared in terms of language and scope to other provisions found in other RTAs.

Besides these explicit provisions, other provisions in RTAs may be relevant to telecommunications services, even though they do not make explicit reference to telecommunications. Most RTAs negotiated in the last two decades include detailed provisions on trade and investment in services, including telecommunications. A mapping of the general provisions on services trade found in RTAs is, however, outside the scope of this paper (Gootiiz et al., 2020). Similarly, the analysis of the level of commitments in RTAs' schedule of telecommunications services is outside the scope of this paper.

The analysis covers the 501 RTAs that have been notified to the WTO between 1957 and 2020 under Article XXIV (Territorial Application – Frontier Traffic – Customs Unions and Free-trade Areas) of the General Agreement on Tariffs and Trade (GATT-1994), the Enabling Clause (Decision on Differential and More Favourable Treatment, Reciprocity and Fuller Participation of Developing Countries), Article V (Economic Integration) of the General Agreement on Trade in Services (GATS) or the Transparency Mechanism for Regional Trade Agreements.⁵ The analysis covers the main text of the RTAs as well as side documents associated with the agreement at the time of signature, such as protocols, annexes and communication letters. The analysis does not, however, cover agreements, decisions, directives or resolutions that the parties to some RTAs have adopted after the entry into force of their respective agreements.⁶

³ For instance, some provisions on e-commerce recognise the importance of the telecommunications chapter's article on access to and use of PTTNS in enabling trade conducted by electronic means.

⁴ The French and Spanish translations of these keywords have also been used. Provisions on the electronic administration of the institutional bodies established under RTAs are excluded from the analysis (WTO, 2018).

⁵ The WTO's RTA database (<http://rtais.wto.org>) contains detailed information on all the RTAs notified to the GATT/WTO.

⁶ For instance, in 1999 the parties to the Codification of the Andean Subregional Integration Agreement (signed in 1987) adopted Decision 462 which establishes provisions regulating the integration and liberalization of the trade in telecommunications services in the Andean Community (see <http://sice.oas.org/Trade/Junac/decisiones/Dec462e.asp>). Similarly, the parties to the Central American Free Trade Area (CACM) signed in 2000 the Treaty on Investment and Trade in Services between Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua, which includes a chapter on telecommunications services (see http://www.sice.oas.org/Trade/sica/PDF/Tratado_INVyCOM_servicios2002.pdf).

3 EVOLUTION OF TELECOMMUNICATIONS PROVISIONS IN RTAS

The inclusion of provisions referring explicitly to telecommunications in RTAs is not a recent phenomenon.⁷ The way to address telecommunications has, however, evolved over time. While some provisions focus on ICT, including telecommunications infrastructure, investment and policy, other provisions address regulations, standards and conformity assessment procedures of ICT equipment and trade in telecommunications services.

The very first telecommunications provisions were included in a chapter on transport and communications in the 1958 Central American Multilateral Free Trade and Economic Integration Treaty.⁸ These provisions committed the parties to direct their combined efforts towards improving the telecommunications systems between their respective territories. Several years later, a couple of telecommunications provisions were also found in the Second Lomé Convention between the European Economic Community and 71 African, Caribbean, and Pacific (ACP) countries signed in 1979.⁹ One of these provisions, located in the chapter on financial resources and methods of financing, stipulated that the European Economic Community could exceptionally grant financial assistance in support of telecommunications projects, among other sectors.¹⁰

The first explicit provision on telecommunications services is found in a side declaration on trade in services to the 1985 RTA between Israel and the United States. In particular, the provision is included in calling on the parties to eliminate existing barriers to trade in services, including communications. A couple of years later, the 1988 RTA between Canada and the United States was the first agreement to include in its services chapter a relatively detailed sectoral annex on computer services and telecommunications-network-based enhanced services. This sectoral annex covered, among other things, rights of access to basic telecommunications for enhanced telecommunications services and the resale and sharing of basic telecommunications transport services. Other provisions covered the parameters for defining commercial presence and investment as well as anti-competitive behaviour of public monopolies.

The first stand-alone chapter on telecommunications services was found in the 1993 North American Free Trade Agreement (NAFTA) negotiated by Canada, Mexico and the United States. This chapter covered different issues, including access to public telecommunications transport networks, value-added services provision and standard-related measures relating to the attachment of terminal to public telecommunications transport networks.¹¹

The number of RTAs with specific telecommunications provisions has, over the years, increased relatively continuously, as highlighted in Figure 1. As of December 2020, telecommunications provisions can be found in 167 RTAs, representing 55 percent of all the agreements notified to the WTO and currently in force. This increasing number of RTAs with telecommunications provisions reflects to a large extent the RTAs' growing trend to cover both goods and services. Only a few agreements covering services trade, such as the RTA between Chinese Taipei, El Salvador and Honduras, explicitly exclude telecommunications services. The rise in the total number of RTAs with telecommunications provisions is also driven by the surge in RTAs negotiated between developing countries. In particular, 59 and 23 percent of the notified RTAs incorporating telecommunications provisions (currently in force) were agreements between high- and middle- and low-income economies (98 North-south RTAs) and between middle- and low-income economies (38 South-South RTAs), respectively. Only, thirty-one RTAs negotiated between developed countries, representing 23 percent of all notified RTAs currently in force, include telecommunications provisions.

⁷ The evolution of all notified RTAs, including those previously in force, is reported in Figure A1 in the Annexes.

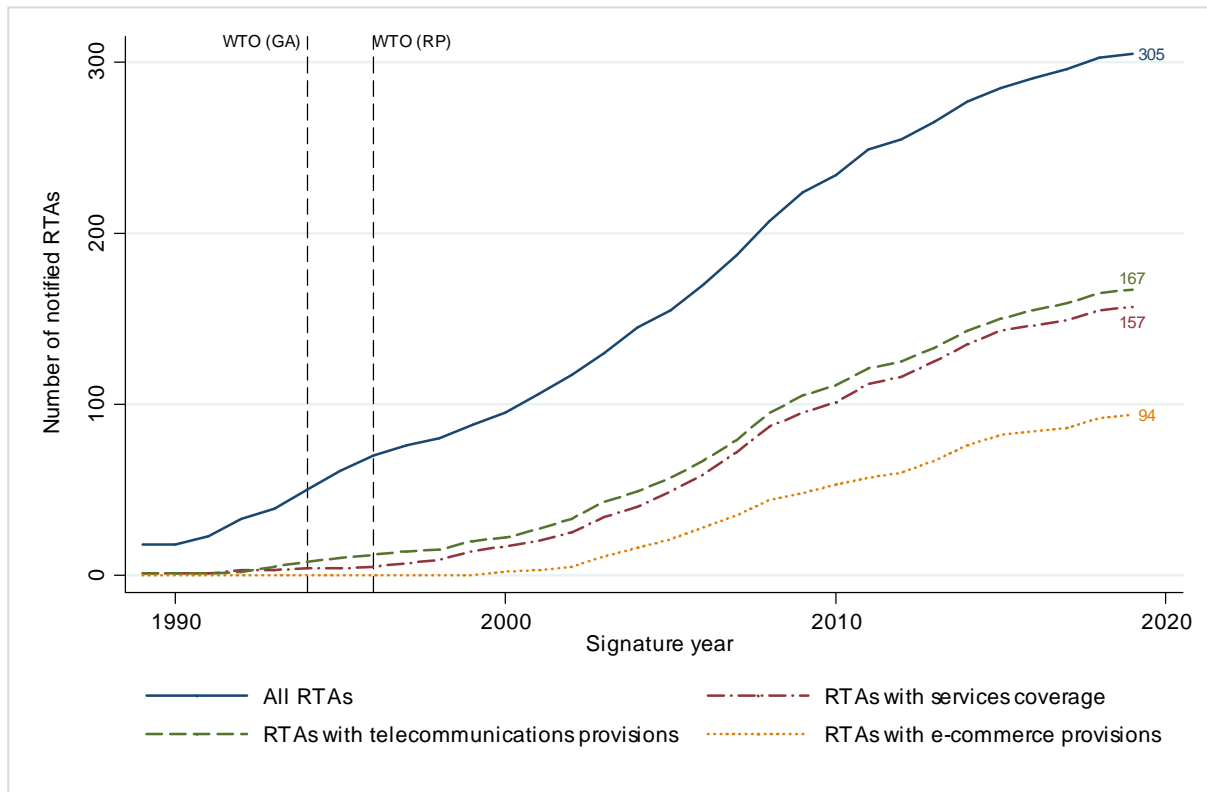
⁸ The Central American Multilateral Free Trade and Economic Integration Treaty between Guatemala, El Salvador, Honduras and Nicaragua is no longer in force.

⁹ The Second Lomé Convention is no longer in force.

¹⁰ The other explicit telecommunications provisions, found in the chapter on regional cooperation, specified the scope of regional and inter-regional cooperation to include telecommunications, which received priority for least-developed ACP members.

¹¹ In 2020, NAFTA was replaced by the agreement between the United States, Mexico and Canada, commonly known as USMCA, CUSMA or T-MEC.

Figure 1: The number of RTAs with telecommunications provisions has increased steadily in the last 20 years



Source: Own computation based on mapping of telecommunications provisions in RTAs.

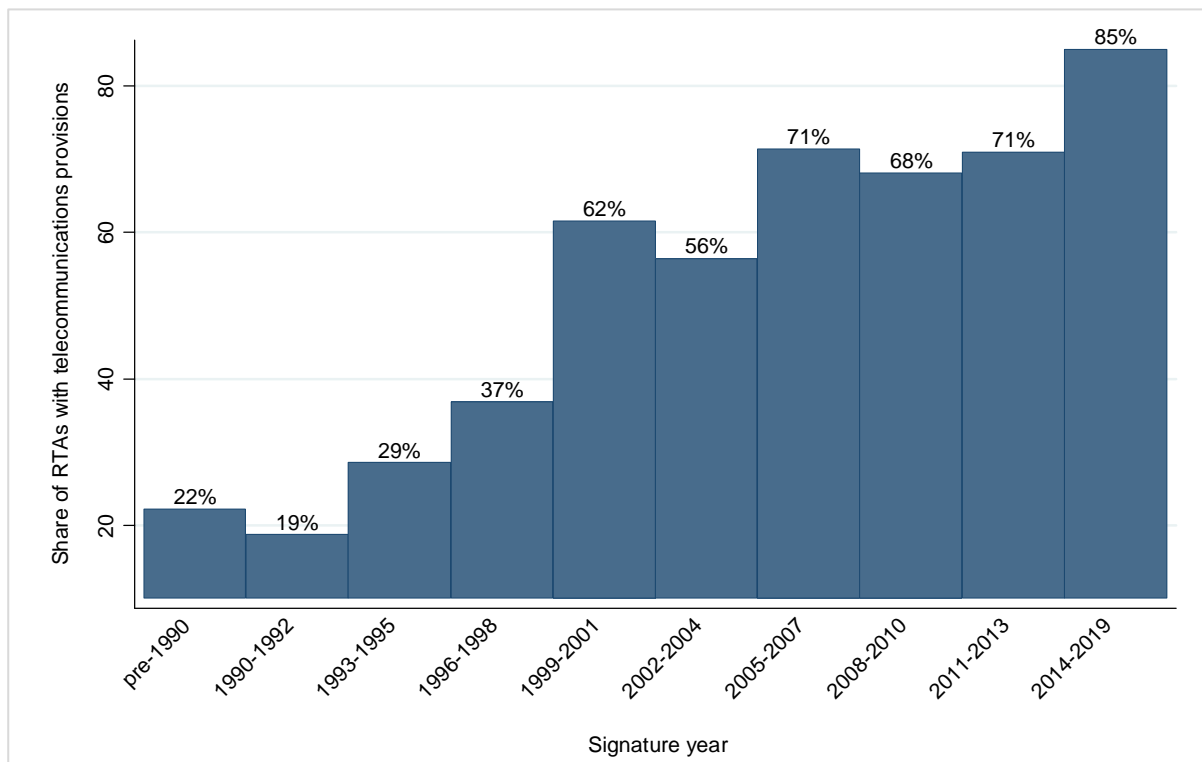
Note: The graph only displays notified RTAs currently in force. WTO (GA) = GATS Annex; WTO(RP) = Reference Paper.

The evolution of RTAs with telecommunications provisions can be broadly characterized by three different periods. Prior to 1999, the number of RTAs with telecommunications provisions was relatively limited. Between 1999 and 2013, the number of RTAs with telecommunications provisions increased at a higher pace. In particular, since the early 2000s a majority of RTAs negotiated incorporate at least one telecommunications provision. Although there has been a slight slowdown in the number of RTAs with telecommunications provisions in the last four years, the average annual share of RTAs with such provisions has further increased significantly since 2014. As highlighted in Figure 2, telecommunications provisions are, on average, included in more than 80 percent of all the RTAs signed between 2014 and 2019.¹²

Beyond the increasing number of RTAs with telecommunications provisions, the number and level of details of these provisions have also increased significantly over the years. As highlighted in Figure 3, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) between Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam incorporates the highest number of telecommunications provisions. The agreement includes a telecommunications chapter covering a large range of issues, including access to and use of telecommunications services; treatment of foreign telecommunications suppliers; regulatory commitments; enforcement and dispute resolution; and international mobile roaming. The CPTPP also establishes a committee on telecommunications to overview the implementation of the telecommunications chapter. The agreement also incorporates in the chapter on technical barrier to trade a sectoral annex providing guidance on the application of technical requirements and conformity assessment obligations to ICT products that use cryptography or that have an electromagnetic capability. The RTAs between Australia and Peru and between Chinese Taipei and Nicaragua, as well as the Additional Protocol to the Framework Agreement of the Pacific Alliance, negotiated by Chile, Colombia, Mexico and Peru, also include a relatively high number of telecommunications provisions.

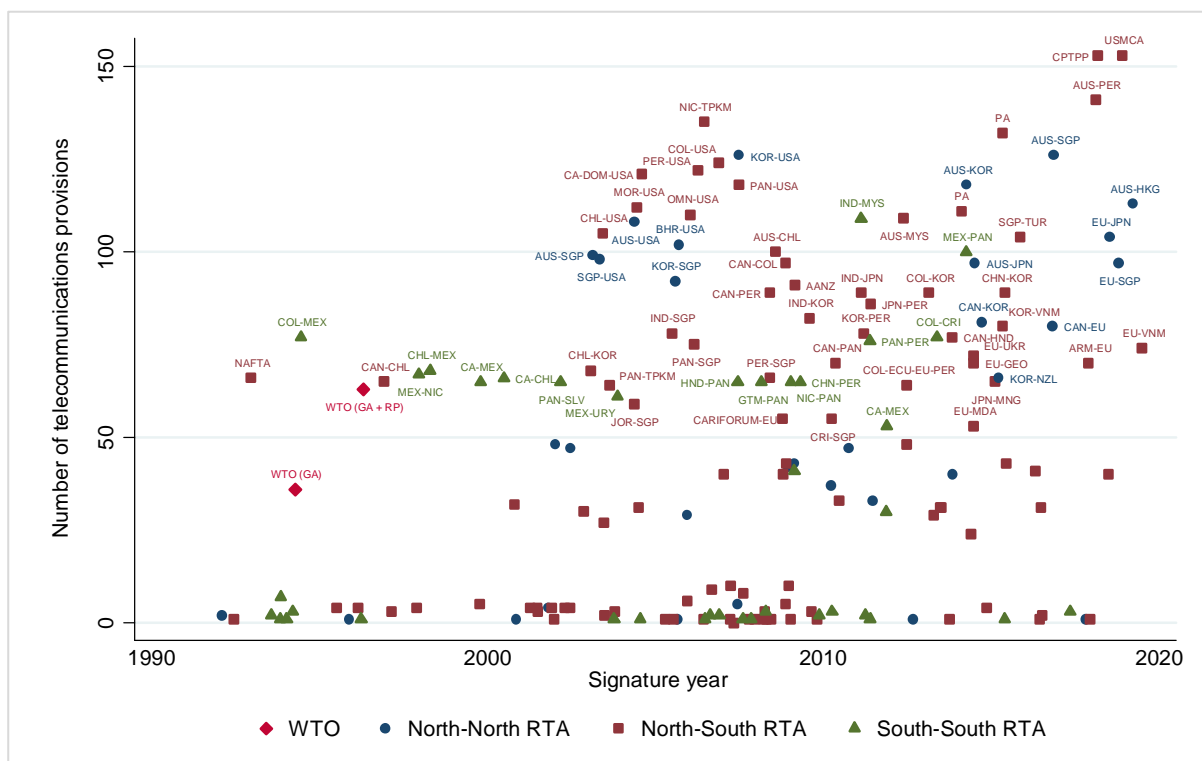
¹² The evolution of the share of RTAs with telecommunications provisions restricted only to notified agreements currently in force is depicted in Figure A2 in the Annexes.

Figure 2: A majority of RTAs include telecommunications provisions since the 2000s



Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph displays only notified RTAs currently in force.

Figure 3: The number of telecommunications provisions in RTAs has increased over time

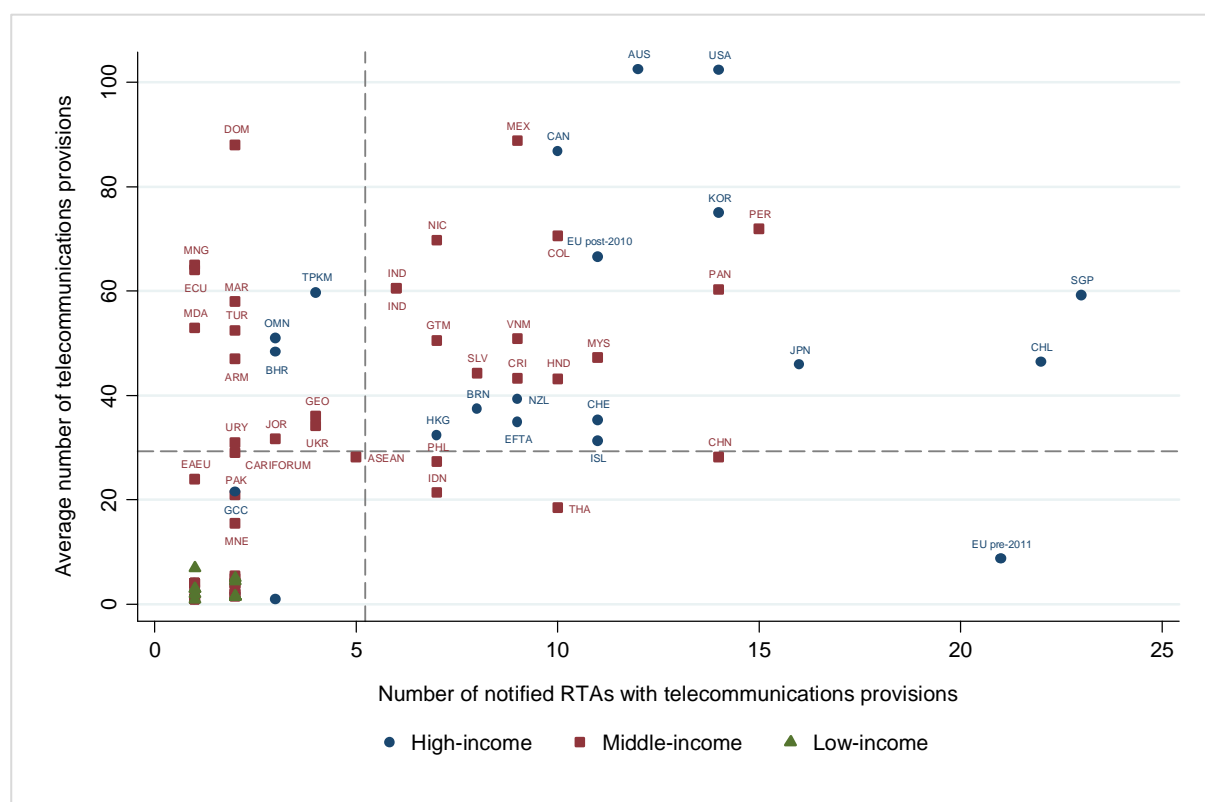


Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: For visual clarity, the graph only displays notified RTAs currently in force as of 1990 with at least one explicit telecommunications provision with the exception of NAFTA. "North" is defined as high-income countries, whereas "South"

is defined as middle- and low-income countries according to the World Bank's country classification. Amended RTAs are reported separately. WTO (GA) = GATS Annex; WTO(RP) = Reference Paper.

Although the number of RTAs with telecommunications provisions continues to increase, the choice to include detailed telecommunications provisions tends to remain limited to RTAs negotiated by high-income and some middle-, mostly upper middle-, income economies. Australia and the United States are the main proponents to include the most detailed telecommunications provisions in RTAs, as depicted in Figure 4. Other countries that tend to incorporate relatively detailed provisions include Canada, the Republic of Korea, Singapore and several Latin American countries, such as Colombia, Mexico, Nicaragua, Panama and Peru. No low-income economies has negotiated a RTA with detailed telecommunications provisions.

Figure 4: RTAs with high average number of telecommunications provisions are typically negotiated by high-income countries and some middle-income countries



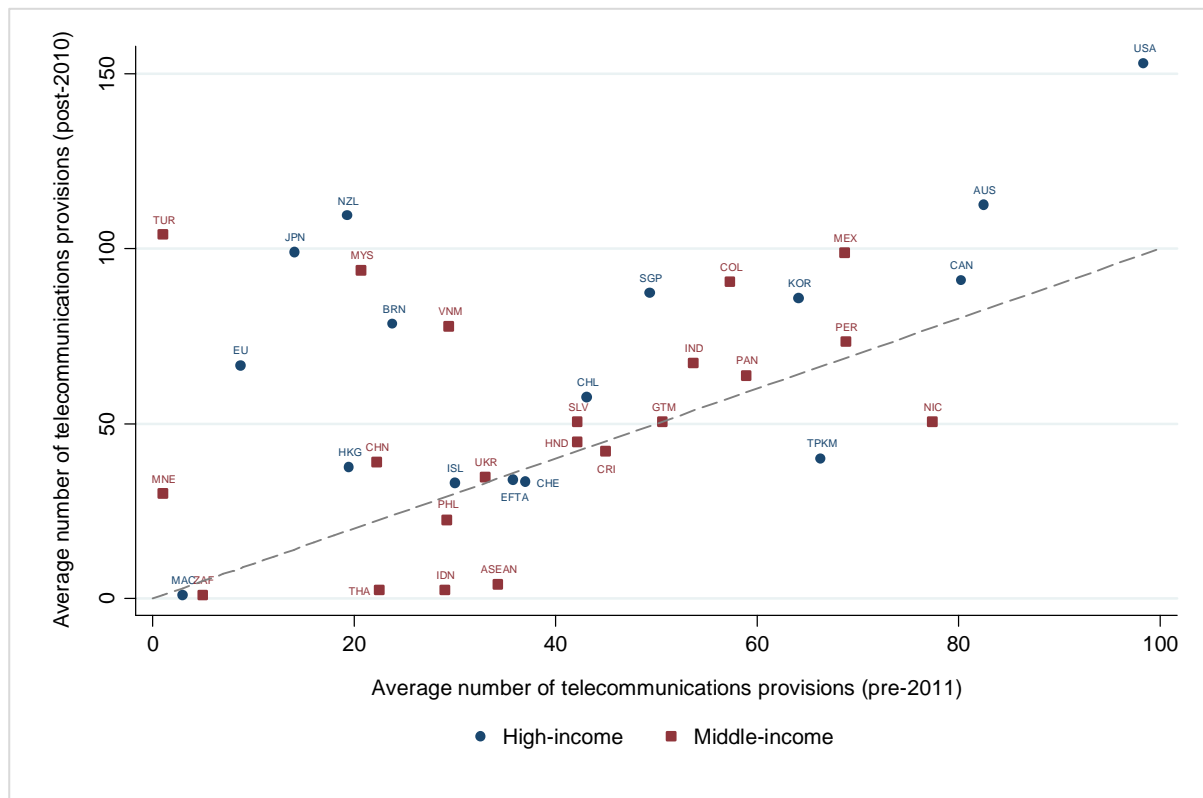
Source: Own computation based on mapping of telecommunications provisions in RTAs.

Note: For visual clarity, the graph only displays notified RTAs currently in force with at least one explicit telecommunications provision. The definition of high-, middle- and low-income countries are based on the World Bank's country classification. The horizontal and vertical dashed lines represent the average number of telecommunications provisions and the average number of RTAs with telecommunications provisions, respectively.

The inclusion of telecommunications provisions in RTAs is, however, a dynamic process. The decision to include telecommunications provisions may change over time. As highlighted in Figure 5, the average number of telecommunications provisions included in RTAs negotiated in the last ten years (2010-2019) is larger for a majority of countries having already included telecommunications provisions in their RTAs before 2010. In particular, Chile, the European Union, Japan, Malaysia, New Zealand, Turkey, and the United States have increased the most the average number of telecommunications provisions in their respective agreements. For instance, until 2007, the average number of telecommunications provisions in RTAs negotiated by the European Union remained relatively low with telecommunications provisions focusing mostly on cooperation. Since 2008 and in particular 2010, the European Union has expanded significantly the scope of its

telecommunications provisions increasingly covering issues, such as telecommunications services and standards and conformity assessment procedures on telecommunications equipment.¹³

Figure 5: Most economies have increased the average number of telecommunications provisions in their respective RTAs



Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph considers only notified RTAs currently in force.

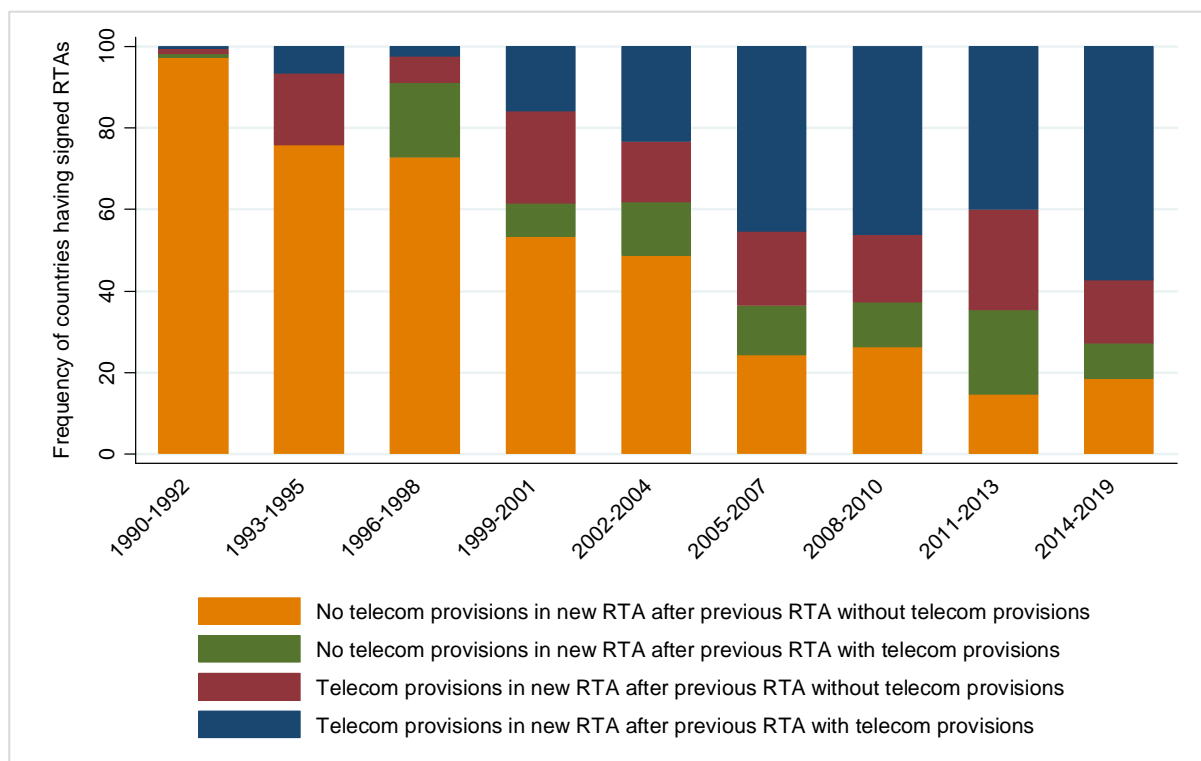
The decision to include telecommunications provisions in RTAs not only changes over time but depends also on the countries that take part in the negotiation of the agreement, as shown in Figure 6. On average, 58% of the economies that negotiated RTAs during the 2014-2019 period, continued to incorporate telecommunications provisions in their new agreements. In addition, 15% of the economies that negotiated RTAs during the same period chose to include telecommunications provisions in their new agreement after not having done so in their previous agreement. Indeed, 45% of the economies that signed RTAs during the 2014-2019 period have incorporated either the same or a higher number of types of telecommunications provisions in their respective new agreements compared to their immediate previous agreements.¹⁴ Conversely, 7% of the economies that negotiated RTAs over the 2014-2019 period decided not to include any telecommunications provisions in their new agreement after having included some telecommunications provisions in their previous agreement.

Given the dynamic nature of the decision to include telecommunications provisions, the universe of RTAs with telecommunications provisions is continuously expanding and spanning multiple clusters, as shown in Figure 7. The main cluster is represented by the parties to the CPTPP, which as explained above incorporates the most comprehensive telecommunications provisions. Other clusters include the Association of Southeast Asian Nations (ASEAN), the European Union, the European Free Trade Association (EFTA) states, India, the Republic of Korea, and the United States (with several Latin American and Middle East countries).

¹³ A chronological map representing the average number of telecommunications provisions for each country over the 1990-2019 period is depicted in Figure A3 in the Annexes.

¹⁴ The evolution of the frequency of RTAs' decision to include or not telecommunications provisions in terms of number of types of provisions is depicted in Figure A4 in the Annexes.

Figure 6: Economies having negotiated telecommunications provisions in their previous RTAs tend to include telecommunications provisions in their next RTAs

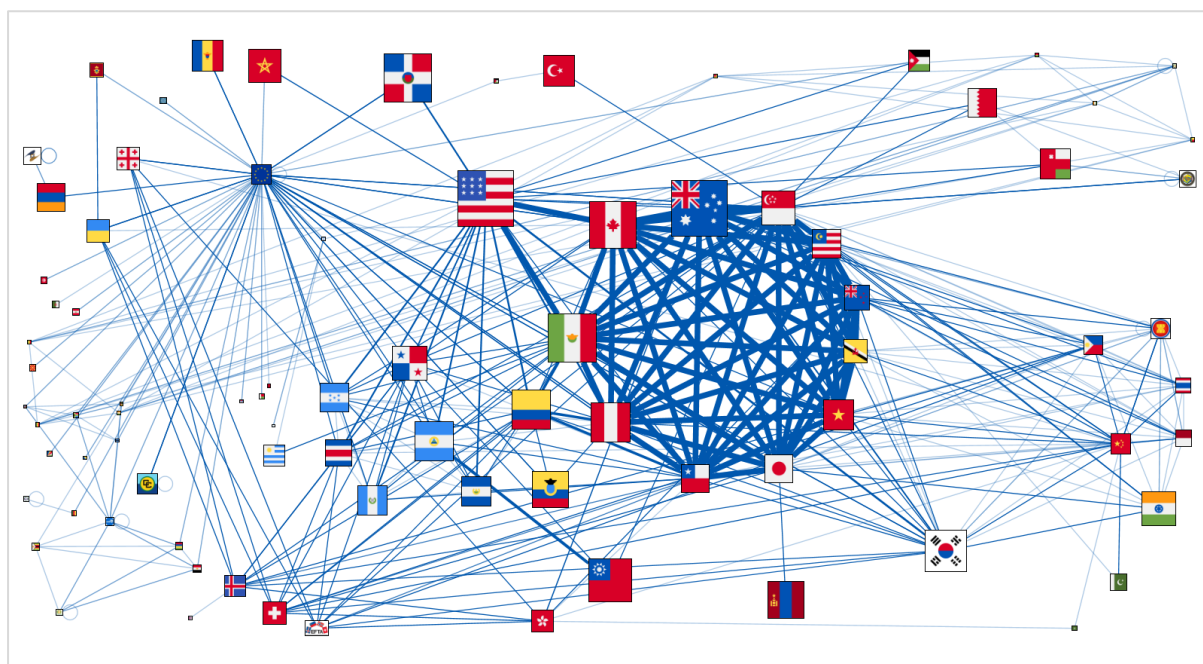


Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph displays only notified RTAs currently in force.

The relationship between the number of telecommunications provisions in a given RTA and the level of development of the parties to that RTA is highly non-linear, as depicted in Figure 8.¹⁵ The number of telecommunications provisions in a given RTA tends to be relatively higher in agreements representing a relatively large market size (measured by the sum of the parties' real GDP). Moreover, the number of telecommunications provisions tends to be relatively higher in RTAs negotiated by parties experiencing different but not too distant levels of economic development (measured by the parties' index of similarity of real GDP). As explained above, several RTAs with a large number of telecommunications provisions have been negotiated between high and middle-income economies. That being said, a limited number of telecommunications provisions is found in some RTAs negotiated between economies experiencing a relatively large level of economic development (measured by the average real GDP per capita and real GDP growth) suggesting that not all advanced economies are or have been in the past proponent of including detailed telecommunications provisions in their respective agreements.

¹⁵ The same patterns are observed when the analysis is restricted to RTAs negotiated in the last 10 years.

Figure 7: The universe of RTAs with telecommunications provisions spans multiple clusters



Source: Own computation based on mapping of telecommunications provisions in RTAs.

Note: For visual clarity, the graph only displays notified RTAs currently in force with at least one explicit telecommunications provision. The size of each node represents the average number of telecommunications provisions by economy. The width of each edge measures the number of telecommunications provisions in the respective RTA.

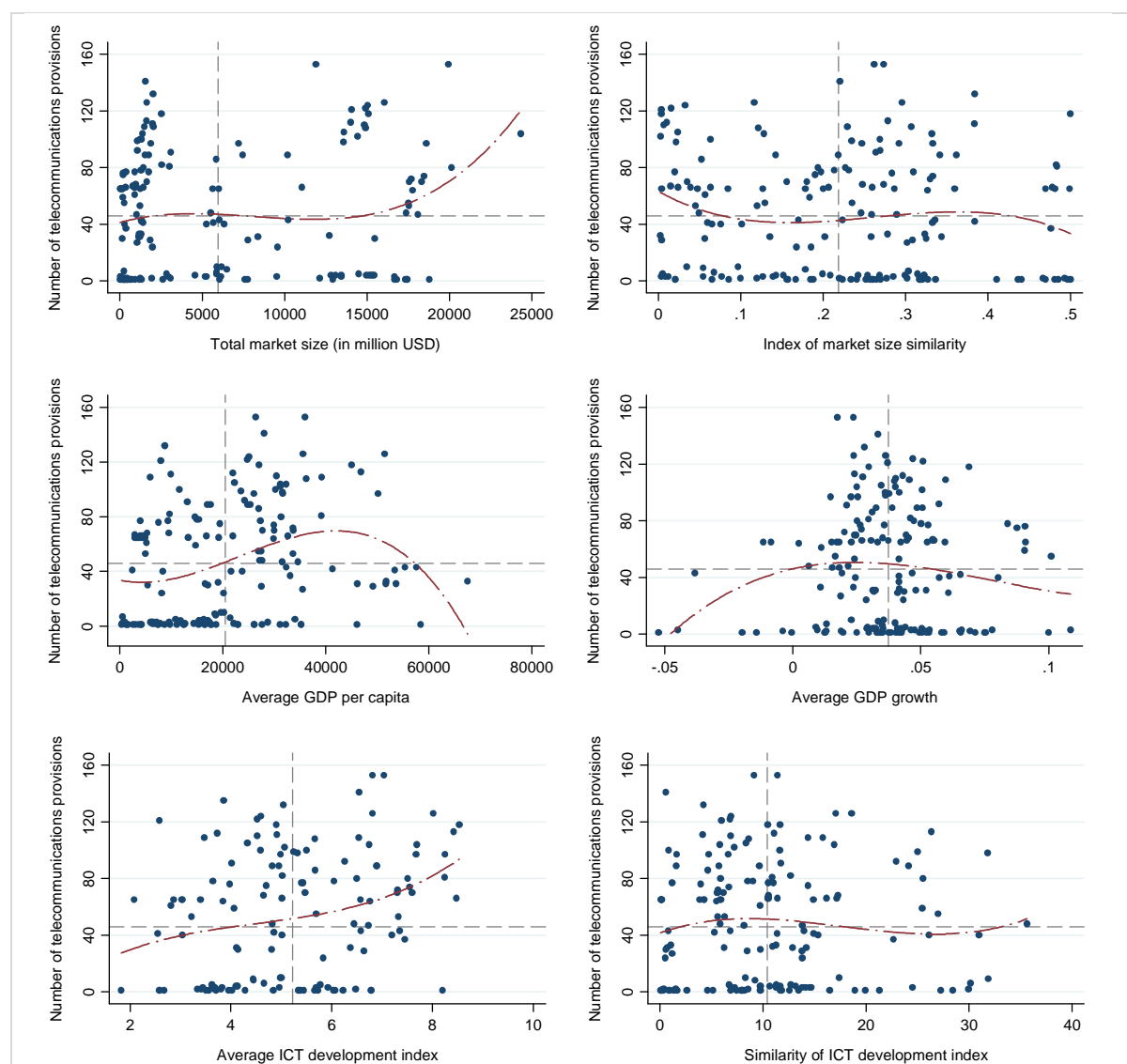
The relationship between the number of telecommunications provisions in a given RTA and the level of ICT development of the parties to that RTA highlights also important idiosyncratic features. Telecommunications provisions tend to be much more comprehensive in RTAs negotiated by countries experiencing a relatively high level of ICT development, measured by the International Telecommunication Union (ITU) ICT Development Index (IDI) which captures (1) ICT access; (2) ICT use; and (3) ICT skills. Most of these ICT-advanced economies are also high-income economies. Yet, a few economies having achieved a more limited level of ICT development have also incorporated a relatively high number of telecommunications provisions in some of their RTAs, sometimes negotiated with a more advanced economy.

The relationship between the number of telecommunications provisions in a given RTA and trade patterns, including trade costs, is also highly heterogeneous, as shown in Figure 9. Some countries with a very high export share of ICT services in total service exports, such as India and Singapore, have also incorporated a relatively high number of telecommunications provisions in some of their RTAs.¹⁶ A similar, albeit less pronounced, pattern is observed with the export share of ICT goods in total goods exports.¹⁷ That being said, some of the RTAs with the highest number of telecommunications provisions have also been negotiated by economies exporting a lower average share of ICT goods and/or services. Many of these economies are advanced economies with a relatively more diversified export structure.

¹⁶ ICT service exports include computer and communications services (telecommunications and postal and courier services) and information services (computer data and news-related service transactions).

¹⁷ ICT goods exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other (miscellaneous) information and technology goods.

Figure 8: Comprehensive telecommunications provisions tend to be found in RTAs signed by economies with large market size and high ICT levels

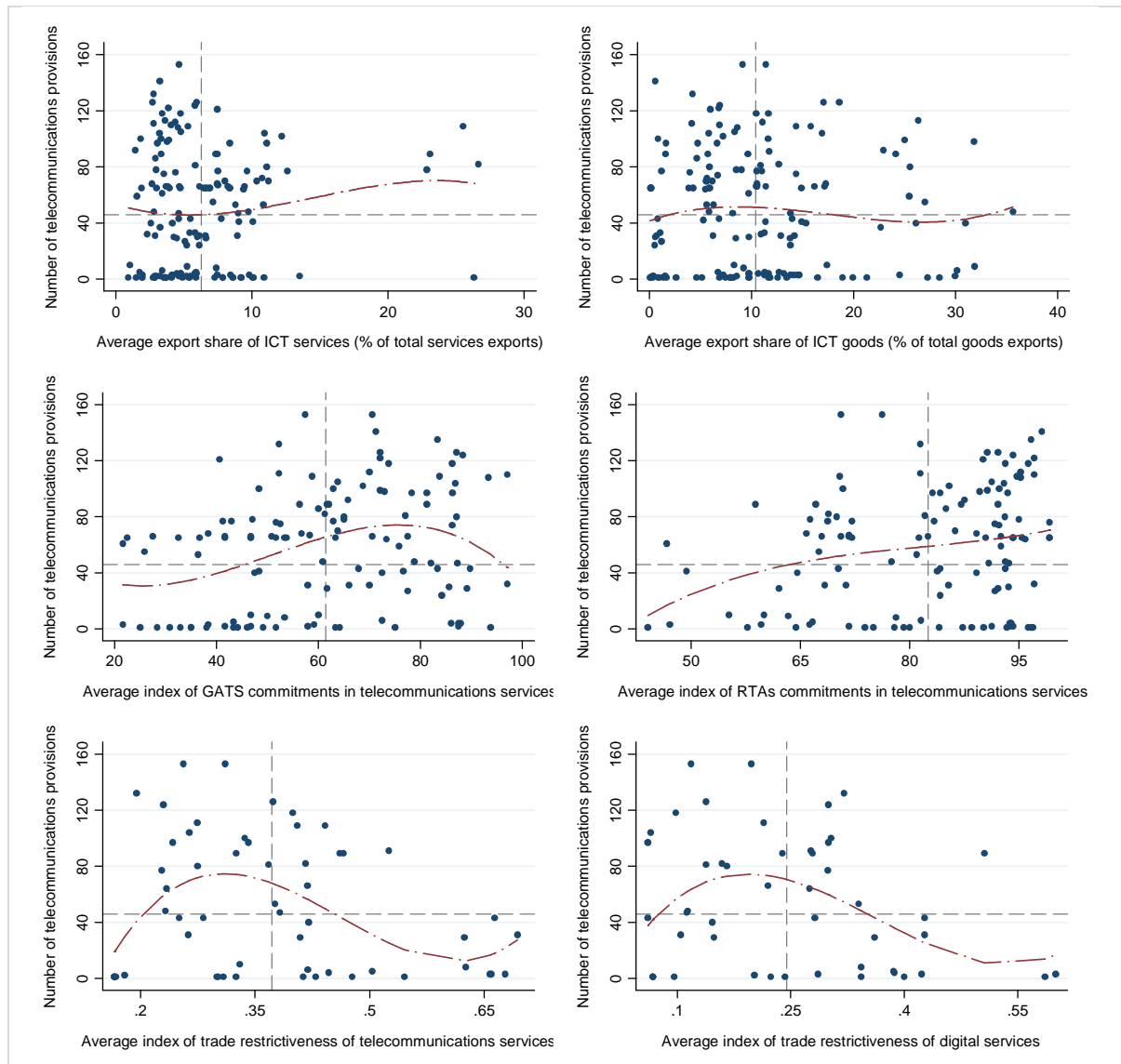


Source: Own computation based on mapping of telecommunications provisions in RTAs and data taken from World Development Indicators and ITU.

Note: The market size is measured by the sum of the parties' real GDP (in US\$ millions). The similarity index between countries i and j is defined as $1 - [X_i / (X_i + X_j)]^2 - [X_j / (X_i + X_j)]^2$ and ranges from 0 (dissimilar) to 0.5 (similar). The ICT Development Index (IDI), developed by the ITU, is a composite index combining 11 indicators capturing three stages of ICT development: (1) ICT readiness reflecting the level of networked infrastructure and access to ICTs; (2) ICT intensity reflecting the level of use of ICTs in the society; and (3) ICT impact reflecting the outcomes of more efficient and effective ICT use. The horizontal and vertical dashed lines represent the average.

The inclusion of detailed provisions referring explicitly to telecommunications in RTAs, in particular detailed provisions on telecommunications services, tends to be more prevalent among WTO members having made deeper market access commitments in telecommunications services under their GATS schedules. Similarly, and more strikingly, economies having negotiated deeper commitments in their respective RTAs schedules have also included comprehensive telecommunications provisions. This pattern and trend reveals the extent to which many detailed provisions on telecommunications services in RTAs are complementary to the specific market access commitments in telecommunications services negotiated under these RTAs. Indeed, the number of telecommunications provisions tends to increase in RTAs negotiated by economies that apply fewer trade restrictions that affect trade in telecommunications services and digitally enabled services.

Figure 9: Comprehensive telecommunications provisions tend to be found in RTAs negotiated by economies with lower trade barriers in telecommunications services



Source: Own computation based on mapping of telecommunications provisions in RTAs and data taken from Roy (2011) and OECD.Stat.

Note: Each dot represents a RTA. The GATS and RTAs commitments index in telecommunications services, constructed by Roy (2011), range from 0 (no commitment) to 100 (full commitment). The telecommunications services and digital services trade restrictiveness indexes, constructed by the OECD, range from 0 (completely open to trade and investment) to 1 (completely closed to foreign services providers). The horizontal and vertical dashed lines represent the average.

4 HETEROGENEITY OF TELECOMMUNICATIONS PROVISIONS

Like many other issues covered by RTAs, such as digital trade, telecommunications provisions are highly heterogeneous across agreements. This heterogeneity takes many forms, from the structure and location of the telecommunications provisions in the RTA to their language and scope.

4.1 Structure and location of telecommunications provisions

The heterogeneity characterising many telecommunications provisions is reflected in their structure and location in RTAs. Telecommunications provisions can be found in the main text of the RTA but also in the annex(es) to the agreement. Some telecommunications provisions are also included in side-documents, such as joint declaration, letter, protocol and cooperation agreement, that are signed at the same time as the RTA. The structural form of telecommunications provisions can vary substantially between RTAs, even among those negotiated by the same country.

Table 1: Main structures of telecommunications provisions in RTAs

Structure of telecommunications provisions	Number of RTAs
Main text of the RTA:	146
- Non-specific article(s):	133
• ICT	28
• Telecommunications services	108
• ICT standards and conformity assessment procedures	39
- Specific article(s):	35
• ICT	27
• Telecommunications services	8
- Specific chapter/section:	68
• ICT	2
• Telecommunications services	66
Annex(es) to the RTA:	84
- Annex(es) to chapter on telecommunications services	29
- Annex(es) to chapter on services	20
- Schedule of telecommunications services commitments	29
- Annex(es) to chapter on technical barriers to trade	12
- Annex(es) to chapter on cooperation	2
Side document(s) to the RTA:	20
- Letter on ICT	1
- Letter on telecommunications services	3
- Declaration on telecommunications services	1
- Formal note on telecommunications services	1
- Memorandum of understanding on ICT	1
- Protocol on ICT	1
- Protocol on telecommunications services	1
- Protocol on ICT standards and conformity assessment procedures	1
- Cooperation agreement on ICT standards and conformity assessment procedures	1
- Implementing agreement	10

Source: Own calculations.

Note: The analysis considers only notified RTAs currently in force. Provisions on telecommunications equipment standards and conformity assessment procedures included in some chapters on telecommunications services are not reported in the table.

The RTAs mapping reveals that 146 notified agreements incorporate at least one explicit provision on telecommunications in the main text of the agreement, as reported in Table 1.¹⁸ Some of these provisions focus on ICT, including telecommunications infrastructure, while others address specifically telecommunications services or standards and conformity assessment procedures related to ICT equipment.

Many RTAs include in the main text of the RTA one or several non-specific articles addressing various issues, including telecommunications. For instance, several RTAs list telecommunications, or more generally ICT, as a cooperation area in their chapter on cooperation. An increasing number of RTAs also include a provision specifying explicitly that the chapter on cross-border services applies to measures affecting the access to and use of distribution, transport, or telecommunications networks and services in connection with the supply of a service.¹⁹ Similarly, some chapters on technical barrier to trade stipulate that standards issued by the International Telecommunication Union (ITU) are considered as relevant international standards.

A limited number of RTAs incorporate a specific article on telecommunications in a chapter that is not specific to telecommunications. For instance, several RTAs to which the European Union is a party, such as the agreement with South Africa, include in their chapter on cooperation an article on information society listing the different areas and forms of cooperation on ICT envisaged. Specific articles on telecommunications services are found in a more limited number of agreements. The RTA between the Gulf Cooperation Council and Singapore includes an article on telecommunications services in the chapter on services trade committing the parties to consider future negotiations on mutual liberalisation of telecommunications services. In some agreements, such as the RTA between the Republic of Korea and New Zealand, the article on telecommunications services specifies, among other things, that the GATS Annex on Telecommunications is incorporated into and made part of the chapter on cross-border services trade.

An increasing number of RTAs, namely 66 agreements, have established a chapter or section dedicated to telecommunications services. As hinted in the previous subsection and discussed in greater detail in the next section, the number and scope of provisions on telecommunications services differ significantly across many agreements. While many provisions on telecommunications services draw on the GATS Annex and Reference Paper, an increasing number of provisions on telecommunications services explicitly address new regulatory issues, such as international roaming and net neutrality.

Detailed provisions on telecommunications services are also found in several annexes to the article or chapter on cross-border services located in the main text of the agreement. This is the case, for instance, of several RTAs to which the European Free Trade Association member states, Japan and Singapore are party, respectively. Provisions on telecommunications services are also included in the annexes of the chapter on telecommunications services. For instance, several RTAs negotiated by the United States include an annex on rural telephone companies. Provisions on telecommunications services can also be found in the schedule of specific telecommunications services commitments under the chapter on cross-border trade. Some RTAs refer to or replicate the GATS Reference Paper, while some other agreements include a modified version of the GATS Reference Paper. The schedule of some RTAs also refers to WTO Group on Basic Telecommunications Chairman's Note on Market Access Limitations on Spectrum Availability. Other telecommunications provisions are found in the annexes to the chapters on cooperation and technical barriers to trade.

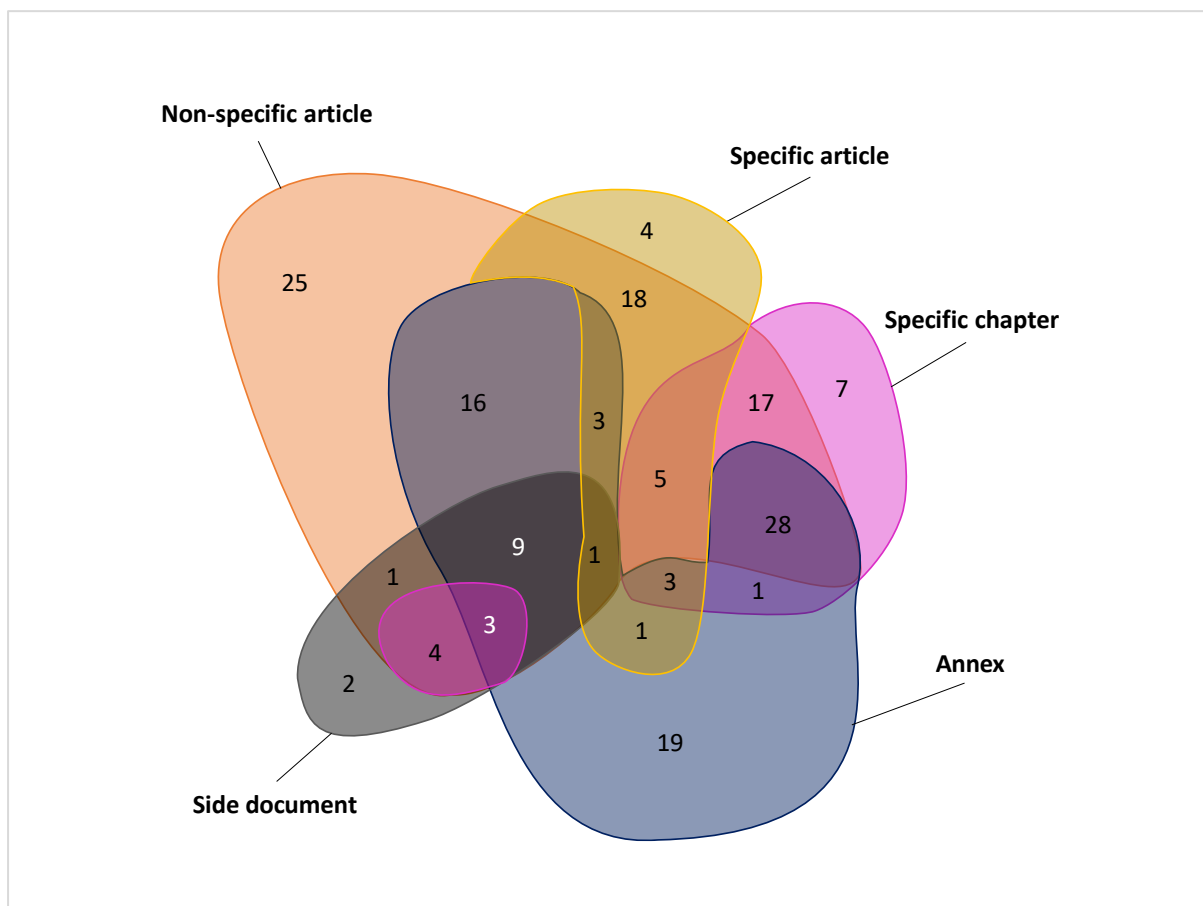
Finally, telecommunications provisions can also be found in some of the side-documents that are part of a few RTAs. These side-documents include exchanges of letters on ICT and telecommunications services, joint declarations and formal notes on telecommunications services, memorandum of understanding on ICT and protocols on ICT, telecommunications services and ICT standards and conformity assessment procedures. Implementing agreements are the most common form of side-document with telecommunications provisions. This is a particular feature of several RTAs to which Japan is a party, where their respective implementing agreement includes a specific article or chapter on ICT cooperation.

¹⁸ This number does not include the few RTAs, including the agreement between Chinese Taipei, El Salvador and Honduras, that explicitly exclude telecommunications services from the scope of the chapter on cross-border services.

¹⁹ This type of provisions is often included in RTAs that also incorporate a chapter on telecommunications services.

As shown in Figure 10, the structure and location of telecommunications provisions are not necessarily mutually exclusive. Many RTAs include telecommunications provisions in a specific chapter on telecommunications services, as well as in annexes and in non-specific articles in the chapters on cross-border services, technical barriers to trade, general exceptions or cooperation.

Figure 10: The structure of telecommunications provisions in RTAs remains heterogenous



Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: Proportions in the figure not respected. The analysis considers only notified RTAs currently in force.

4.2 Scope and types of telecommunications provisions

As noted above, telecommunications provisions in RTAs have evolved and expanded over the years, including in agreements negotiated by the same country. Based on the bottom-up mapping approach, more than 700 different types of telecommunications provisions in RTAs have been identified, which can be grouped in 58 main types of telecommunications provisions, as reported in Table 2. As discussed in more detailed in Monteiro et al. (forthcoming), telecommunications provisions found in RTAs cover a broad range of different issues, from ICT, including telecommunications infrastructure, investment and policy, to telecommunications services and standards and conformity assessment procedures related to ICT equipment.

Table 2: Main types of telecommunications provisions in RTAs

Main types of provisions	Total	First year	Main types of provisions	Total	First year
Services chapter scope	53	1985	Number portability	39	2002
GATS Annex / Reference Paper in Services schedule	29	2000	Dialling parity	17	2003
Telecommunications services chapter/article scope	99	1988	Regulatory authority	79	2002
Definitions	102	1988	Licenses and other authorizations	80	1993
Objectives	17	1988	Enforcement	36	2003
Approaches to regulation	30	1994	Resolution of telecommunications disputes	78	2002
Harmonization of ICT policy	8	1992	Transparency	83	1992
Harmonization of telecommunications policy	14	1992	Information confidentiality	86	1992
Commitments	3	2003	ICT standards-related measures	45	1992
Cross-border telecommunication services provision	3	2014	Industry participation	7	2003
Access and use of PT(T)NS	78	1992	Flexibility in technology choice	29	2003
Access and use of major suppliers' PT(T)NS	3	2017	Broadband	1	2015
Access to rights of way	34	2003	Net neutrality	1	2015
Submarine cable systems	25	2003	International mobile roaming	10	2014
Satellites	1	2004	Consumer protection	1	2015
Competitive safeguards	90	1988	Quality of service	1	2015
Treatment by major suppliers	41	2003	Stolen or lost mobile terminal equipment	1	2015
Co-Location	42	2002	Emergency situations	1	2015
Interconnection	66	1998	Unsolicited electronic messages	3	2009
Interconnection with major suppliers	78	2002	Cooperation on ICT	67	1958
Leased circuits services	32	1992	Cooperation on ICT standards	15	1995
Re-sale	37	2003	Cooperation on telecommunications (services)	87	1958
Unbundling of network elements	33	2003	Institutional arrangements	16	1992
Conditions for value-added services provisions	31	1988	Consultations	3	2004
Government-owned telecommunication suppliers	18	2003	Relationship to other chapters	56	1992
Rural telephone suppliers	19	2003	Relation to international organizations/agreements	45	1992
Universal service	79	2002	General exceptions	50	1994
Allocation and use of scarce resources	80	1993	Future negotiations	25	1992
Access to number	21	2003	Transitional arrangements	1	2009

Source: Own calculations.

Note: The analysis considers only notified RTAs currently in force. The columns "Total" report the total number of RTAs that include a respective main type of telecommunications provisions. The columns "First year" report the year in which the first RTA incorporated a respective main type of telecommunications provisions. PT(T)NS = Public telecommunications (transport) network and service.

Some of the most common telecommunications provisions found in RTAs build on existing WTO rules, in particular on telecommunications services. Some provisions on telecommunications services refer to or replicate some of the provisions of the GATS Annex on Telecommunications and the Reference Paper on Regulatory Principles on Basic Telecommunications. The GATS Annex ensures that suppliers of all scheduled services have access to and use of PTTNS on reasonable and non-discriminatory terms and conditions. The GATS Annex further requires the publication of relevant information on conditions affecting access to and use of PTTNS. The GATS Annex also promotes technical cooperation, in particular toward developing and least developed economies. The Reference Paper sets out various regulatory principles regarding competitive safeguards, terms of interconnection with major suppliers, transparency of negotiation procedures and interconnection arrangements, dispute settlement of interconnection request, independence of telecommunications regulatory bodies, universal service provisions and allocation and use of scarce telecommunications resources.²⁰

While some provisions on telecommunications services replicate or modify with few changes some of the disciplines set out in GATS Annex on Telecommunications and the Reference Paper, some other provisions clarify certain obligations. In many cases, these clarifications draw on some GATS provisions, including those related to transparency and domestic regulation. Similarly, many provisions on standards, technical regulations and conformity assessment procedures related to telecommunications equipment, including terminals interfacing with the PTTN and inter-operability of PTTS, are based on disciplines set out in the Agreement on Technical Barriers to Trade (TBT) including the promotion of international standards, the application of transparent, non-discriminatory and expeditious conformity assessments procedures of ICT equipment, and the mutual recognition of approved test results.

In parallel, an increasing number of provisions on telecommunications services go beyond the disciplines set out in the GATS Annex and some GATS provisions as well as the Reference Paper and the TBT Agreement by expanding the commitments' sectoral coverage, enhancing some existing disciplines and creating new ones, or addressing new regulatory issues. For instance, some provisions broaden the scope of the Reference Paper obligations beyond basic telecommunications, to also cover value-added telecommunications services in certain respects. Some other provisions on telecommunications services require major PT(T)NS suppliers to provide leased circuit services at "capacity-based and cost-oriented prices", which goes beyond "reasonable and non-discriminatory" terms and conditions required under the GATS Annex. Similarly, while neither the GATS Annex nor the Reference Paper stipulates any particular regulatory approach, some provisions specify the preferred regulatory approach to be taken by the telecommunications regulatory bodies. One approach, referred to as forbearance, found in several RTAs, calls on the parties to refrain from applying direct regulation when the enforcement of such regulation is not necessary to prevent unreasonable or discriminatory practices, to protect consumers or to promote public interest.

Several new issues related to the anti-competitive behaviours of major PT(T)NS suppliers have been addressed in an increasing number of RTAs. For instance, provisions on number portability guarantee the right of PTNS end-users to retain the same telephone numbers when switching between like PTNS suppliers. Similarly, provisions on dialling parity guarantee the ability of PTNS end-users to use an equal number of digits to access a like PTNS, regardless of the PTNS supplier chosen by the end-user. Access to and use of facilities owned or controlled by major PT(T)NS suppliers, including submarine cables, satellites, rights of way, poles, ducts and conduits, have also been addressed in some RTAs. Some of the latest regulatory issues related to telecommunications services and reflecting some of the technological changes that have impacted the telecommunications sector include broadband, international mobile roaming and net neutrality.

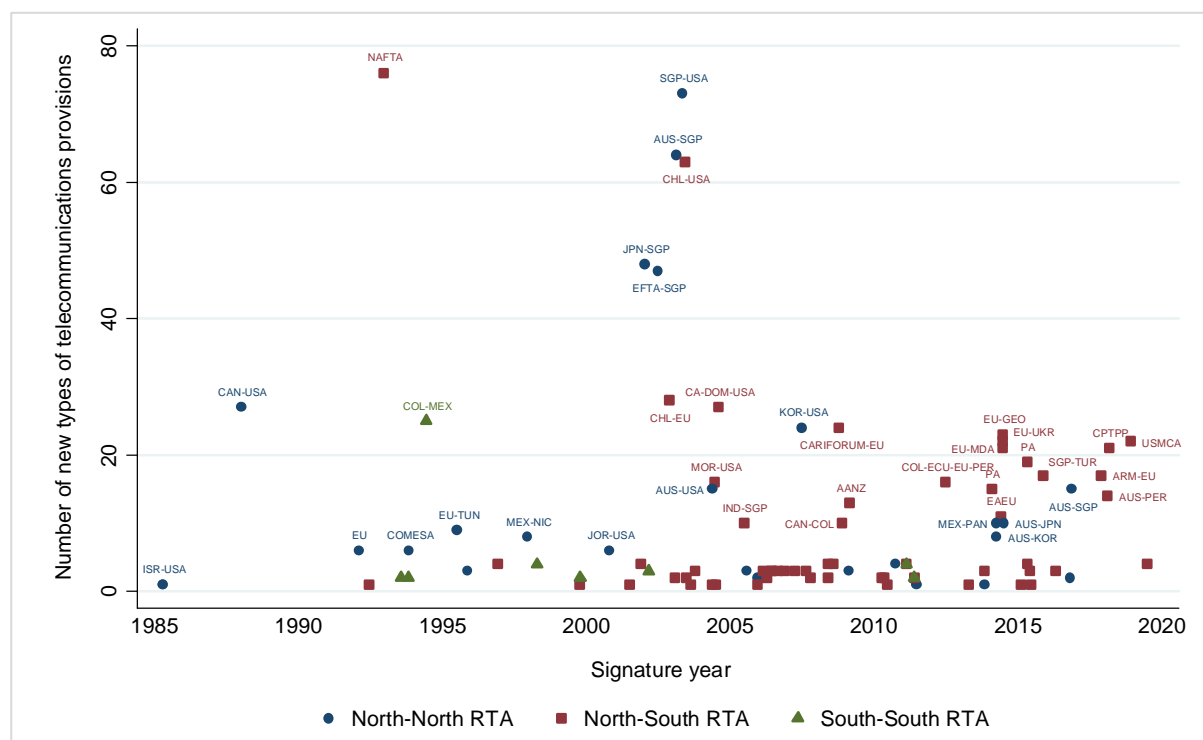
Some recent regulatory issues and technological development, such as broadband, are addressed in some RTAs through cooperation. Cooperation provisions on telecommunications are indeed a relatively common type of telecommunications provisions in RTAs. Yet, none of the notified RTAs explicitly replicates the provisions on cooperation and consultations set out in the GATS Annex. Many cooperation provisions found in RTAs address telecommunications, including telecommunications services, and ICT development and diffusion. Some of these cooperation provisions, found in a stand-alone article or chapter on technical cooperation, specify the areas and forms of cooperation, such as training to develop ICT skill, exchanging information on standardisation, conformity testing and certification of ICT or promoting co-operation between the parties' private sector.

²⁰ Several RTAs without provisions on telecommunications services include a provision committing the parties to consider the possibility to extend the scope of future negotiation to telecommunications services.

As hinted above, many telecommunications provisions are specific to a single or couple of RTAs. This large number of idiosyncratic telecommunications provisions stems in part from the terminology and scope used to define telecommunications, in particular telecommunications services. For instance, more than 75 definitions of various terms related to telecommunications services have been included in RTAs.²¹ In some cases, a same term is defined differently in various agreements.

In fact, the number of new types of telecommunications provisions, defined as any provision adding clarification, modifying existing disciplines, including their scope, or creating new disciplines, continues to rise albeit at a slower, as shown in Figure 11.²² The signature of a RTA with the highest number of new telecommunications provisions occurred in the early 1990s and 2000s with the signature of a couple of RTAs negotiated by the United States with Canada and Mexico, Chile and Singapore, and the RTA between Australia and Singapore. The United States and Singapore, along with the European Union, Australia, Mexico, Canada and Chile have effectively devised and incorporated the highest number of new telecommunications provisions in their RTAs.²³ Other countries having included many new telecommunications include Japan, Colombia and Peru. The Additional Protocol to the Framework Agreement of the Pacific Alliance, to which Peru is also party, include many of the new broader types of telecommunications provisions, including on emergency situation, quality service, and stolen or lost mobile terminal equipment.

Figure 11: The number of new types of telecommunications provisions keeps on rising albeit at a slower pace



Source: Own computation based on mapping of telecommunications provisions in RTAs.

Note: The analysis considers all notified RTAs. The definition of new type of provisions is based on language differences. A provision addressing an issue already covered by another type of provisions but with a different scope is considered as a new type of provisions. "North" is defined as high-income countries, whereas "South" is defined as middle- and low-income countries according to the World Bank's country classification.

²¹ The list of definitions found in RTAs is reported in Figure A5 in the Annexes.

²² The evolution of the cumulative number of new types of telecommunications provisions in RTAs is depicted in Figure A6 in the Annexes.

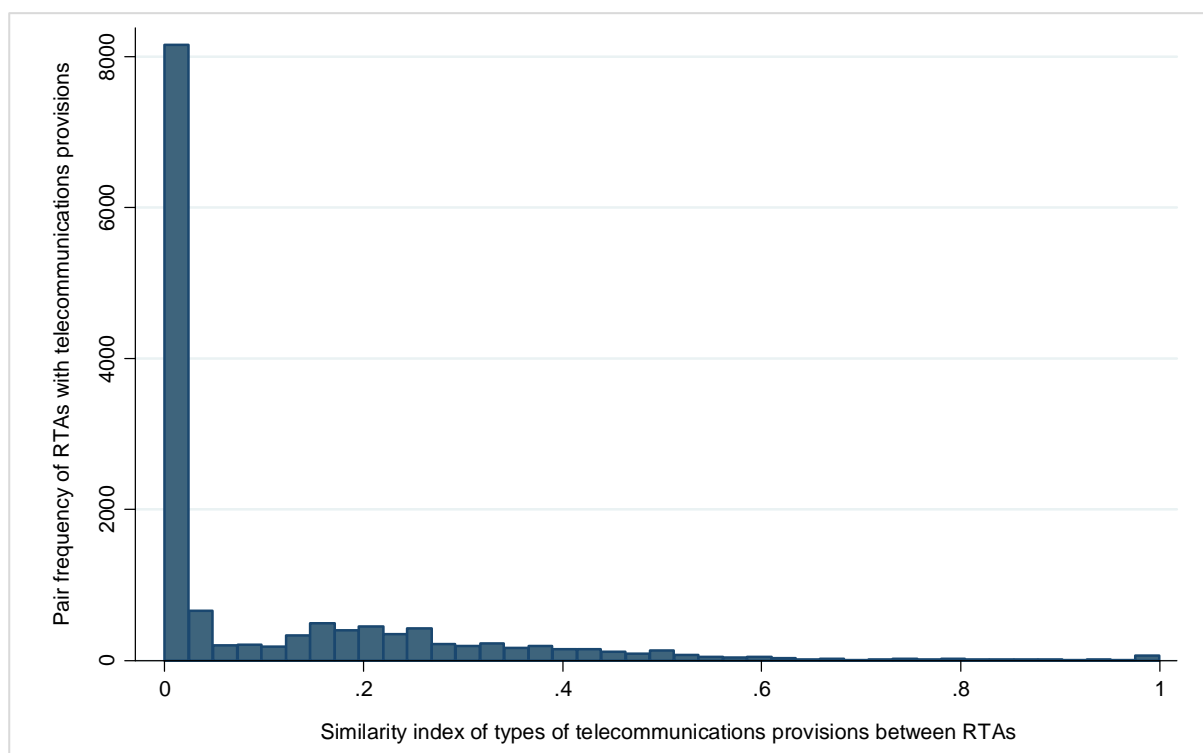
²³ The relationship between the number of new types of telecommunications provisions and number of notified RTAs with such new provisions is shown in Figure A7 in the Annexes.

A more comprehensive approach to capture the heterogeneity of the main types of telecommunications provisions in different RTAs can be taken to compute the Jaccard index, which compares and determines for each possible pair of RTAs how many type(s) of telecommunications provisions are common to both agreements. The closer the index is to one (zero), the more (less) both RTAs include the same type(s) of telecommunications provisions.

Only a limited number of RTAs incorporate exactly the same main types of telecommunications provisions. In most cases, the exact same number of main types of telecommunications provisions is relatively limited. For instance, several RTAs to which the EU is a party, including the agreements with Jordan, Morocco, and Tunisia, include an article on cooperation on ICT, including ICT standards and conformity assessment procedures. The few RTAs sharing the exact same large number of main types of telecommunications provisions include the RTAs to which the United States is a party with Colombia, Oman, Panama and Peru (with 32 common main types of provisions) and the RTAs negotiated by Chile and Panama, respectively, with other Central America countries (with 14 common main types of provisions).

More generally, and even though the level of similarity between RTAs is higher for some pairs of RTAs, it tends to be much lower for many pairs of RTAs, as highlighted in Figure 12. Almost 60 per cent of all pairs of RTAs with telecommunications provisions share very few, if any at all, similar main types of telecommunications provisions.²⁴ RTAs with telecommunications provisions have, on average, 5 main types of telecommunications provisions in common. However, the level of similarity tends to increase with the number of common types of telecommunications provisions. In other words, the RTAs that include a large number of telecommunications provisions, typically in a stand-alone chapter, section or annex on telecommunications services, tend to share an increasing number of these provisions with some other RTAs (with stand-alone chapter, section or annex on telecommunications services).

Figure 12: Few RTAs share the exact same types of telecommunications provisions



Source: Own computation based on mapping of telecommunications provisions in RTAs.

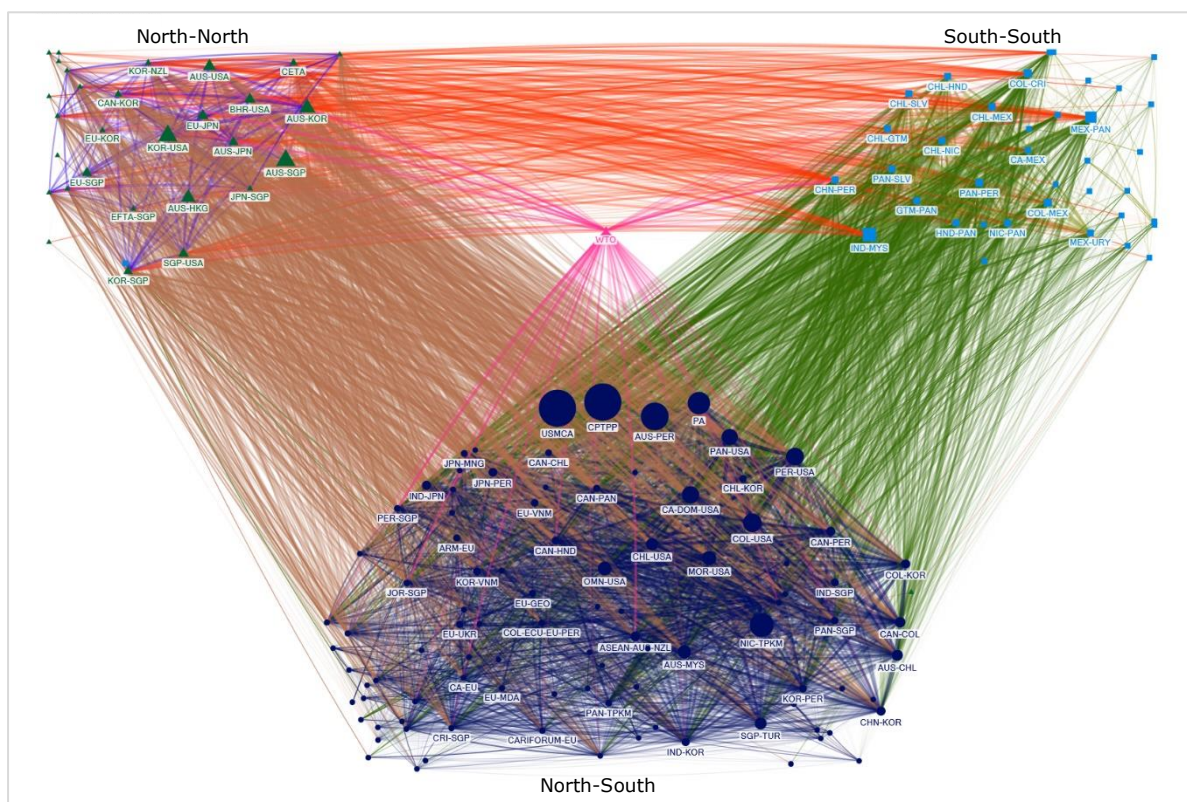
Note: The analysis considers only notified RTAs currently in force. Similarity is measured by the Jaccard similarity coefficient. The closer the Jaccard index is to one (zero), the more (less) both RTAs include the same type(s) of telecommunications provisions.

²⁴ This share is computed by considering a lower-than-average Jaccard similarity index (0.22) as less similar agreements. If a lower-than-median Jaccard similarity index (0.08) is considered, the share of RTA pairs with few common telecommunications provisions is equal to 50 percent.

Despite the important heterogeneity in terms of language that characterizes many telecommunications provisions, more than 70 per cent of RTAs with provisions on telecommunications services share at least one main type of provisions with another agreement.²⁵ The provision in the services chapter specifying that telecommunications services are covered is one of the most commonly shared main types of provisions on telecommunications services. Other main types of provisions on telecommunications services commonly shared, mostly found in a chapter, section or annex on telecommunications services, include provisions detailing the definition of specific terms and provisions on competitive safeguards. However, the definition list tend to differ across RTAs. In addition, the definition of the same term sometimes differ across agreements.

The heterogeneity of telecommunications provisions can also be visualized by generating the network of all RTAs with telecommunications provisions, where each node (i.e. square, diamond, and triangle) represents a RTA. The size of the symbol (vertex) represents the number of types of telecommunications provisions, while the width and opacity of the edges connecting the RTAs reflect, respectively, the number of common telecommunications provisions and their level of similarity, measured by the Jaccard index. The larger and opaquer the edge connecting two RTAs, the larger the number of similar telecommunications provisions included in those two RTAs. As depicted in Figure 13, RTAs negotiated between high-income countries and middle- and low-income countries (North-South RTAs) tend to share more common types of telecommunications provisions than agreements negotiated between high-income countries (North-North RTAs) and between middle- and low-income countries (South-South RTAs). Although a couple of North-North RTAs share a relatively high number of telecommunications provisions with some South-South RTAs, North-North RTAs tend to share more similarities with North-South RTAs than South-South RTAs. That being said, many RTAs follow different idiosyncratic patterns.

Figure 13: Telecommunications provisions remain highly heterogenous across RTAs



Source: Own computation based on mapping of telecommunications provisions in RTAs.

Note: For visual clarity, the graph only displays notified RTAs currently in force with at least one explicit telecommunications provision. "North" is defined as high-income countries, whereas "South" is defined as middle- and low-income countries according to the World Bank's country classification. Each RTA is represented by a node whose size represents the number of types of telecommunications provisions. The labelled RTAs include a higher-than-average number of types of telecommunications provisions. The width of each edge measures the number of similar types of telecommunications provisions between two RTAs, while the opacity of each edge captures the level of similarity.

²⁵ The relationship between the similarity index of types of telecommunications provisions and the number of common types of telecommunications provisions is depicted in Figure A8 in the Annexes.

5 CONCLUSION

Telecommunications provide essential services to the whole economy, including the information society. Over the last 30 years, the telecommunications sector has experienced important technological and regulatory changes. Part of the telecommunications market reforms that occurred in the 1990s are reflected in the GATS Annex on Telecommunications and the Reference Paper on Regulatory Principles on Basic Telecommunications. These WTO rules provide the foundation of best regulatory practices in telecommunications services with a view to foster competition and facilitate trade by services suppliers that need to access and use PTTNS to conduct their business activities. At the same time, a number of WTO members have negotiated and incorporated provisions addressing explicitly telecommunications in their respective RTAs. As of December 2020, telecommunications provisions can be found in 167 RTAs, representing 55 percent of all the agreements notified to the WTO and currently in force. Along with the growing number of RTAs with telecommunications provisions, the number of telecommunications provisions in a given agreement has also increased over the years. Similar to other types of provisions found in RTAs, telecommunications provisions remain highly heterogenous, including in some agreements negotiated by the same country.

Some provisions address ICT infrastructure, investment and policy. Other provisions focus on standards and conformity assessment procedures of ICT equipment. The most detailed and comprehensive telecommunications provisions, mostly found in RTAs negotiated by advanced economies, address trade in telecommunications services. While many telecommunications provisions found in RTAs draw on the GATS Annex on Telecommunication and other GATS provisions as well as the Reference Paper on Regulatory Principles on Basic Telecommunications and the TBT Agreement, an increasing number of telecommunications provisions clarify or expand existing WTO disciplines or explicitly address new regulatory issues. These new regulatory issues, found in a limited number of relatively recent RTAs, reflect technological and regulatory changes impacting the telecommunications sector in recent years, such as broadband, international mobile roaming, net neutrality, stolen or lost mobile terminal equipment, access in emergency situations and consumer protection. Given the dynamic nature characterizing both the telecommunications sector and many RTAs, telecommunications, like other types of provisions in RTAs are likely to keep evolving to reflect new regulatory and technological realities.

REFERENCES

Burri M. (2020) Telecommunications and media services in preferential trade agreements: Path dependences still matter. In: Hoffmann R., Krajewski M. (eds) *Coherence and Divergence in Services Trade Law*. European Yearbook of International Economic Law. Springer, Cham.

Gootiiz, B., Jonetzko, G., Magdeleine, J., Marchetti, J. and Mattoo, A. (2020), "Deep trade agreements in services: Findings from a new database", in Mattoo, A., Rocha, N. and Ruta, M. (eds), *Handbook of Deep Trade Agreements*, Washington D.C.: World Bank.

Monteiro, J.-A. and Teh, R. (2017), "Provisions on electronic commerce in regional trade agreements", WTO Working Paper ERSD-2017-11, Geneva: World Trade Organization (WTO).

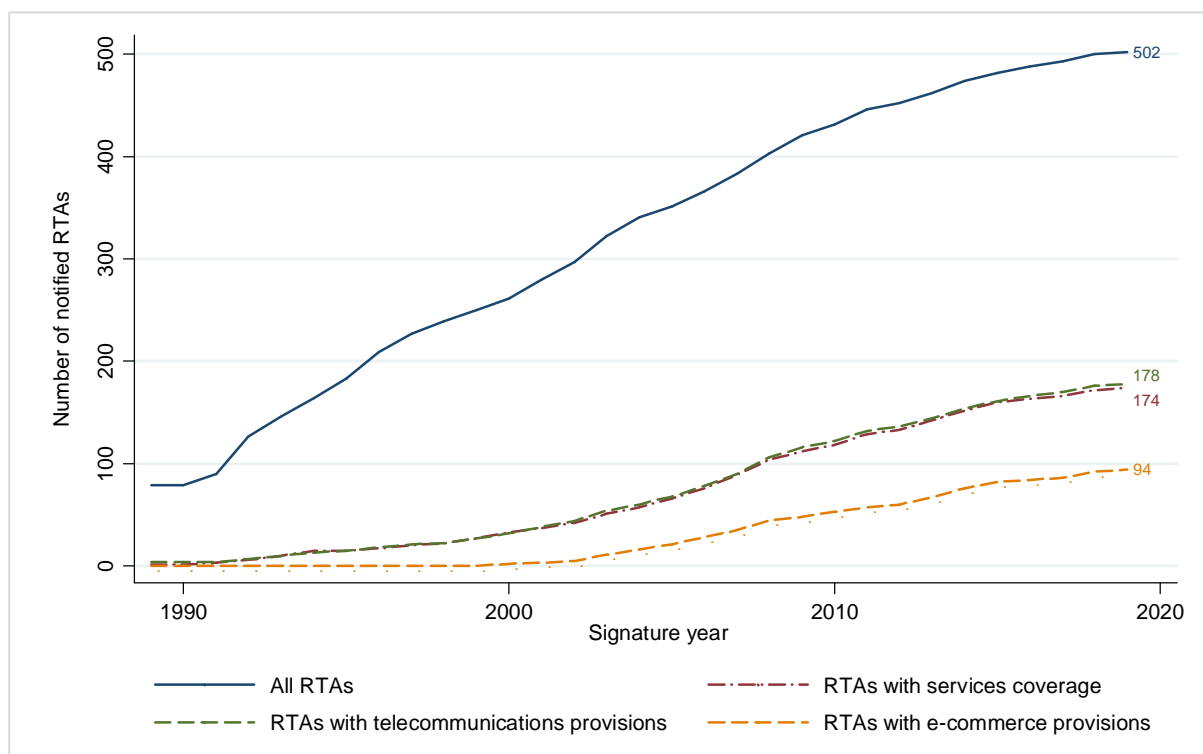
Monteiro, J.-A., Posada, K. and Tuthill, L. (forthcoming), "Communication break down: Typology of telecommunications provisions in regional trade agreements", WTO Working Paper, Geneva: World Trade Organization (WTO).

Tuthill, L. and Sherman, B. L. (2008), "Telecommunications: Can trade agreements keep up with technology?", chapter of *Opening Markets for Trade in Services; Countries and Sectors in Bilateral and WTO Negotiations*, Cambridge Univ. Press and WTO, 2008, Eds. Marchetti, M.Roy.

World Trade Organization (WTO) (2018), *World Trade Report 2018: The future of world trade - How digital technologies are transforming global commerce*, Geneva: WTO.

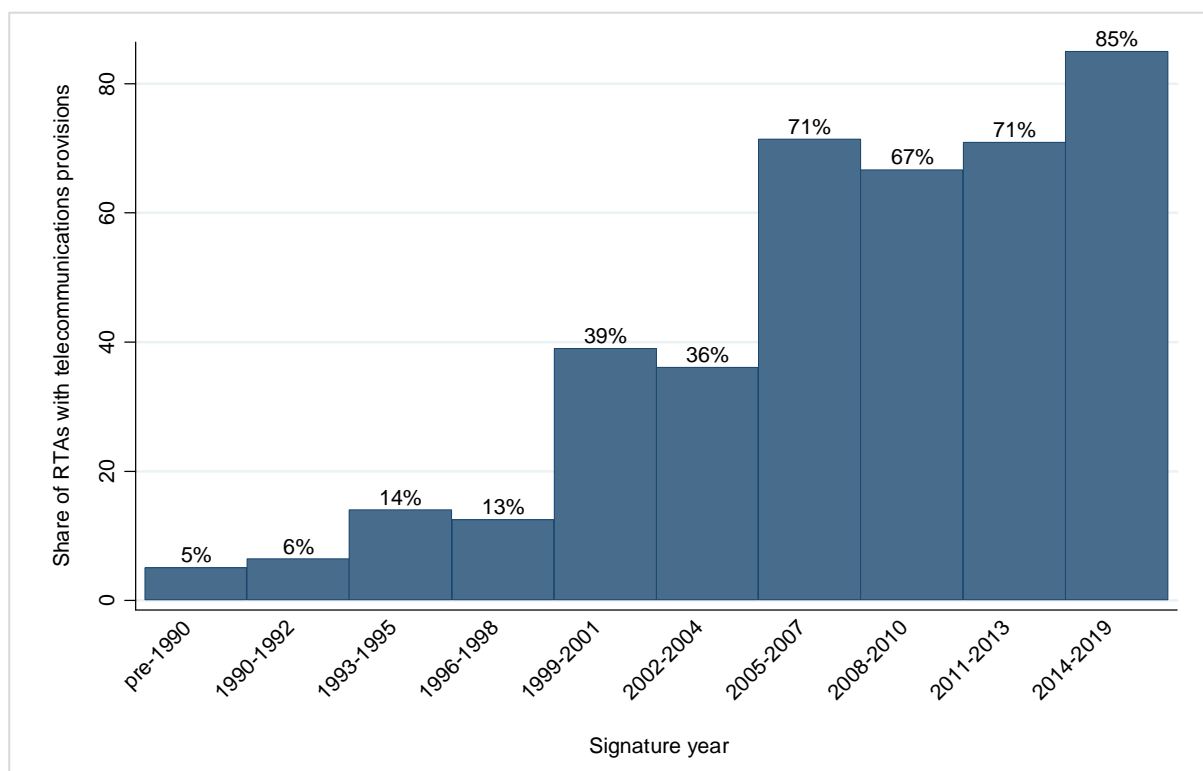
ANNEXES

Figure A1: Evolution of all notified RTAs with telecommunications provisions



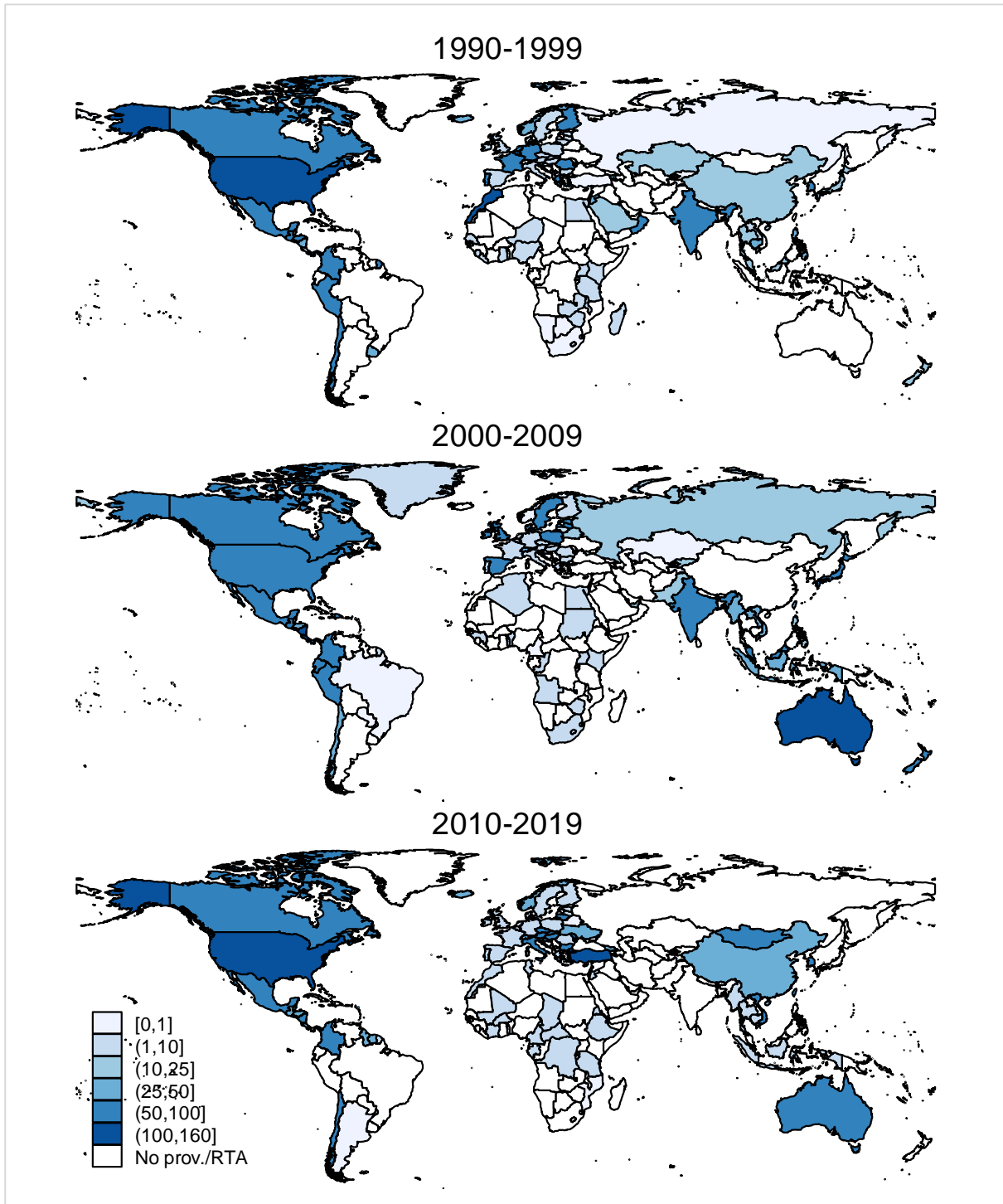
Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph displays notified RTAs previously and currently in force.

Figure A2: Share of all notified RTAs with telecommunications provisions



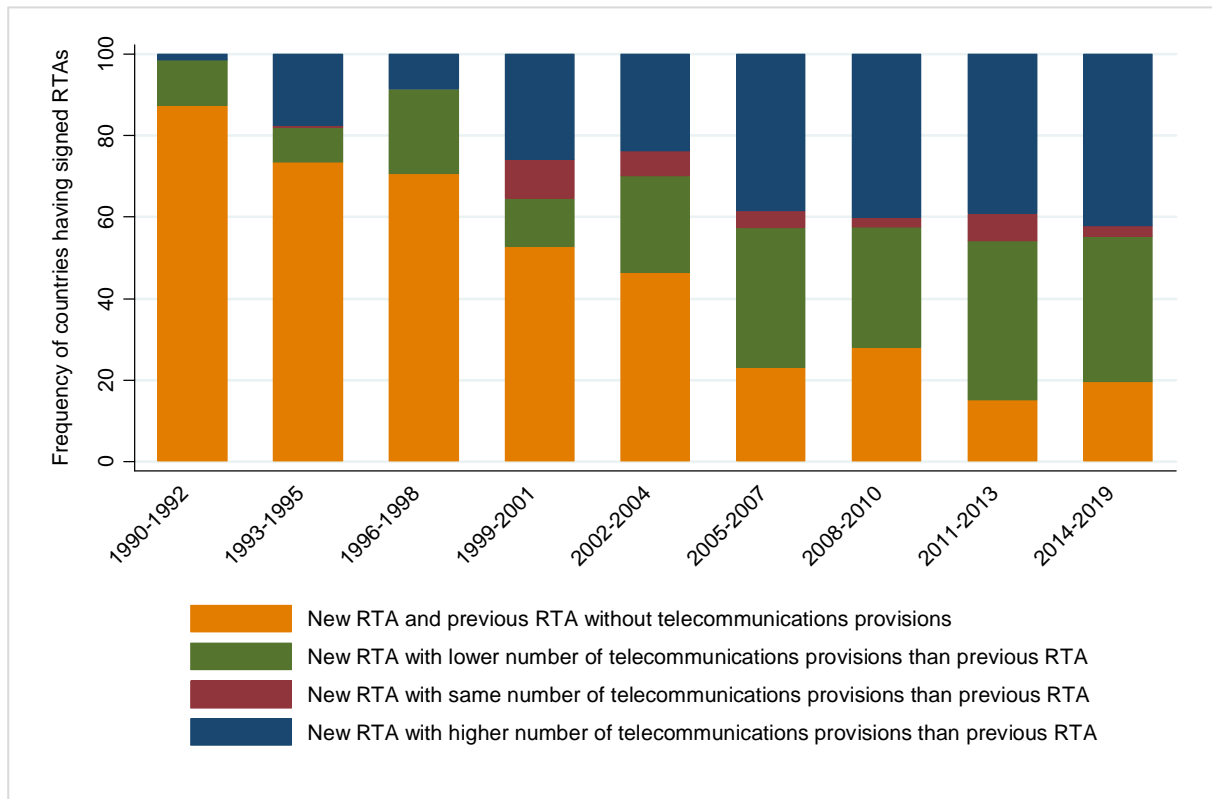
Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph displays notified RTAs previously and currently in force.

Figure A3: Average number of telecommunications provisions in RTAs by country



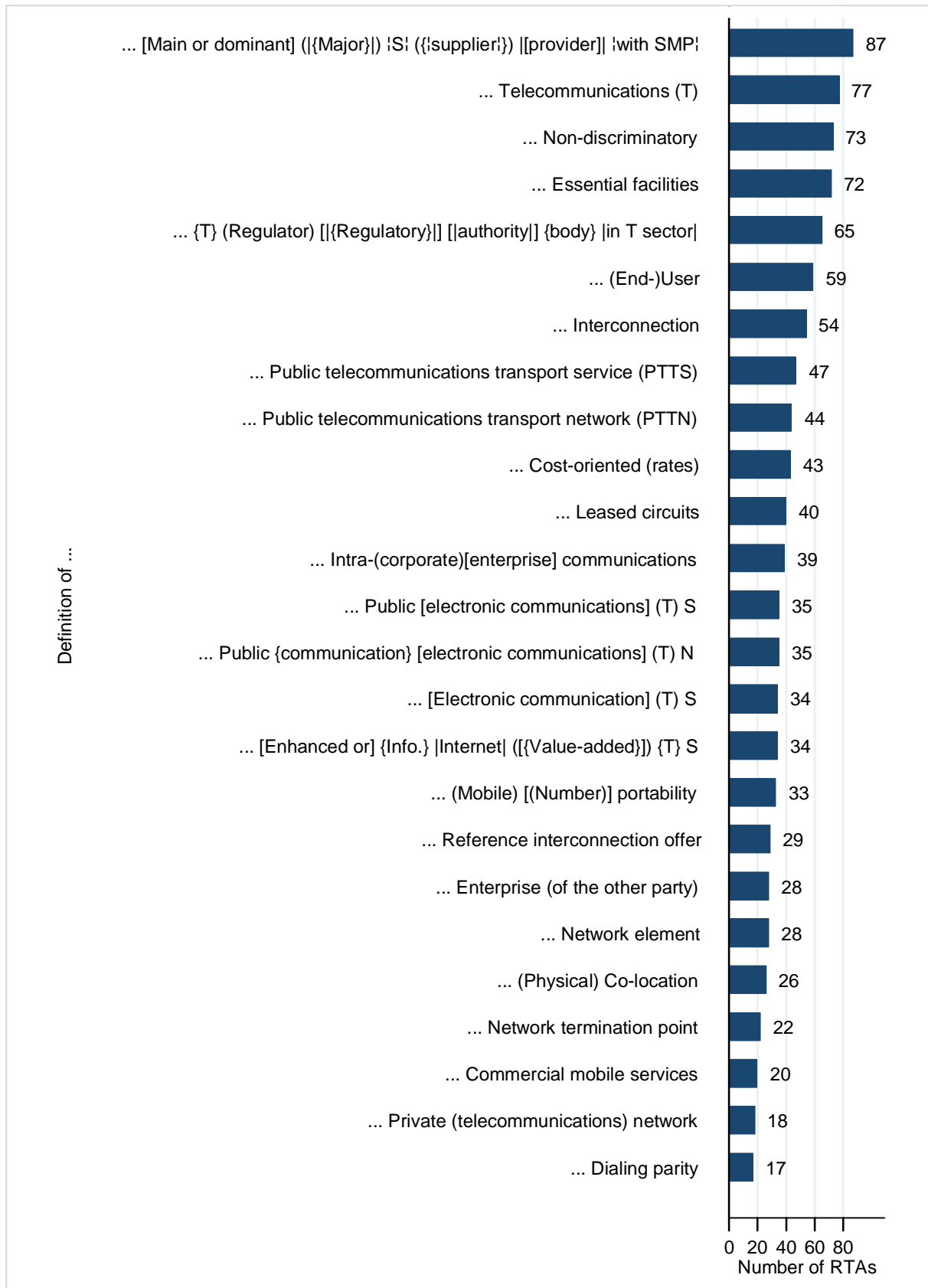
Source: Own computation based on mapping of telecommunications provisions in RTAs.
Note: The graph displays notified RTAs previously and currently in force.

Figure A4: Frequency of economies' decisions to include telecommunications provisions in RTAs



Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph displays notified RTAs previously and currently in force.

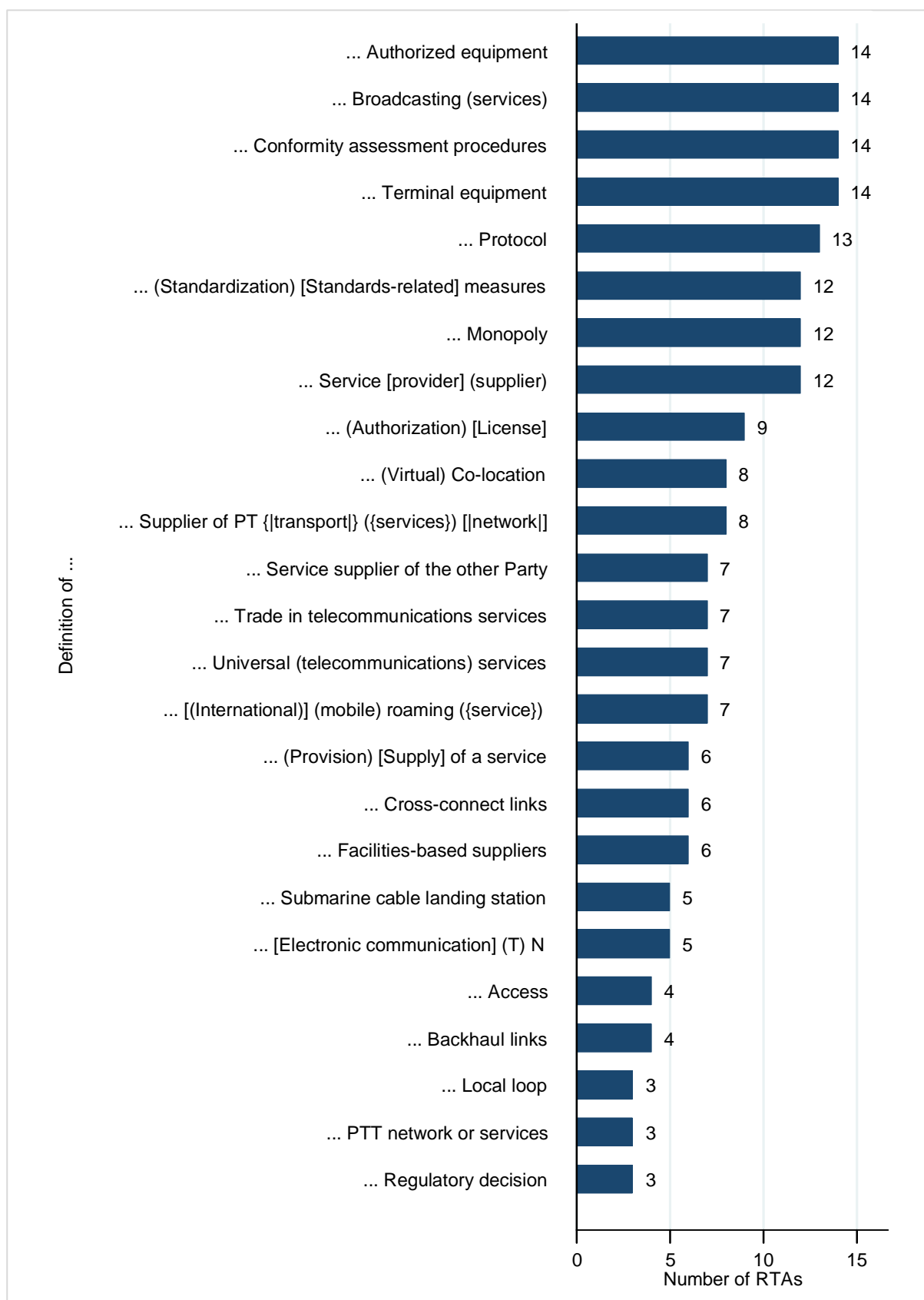
Figure A5: List of telecommunications-related definitions found in RTAs



Source: Own computation based on mapping of telecommunications provisions in RTAs.

Note: The graph considers notified RTAs currently in force. The following abbreviations read as follows: N = network(s); S = service(s); SMP = significant market power; and T = telecommunication(s).

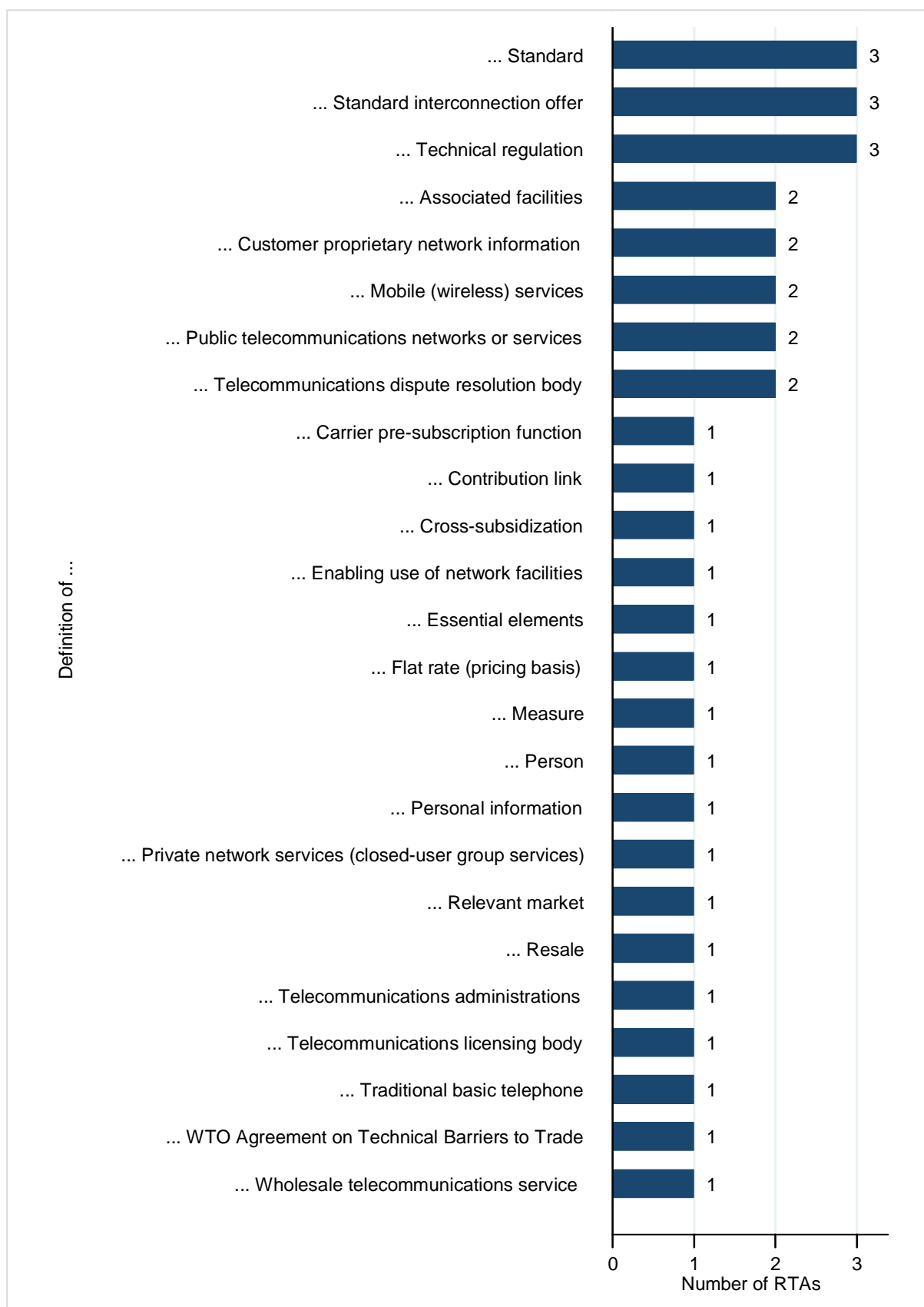
Figure A5: List of telecommunications-related definitions found in RTAs (continued)



Source: Own computation based on mapping of telecommunications provisions in RTAs.

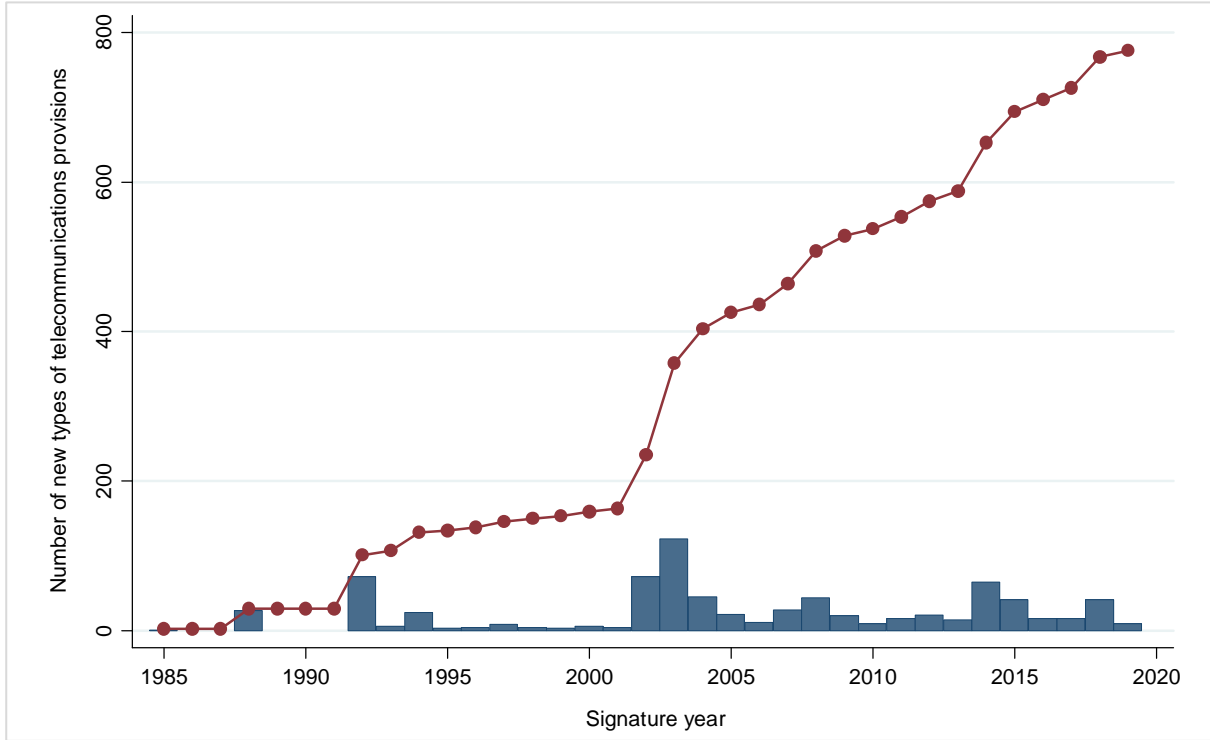
Note: The graph considers notified RTAs currently in force. The following abbreviations read as follows: N = network(s); and T = telecommunication(s).

Figure A5: List of telecommunications-related definitions found in RTAs (continued)



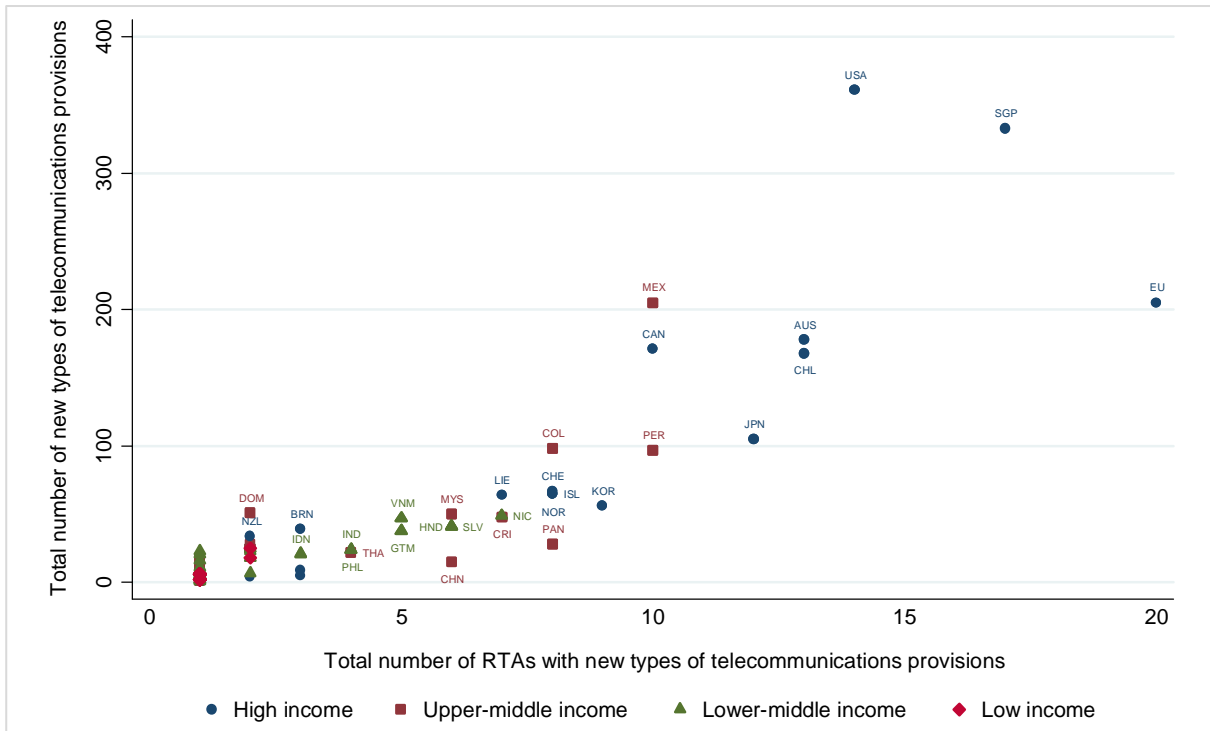
Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The graph considers notified RTAs currently in force.

Figure A6: Evolution of new types of telecommunications provisions in all notified RTAs



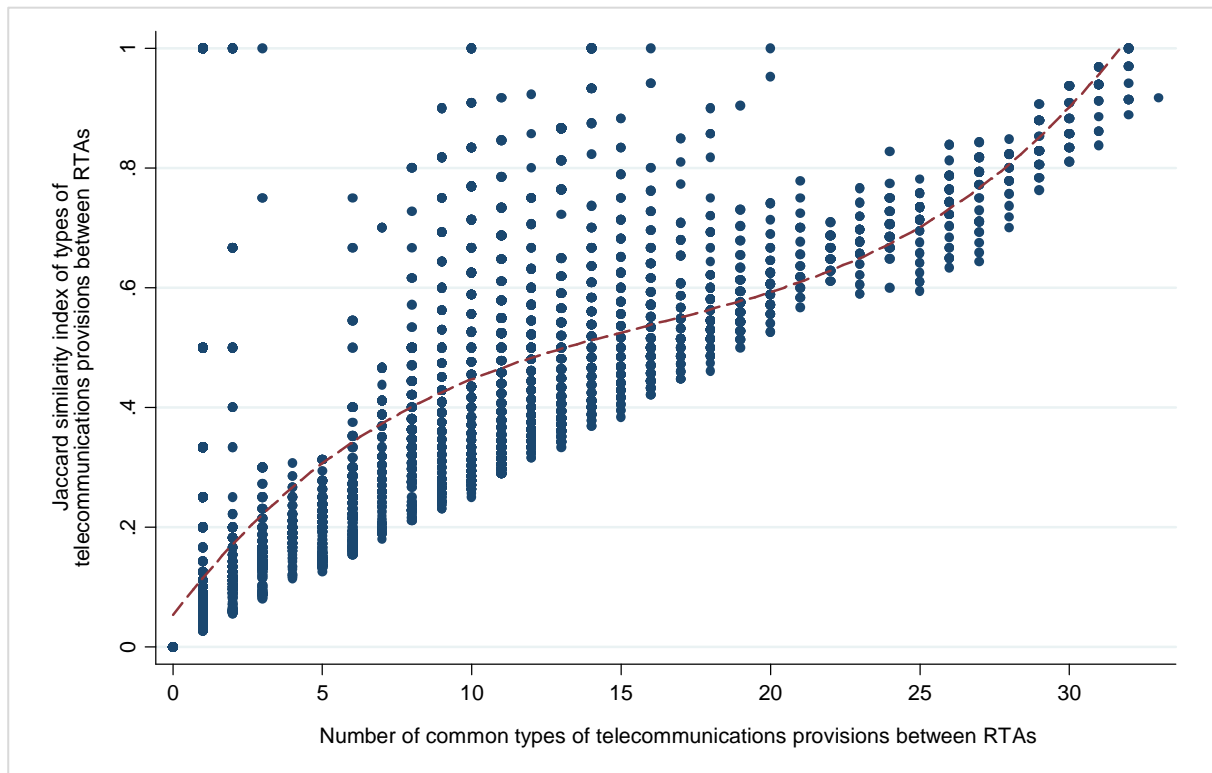
Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The analysis considers RTAs previously and currently in force. The definition of new type of provisions is based on language differences.

Figure A7: Relationship between the number of new types of telecommunications provisions and the number of notified RTAs with such new provisions



Source: Own computation based on mapping of telecommunications provisions in RTAs.
 Note: The analysis considers RTAs previously and currently in force. The definition of new type of provisions is based on language differences.

Figure A8: Relationship between the similarity index of types of telecommunications provisions and the number of common types of telecommunications provisions



Source: Own computation based on mapping of telecommunications provisions in RTAs.
Note: The analysis considers only notified RTAs currently in force. Similarity is measured by the Jaccard similarity coefficient. The closer the Jaccard index is to one (zero), the more (less) both RTAs include the same type(s) of telecommunications provisions.