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MASTER'S THESIS  
**DEEP FREE TRADE AGREEMENTS AND GLOBAL VALUE  
CHAIN INTEGRATION**

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## **ABBREVIATIONS**

**BIT** – Bilateral Investment Treaty

**DESTA** – Design of Trade Agreements

**EU** – European Union

**EVFTA** – EU-Vietnam Free Trade Agreement

**FDI** – Foreign Direct Investment

**FE** – Fixed effects

**GATT** – General Agreement on Tariffs and Trade

**GDP** – Gross Domestic Product

**GMM** – Generalized Method of Moments

**GVC** – Global Value Chain

**ICIO** – Inter-Country Input-Output

**ICT** – Information and Communication Technology

**IMF** – International Monetary Fund

**IPR** – Intellectual Property Rights

**IV** – Instrumental Variable

**MFN** – Most Favoured Nation

**MNE** – Multinational Enterprise

**NTT** – New Trade Theory

**NNTT** – New New Trade Theory

**OECD** – Organization for Economic Co-operation and Development

**PTA** – Preferential Trade Agreement

**RE** – Random effects

**R&D** – Research and Development

**RTA** – Regional Trade Agreement

**TiVA** – Trade in Value Added

**TPP** – Trans-Pacific Partnership

**UNCTAD** – United Nations Conference on Trade and Development

**US** – The United States

**WTO** – World Trade Organization



## INTRODUCTION

If you purchase a product in any store, odds are that the product was manufactured in Bangladesh or assembled in Mexico. Clothes can have a label “made in China” but the whole garment was not really made in China. Materials or services are collected from different countries around the world and then sold as a finished product to consumers worldwide. The garment embodies the value from many different countries in each of which wages and profits are earned in the process of bringing the final product to the market. What we used to know as “Made in” labels in manufactured goods has now become replaced by the “Made in the World” label (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 6). So, what makes all this possible?

The demand for trade comes from limitations in the availability of resources and the country’s comparative advantage. Technological and transportation advancements together with lower barrier costs have made the world more connected and have opened borders to globalization to the point where no country can afford to remain isolated. In the last few decades, two phenomena that help drive today’s global economy are stepping to the front: the growing importance of global value chains (hereinafter: GVCs) and deepening of preferential trade agreements (hereinafter: PTAs).

On the one hand, complex GVCs are becoming a dominant economic reality in the twenty-first century. They characterize the principle of division of labor spread to an international or global scale. The production of goods and services in GVCs happens by breaking the production processes into small parts where each part takes place in a different country with each part in the process chain adding value to the end product. Technological innovation in communication and advancement in transportation, internet, and logistics enabled the unbundling of stages of production processes across time and space and made the slicing up of value chain easier, more specialized, and productive (Ferrantino, n. d.).

At the same time, preferential trade agreements (PTAs) are rising in number, as well as deepening in content. Modern PTAs are defined as “deep” agreements – deep because they include economic governance that covers disciplines and commitments that go substantially beyond the rulebook of WTO (WTO, 2011, p. 98). They cover disciplines such as “investment, competition, and IPRs (Intellectual Property Rights protection), and require significant adaptation processes by the participating countries” (Berger et al., 2016, p.7).

So, what connection do preferential trade agreements and global value chains have? Since the early 1990s, both the GVCs and PTAs have gained importance and showed a rising trend. Current studies find a clear positive relationship between rising of GVCs and the parallel boost of deep PTAs (Berger et al., 2016, p.21), emphasizing that “the pattern of

deep agreements is shaping and is shaped by GVCs” (IMF, 2013, p. 32). Deep preferential trade agreements drive the country’s participation in GVCs, which means that policymakers can use trade agreements as a helpful instrument to secure national producers to global and regional production processes (Ruta, 2017, p.2). “Recent evidence shows that deep preferential trade agreements boost GVC integration and that undoing this depth is likely to hurt GVCs” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 183). “The future of the GVC-PTA relationship will crucially depend on continuing trust in the willingness of other partners to preserve an open trading system” (Ruta, 2017, p. 3).

The purpose of my master’s thesis is to enable a deeper understanding of the successful integration of countries into global value chains and their implications for economic development and policymaking. Furthermore, I want to contribute to the understanding of the role that deep trade agreements play in the process of countries’ and firms’ integration into global value chains. It is my objective to see how rising GVCs integration and proliferation of deep PTAs have contributed to shape current trade in a new way and make new trade rules for the future. More specifically, the aim of my master’s thesis is, first, to review the literature on preferential trade agreements and how they have deepened over time. Second, the objective is to make a connection between the two by reviewing theoretical literature on GVC-PTA relationship and their future. Finally, I aim to analyze the connection between participating in GVCs and deep PTAs empirically.

In the empirical analysis, I will examine both the degree of involvement of countries in GVC and their position along the GVC. Based on TiVA-OECD database, I will assess the determinants of the GVC participation accounting for both backward and forward participation, the position in the GVC in terms of the average distance to final demand and the number of the production stages (domestic and international). The GVC participation index shows to what extent each country is involved in a vertically fragmented production process. Index of distance to final demand measures where precisely is a country’s location within the supply chain or how far are countries located from the final downstream industry in the production process. Finally, the index of a number of the production stages shows the length of the entire supply chain (van der Marel, 2015, p.3). I will focus on the role which deep trade agreements play in countries’ vertical integration within global value chains. The empirical part consists of econometric analysis, using the static and dynamic regression on panel data.

The key research question is how deep trade agreements countries have signed affect participation in GVC both in terms of the degree of involvement and the position along the GVC. This question will be answered through testing the following hypotheses: (i) The more free trade agreements a country has signed, the higher is its GVC participation. (ii) The deeper the agreements are on average, the stronger is their impact on participation. (iii) The deeper the agreements are on average, the bigger is the distance to

final demand. (iv) The deeper the agreements are on average, the longer are GVCs. (v) The EU countries have deeper agreements and are, therefore, more involved in GVCs.

The structure of the remaining chapters is as follows. Chapter 1 describes the basic characteristics of GVCs, its evolution, and impact. Chapter 2 describes characteristics, evolution, and impact of deep PTAs. Chapter 3 discusses the connection and future of both. Chapter 4 presents the static and dynamic econometric model together with data description, methodology, results, and discussion. Chapter 5 concludes.

## **1 THE GLOBAL VALUE CHAINS**

During recent years, global interactions have deepened, broadened, and proliferated. Global economy today produces and exchanges goods in a way that has never been more dynamic, interconnected or simple. Trade has evolved from a final good crossing one border to a complex trade in inputs crossing many borders before they finally become a final good (van der Marel, 2015, p2). It shows that the world trade and production are more and more structured around global value chains (GVCs) that is seen in growing share of international trade, global GDP, and employment (Gereffi & Fernandez-Stark, 2016, p. 6). A GVC “describes the full range of activities that firms and workers perform to bring a specific product from its conception to its end use and beyond” (Gereffi & Fernandez-Stark, 2016, p. 7). GVCs show how economies are connected, how they specialize, and how they transform global trade by dividing labor on a global scale by breaking production into small parts that can be carried out in different countries with each part adding value to the goods or services being produced (Ferrantino, n. d.). The traditional perspective of international trade where every country produces and exports finished products to another country today describes just 30% of total trade in goods and services. 70% of international trade consists of trade where services and goods are exchanged in GVCs across countries before reaching final consumers around the world (OECD, 2018).

The idea of the division of labor exists for a very long time. In pre-industrial time, production and consumption took place in close proximity. For example, in Adam Smith’s pin factory in 1776, each worker did a different task in making the pinhead and value was added in every task. The whole process took place in a single location under the same roof. After the industrial revolution in the 19<sup>th</sup> century, international trade began to develop with steam engines, allowing activities to spread beyond local communities and so goods could travel all over the world. In Henry Ford’s automobile factory in the 1920s, raw materials, brought from different parts of the world, entered in one end of a factory and a finished car came out at the other end. Ford came up with a business model where more tasks took place in one factory, again under the same roof, each task adding value to a final product (Ferrantino, n. d.; World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 32).

Nowadays, this kind of division of labor has become global. Materials or services are obtained from countries around the world, which are then sold as a finished product to consumers worldwide. What we used to know as “Made in” labels in manufactured goods have now become replaced by the “Made in the World”<sup>1</sup> label (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 6). Since GVCs emerged in the 1980s, they have become longer and more complex (De Backer & Flaig, 2017, p.8). Complex GVCs today have turned into a dominant economic reality that involves countries at all levels of development. Technological innovation in information and communication technology (hereinafter: ICT) and advancement in transportation, Internet, and logistics enabled the unbundling of stages of production processes across time and space and made the slicing up of value chain easier, more specialized and productive. Slicing up the value chain gives the possibility that different parts of the product can be produced in different countries, where each step can be done most efficiently. In this way, more countries can join the worldwide GVCs, rather than build the whole chain by themselves and they can participate in different industry activities in which they specialize (Ferrantino, n. d.).

In GVCs, the division of labor is not only restricted to the physical production of goods. Activities, such as R&D, design, production, marketing, and distribution are all important part in bringing a finished good to the market. Sometimes, they can look more like services rather than goods, yet, they are all a necessary part of the value chain. Even services can have their own value chains (Ferrantino, n. d.). Dividing the line between goods and services can be hard sometimes. The very nature of service and its intangibility makes them statistically harder to measure. Lately, however, measuring trade in services gained importance from liberalizing trade in services, increasing the significance of services in GVCs and the availability of multicountry input-output tables (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 158). The services’ content incorporated in goods is rising and the value-added data show that many exported goods incorporate services, making the content of services much higher than previously thought (OECD, WTO & World Bank Group 2014, p. 15) due to the technological innovations and new business models. Services are often considered as a “glue” of GVCs because they play an important role of coordinating GVC activities, such as logistics,

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<sup>1</sup> “Made in the world” is expression by Pascal Lamy, former WTO director.

communications services, and transfer of data and know-how across borders (De Backer & Flaig, 2017, p. 6).

## **1.1 Evolution of global value chain theory**

Theory of international trade has been evolving with time and certain economic conditions around the world. In the late 18<sup>th</sup> century, Adam Smith showed that trade benefits both countries engaged in the trade and that specialization in a production led to an improvement in efficiency and growth. Countries could benefit by producing what they are efficient at and trading it for goods in which they are not efficient. Therefore, a country will have an absolute advantage in the production of goods with fewer resources than other countries (Schumacher, 2012, p. 20). In the early 19<sup>th</sup> century, David Ricardo<sup>2</sup> developed the idea of comparative advantage. He argued that free trade benefits two or more trading countries, regardless of whether one country has an absolute advantage in all areas of production. The benefits from trade come because each country specializes in producing a good or a service in which they have a comparative advantage at a lower cost than any other country (Suranovic, 2010, p. 69).

Based on the theory of comparative advantage, Heckscher and Ohlin developed a theorem which is extended to show how international trade is highly driven because of differences in the country's resources. The theorem shows how factor proportions can govern the comparative advantage. Their model states that a country is going to export goods which use its abundant factors intensively and import goods which use its scarce factors intensively. In the two-factor case, a capital-abundant country is going to export the capital-intensive good and the labor-abundant country is going to export the labor-intensive good. This model takes into consideration differences in factor endowments as the only driving force of international trade (Krugman & Obstfeld, 2003, p. 67).

After Heckscher-Ohlin model two theorems developed: the Stolper-Samuelson theorem and the Rybczynski theorem. Rybczynski theorem states that under specific economic assumptions (constant returns to scale, perfect competition, equality of the number of factors to the number of products and two-commodity, and two-factor country) an increase in the endowment of one factor of production increases absolutely the output of the good intensive in that factor and reduces output of the other good absolutely when the terms of trade are held constant (Winters, 1991, p. 40). The Stolper-Samuelson theorem says that an increase in the price of a single good raises the real reward of the factor which

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<sup>2</sup> *From Ricardo to H-O, the next classical premises held: perfectly competitive markets, constant returns to scale, homogenous producers, trade of final products.*

is intensive in that good absolutely and reduces that of the other absolutely (Winters, 1991, p.40). However, Leontief paradox does not support the conclusions of the Heckscher-Ohlin theory. Its results showed that the United States, one of the most capital-abundant country, exported commodities that were more labor-intensive than capital-intensive, which is contrary to Heckscher-Ohlin theory, which says that the United States should have exported goods that have more high capital intensity (Krugman & Obstfeld, 2003, p.82).

In the 1970s and 1980s, the New Trade Theory (hereinafter: NTT) developed with Paul Krugman being the leading academic in creating it. Later, it was generalized by Helpman and Krugman in 1985. Until NTT, the traditional trade theory focused on perfect competition, inter-industry trade and had restrictions on only labor intensity (Ricardo's theory) and differences in factor endowments (Heckscher-Ohlin theory) between countries as a source of comparative advantage. The NTT, on the other hand, takes into consideration factors of comparative advantage within the model instead of outside of the model and considers factors like intra-industry trade based on empirical findings on intra-industry trade, mainly from Grubel and Lloyd (1975), imperfect competition, mobility of factor endowments, transportation costs, and economic and political differences between countries (Essays, 2013; World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 31). The key factors in the NTT are substantial economies of scale and network effects that can occur in key industries. Two countries may not have any discernible differences in opportunity cost at a specific point in time, yet, when one country specializes in a particular industry, then, it can achieve economies of scale and other network benefits from its specialization (Pettinger, 2017).

Bernard and Jensen (1995) conducted a study that indicated significant heterogeneity in firm productivity between exporters and non-exporters within the same industry and Melitz (2003) presented answers for these findings, creating a theory called the New-New Trade Theory (hereinafter: NNTT). In his model, very few highly productive firms are engaged in export and only the most productive firms can achieve sufficient profits to cover the large fixed costs required for export operations (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 31).

The literature, linked to the GVC theory, has developed only recently. The basic topic of literature is the cross-border transfer of tasks or the added value achieved through these tasks, including the movement of final products. GVC theory comes from a diverse set of intellectual origins. Its idea can be tracked back to 1970s with work of Bair (2005) on “commodity chain”. In 1990, Jones and Kierzkowski developed a theory of production fragmentation which was followed by growing studies of trade in intermediate goods (Feenstra & Hanson, 1996; Campa & Goldberg, 1997; Yeats, 1998). Next, concepts like Baldwin’s unbundling (Baldwin, 2006) and trade in tasks (Grossman & Rossi-Hansberg, 2008) added to the existing literature. Parallel, some methodological frameworks developed in sociology as well. Gerry Gereffi (1994) presented the concept of “global

commodity chain” on the case of apparel from raw materials to a final product. In 2005, Gereffi, Humphrey, and Sturgeon specified the theoretical framework for GVC analysis which captured the structure and mechanism of value distribution among countries and led to the term “Global Value Chains”, based on the study of trade and industrial organization as a value-added chain in international business by Porter (1985). Empirical research is more recent and is related with input-output analysis (Johnson & Noguera 2012) and the length of the supply chain (Dietzenbacher, Romero & Bosma 2005; Fally 2011). Antràs and Helpman (2004) highlighted the work of both, the New Trade Theory (increasing returns to scale) and the New-New Trade Theory (firm heterogeneity) in their study built on the groundworks of contract theory, which can be related with sociologists’ view on GVCs. Finally, Antràs and Chor (2013) took the properties of this model and further joined the methodological advance in input-output economics (World Bank group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 16–17). A new strand of literature is talking about production “networks” instead of “chains” (Coe & Hess, 2007), emphasizing the complexity of interactions between producers worldwide (De Backer & Miroudot, 2013, p. 8).

## **1.2 Drivers of global value chains**

Many factors have driven GVCs in the past and made them a driver of globalization and economic expansion around the world. According to Amador and Cabral (2014), the key drivers are considered to be the Acceleration of technological progress and decreasing trade costs, economic and trade liberalization, and foreign direct investment (hereinafter: FDI). This was followed parallel by lowering of information, communication and transport costs, and reduction of political and economic barriers to trade (Amador & Cabral, 2014, p. 6). Research (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 197) also indicate the importance of the proximity of neighboring countries and the influence they have on the country’s upgrading in the GVCs. The main driving forces are addressed in this section in more details.

### **a) Technological progress and trade costs**

Technological progress has been one of the biggest drivers of global value chains. It is the reason that products made in different countries from all over the world come together into a finished product and are consumed worldwide, giving opportunity to the international fragmentation of production. Innovations and development in technologies such as transportation, information and telecommunications are essential in handling of the management of very complex GVCs (Amador & Cabral, 2014, p. 8). “Therefore, as these costs are relatively more important in internationally fragmented activities, potential savings arising from technological progress act as a driver of GVCs” (Amador & Cabral, 2014, p. 6). According to Baldwin (2011b, p. 2) proliferation of certain technologies has revolutionized the global production process, which led to the unbundling of stages of production. The steam revolution which was mostly about declining trade costs led to

first unbundling between production and consumption. Despite production being already spread worldwide, it was still gathered locally to reduce coordination costs (Amador & Cabral, 2014, p. 4). The second unbundling of production activities happened in information and communication technology (ICT). Progression in ICT, along with a sharp decrease in telecommunication costs, led to an expansion of GVCs and altered the past look on international trade (Amador & Cabral, 2014, p.10). Transport and communication costs declined mainly as a result of technological advancement, for instance the spread of the Internet. Advancement in logistic also ensured a smooth flow of goods and services in a less expensive way (De backer & Miroudot, 2013, p. 8).

Based on the World Bank Group, IDE-JETRO, OECD, UIBE and WTO (2017), reducing trade costs is the key in order to build more inclusive GVCs. Even though trade costs have lowered over the last decades, non-tariff trade costs (transportation, infrastructure, and other cross-border related fees) and uncertainty continue to be an important obstacle to GVC participation. This is because non-tariff trade costs are usually higher than any other import tariffs because they include a monetary dimension (transportation, insurance), as well as an intangible dimension (information costs, licensing, regulation, insecure contracts, and weak trade governance), which leads to uncertainty. This could all be presented as ad valorem tariff equivalents and they are usually higher than tariffs. Countries that have high trade costs will find it difficult to participate in GVCs and any exports are probably going to be primary products (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 6). Despite the general decrease in trade costs, their importance has grown with the rise of fragmented supply chains and competition around the world. The cascade effect where trade, insurance and other border costs are increased when they pass the steps accompanied by modern supply chains happens due to the trade costs which accumulate when intermediate goods are first imported and then re-exported farther downstream going through different production processes before finally reaching the end consumer. Trade costs therefore reduce the profits from trade that countries expect from engaging in GVCs. The financial impact of trade costs is enlarged with the trade in tasks rationale that governs GVCs. As firms disperse their production over multiple locations, the associated trade costs need to be regained from the smaller fraction of value added at each production stage (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 97). “This larger relative weight of transaction expenses on the profitability of individual business operations explains why trade along GVCs is particularly exposed to trade costs” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 98).

#### b) Economic and trade liberalization

Lower trade costs are not only limited to technological advancement. Political and economic barriers decreased a lot which has also been an essential driver of trade, as well as GVCs. Even though a gradual decrease in non-tariff barriers helped to expand international trade and, thus, GVCs in the past, it is also expected that it will do so in the future. The reduction of barriers to service trade will be very important which will further

help the expansion of GVCs (De Backer & Flaig, 2017, p.15). According to Baldwin (2012, p. 5), supply-chain trade is quite regionalized, “supported by a combination of deep regional trade agreements (RTAs), bilateral investment treaties (BITs), and unilateral reforms by developing countries, mostly accomplished outside the World Trade Organization (WTO)” (Amador & Cabral, 2014, p. 12) . The pervasiveness of GVCs gives the WTO multilateral trading system significant difficulties, because its standards depend on the presence of localized production within countries and not on internationally fragmented production systems (Baldwin, 2011a). Nonetheless, WTO member countries recently agreed upon an exhaustive new agreement on trade facilitation called the “Bali Package”. Bali Package aims to reduce red tape and facilitate customs procedures in an effort to cut down the cost of doing business and simplify its procedures. All three regional blocks, Europe, Asia, and North America, have had political and economic liberalization to some degree (Amador & Cabral, 2014, p. 12).

Trade liberalization also played a role. Decreasing trade barriers, especially for tariffs, has further reduced costs (OECD, 2013, p. 9). As reported by Orefice and Rocha (2014), there is a positive two-way relationship between deep integration and production networks trade (Orefice & Rocha, 2014, p.9). Trade agreements that are deeper will promote the formation of “production networks by facilitating trade among potential members of a supply chain...On the other hand countries already involved in international fragmentation of production are more willing to sign deeper preferential trade agreements with their partners” (Amador & Cabral, 2014, p. 14). Deep-trade agreements which are necessary for the smooth functioning of GVCs will if successful, strengthen the regional character of GVCs (De Backer & Flaig, 2017, p. 10).

#### c) FDI flows and intra-firm trade

Flows of FDI and intra-firm trade are for the most part a consequence of the growth of GVCs and not particularly drivers for GVC growth. Multinational enterprises (hereinafter: MNEs) play an important part as a business strategy through FDIs. “The presence of foreign affiliates is clearly an important factor influencing both imported contents in exports and participation in international production networks” (OECD, WTO & World Bank group, 2014, p. 14). FDIs build a foundation of GVCs. For many OECD economies, the share of national employment by foreign affiliates is bigger than 20%. (OECD, WTO & World Bank group, 2014, p. 39). GVCs are becoming very dominant and important for future trade, FDI patterns, and growth opportunities. Governments need to search for a way to establish a business environment that creates an attractive country for the location of GVCs and help with creating opportunities over time (OECD, WTO & World Bank group, 2014, p. 3).

Economic liberalization and deregulation advanced the increase of FDI flows since the nineties (Amador & Cabral, 2014, p. 14). As MNEs become important actors in international trade, “GVCs are increasingly associated with FDI flows, with subsidiaries

providing inputs to their parent firms. In this case, trade in intermediate goods takes the form of intra-firm transactions with production stages located in different countries, i.e. vertical production networks within multinationals” (Amador & Cabral, 2014, p. 15). FDI is also an important contributor for transferring of knowledge and skills which help in upgrading in GVCs. Numerous studies which have analyzed the impacts of FDI on horizontal and vertical spillovers (for example Görg & Greenaway, 2004; Lipsey & Sjöholm, 2005) show that the gains from linkages do not appear automatically. According to Taglioni and Winkler (2016, p. 182), they rely upon the spillover potential of the foreign firm, absorption potential of local actors to gain from GVC spillovers in host countries, and the overall business environment in the host country.

#### d) Neighboring countries

Neighboring countries and proximity influences trade, particularly in services, including those that contribute to GVC production. Based on OECD and World Bank Group (2015, p. iv), authors prove that even countries with good structure, lower unit labor costs and higher connectivity will still suffer in the case their neighbors do not perform well in the same areas. “Bad neighbors have a depressing effect on trade and presumably on growth. This may result from depressing effects on local trade or other factors” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. v).

### **1.3 The increasing importance of global value chains**

Why are GVCs important for economic development? GVCs represent an increasing share of international trade. Its impact is seen in various sectors, such as apparel, commodities, tourism, electronics, and business service outsourcing which all have an important impact on international trade, production, employment, global GDP, and the way firms, producers, and workers integrate into the global economy (Gereffi & Fernandez-Stark, 2016, p. 6).

Around the world, GVCs connect firms, including workers and consumers. It helps firms, workers, and consumers in developing countries to be a part of the global economy. Under the earlier model of industrialization, developing countries had to make a choice. They could either try to establish the whole production process of a complex good which could be very costly and inefficient, or they could just remain specialized in agriculture or mining and not manufacture. However, with GVCs, it is possible to enter the value chain by doing one task or a few tasks which is much easier than reproducing the whole value chain (Ferrantino, n. d.). In this way, countries can focus on a specific production process or task by using their comparative advantage which helps them to integrate into the global economy more quickly than was possible in the previous period of industrialization (Kowalski, Lopez-Gonzalez, Ragoussis & Ugarte, 2015, p. 33). For many countries, especially smaller or low-income countries, it is important to incorporate themselves into GVCs so they can reach bigger development and capture higher gains in terms of national

economic development and creating more and better jobs (UNCTAD 2013) in order to decrease unemployment and poverty. Hence, it does not only matter whether to participate in the global economy or not. The real question is how to do so gainfully (Gereffi & Fernandez-Stark, 2016, p. 6).

There are many other gains that come from engaging in GVCs. First, it brings the potential for technology transfers or spillovers from developed countries to developing countries as a consequence of local learning (Pietrobelli & Rabellotti 2010, p. 1261). Secondly, GVCs help firms and business to obtain access to markets by specializing in niche intermediate activities in a chain which enables suppliers to upgrade production into higher-value segments of their industries, attain standards that increase their ability to access markets, and learn new processes (OECD, WTO & World Bank group, 2014, p. 10). Thirdly, on the national level, GVCs allow countries to specialize in areas where they have comparative advantage and in this way help countries to boost their productivity growth. Simultaneously it stimulates a growing interdependency and interconnectedness of countries (OECD, WTO & World Bank group, 2014, p. 10). Some countries in development have gained from participating in GVCs by using new technologies and know-how. Other countries have built the density of their production structure and a few countries have achieved both (WTO, 2013). Finally, according to UNCTAD (2013, p. 133–135), 80 percent of international trade now goes through GVCs and the share that comes from developing country in global value-added trade doubled from 20 to 40 percent between 1990 and 2010. Even though job creation by GVCs is difficult to calculate, a study by Jiang and Milberg (2013, p. 2) estimates that in 39 countries which the authors looked at, GVCs generated 88 million jobs worldwide.

GVC framework can be helpful for governments with questions about development issues not yet researched by previous models. It can assist with learning and understanding in what way global industries are organized by examining the structure and dynamics of different actors involved within a given industry since it focuses on separate tasks of value added in a production process, from conception to production and end use (Gereffi & Fernandez-Stark, 2016, p.6).

Countries participating in GVCs face risks and costs as well. Many countries can experience weakening of domestic content of countries' export as a result of GVC development and upgrading. Sourcing abroad permits firms to create production that is less labor-intensive in the home country and then employment in a capital-intensive country will decline for any given level of output. In spite of that, higher competitiveness and sales typically facilitate additional hiring which may offset the job losses because of the decrease in labor intensity (OECD, WTO & World Bank group, 2014, p. 14). Another risk comes from the fact that the gains from upgrading in value chains are not equally distributed. Jobs, gathered at the bottom of the GVCs, are usually low paid and insecure, whereas high-skilled jobs, carried by large, high-tech firms with diversified export markets, and high-skilled workers with formalized contracts will benefit the most (Gereffi

& Luo, 2014, p. 18). Some other risks include being stuck in particular segments, having a burden to cut down the costs that can lead to bad environmental and occupational safety, uncertain demand for labor, and a race to the bottom of regulations and taxation policies (OECD, WTO & World Bank group, 2014, p. 14).

What makes all this possible? GVCs which are typically organized by lead firms work together with many partners from all over the world, connecting together suppliers and buyers that are integrated and driven by MNEs. They involve international trade flows within their networks of foreign affiliates, contractual partners, and arms-length external suppliers. Unlike the classical multinationals in the 1970s which tended to own all its facilities around the world and control them, a lead firm is unlikely to own every step of the production process around the world. They are much more likely to organize and network the relationships and contracts that get the job done, as well as integrate the know-how of lead firms and suppliers of key components along all the stages of production and in multiple companies and offshore locations (Ferrantino, n. d.)

#### **1.4 Implications of global value chains for developing and developed countries**

GVCs have been an important driver for growth, both for developed and developing countries. GVCs involve countries at all levels of development, from the poorest to the most advanced. Yet not all countries are equally involved or carry the same weight in GVCs. Small, open countries, like the Slovak Republic or Belgium, depend intensely on foreign imports to make finished goods. In large countries, like the USA or Japan, a much larger percentage of the value chain comprises of domestic goods. This holds for Australia, Norway, and Russia as well because their main exports are natural resources like minerals, oil, and gas (OECD, n. d.). Some countries engaged in GVC trade more, either as the host country to lead firms or as suppliers of very specific tasks, while other countries engage very little or not much at all (OECD, WTO & World Bank group, 2014, p. 20). These different levels of participating are controlled by numerous factors, like the country's geographic location and resource endowment or the country's human capital and physical infrastructure (OECD, WTO & World Bank group, 2014, p. 20). Economies can "participate in GVCs both as users of foreign inputs and as suppliers of intermediate goods and services that can be used in other economies' exports" (OECD, 2013, p. 11). Both can be shown through participation index, explained in chapter 4. Governments can generate policies that would either advance or diminish the capacities of their firms to improve their competitiveness, attract investment, and help in connection in GVCs (OECD, WTO & World Bank group, 2014, p. 7). Developed countries involved in GVCs will profit whole population because of enhanced trade and more rapid growth, yet all to a different degree. On the other hand, developed countries will profit from enhanced international trade and investment, which are concentrated between the high skilled workforce and the capital owners (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 12–13).

GVCs provide developing countries with new opportunities to participate in global trade more and to diversify their exports. Without GVCs, they would need to be capable of producing an entire product by itself. Countries in development used to export unprocessed raw materials, implying that the jump to producing finished products was not easy. Today, however, being part of the GVC, many developing countries can export primarily manufactured goods. Nevertheless, very few developing countries are actually deeply involved in GVCs. China is the best example (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 1). By doing a task or a few tasks, it allows firms in developing countries not only to move up in the GVCs but also to do it more rapidly, capturing bigger gains in terms of national development. GVCs boost upgrading by rewarding innovation, learning and skills. By being a part of GVC, “developing economies with the fastest growing GVC participation have GDP per capita growth rates 2% above average” (OECD, WTO & World Bank group, 2014, p. 18). Some countries in development have benefited not only from the FDIs in the production of goods and services but also from higher value-added operations like innovations and R&D, which profited mainly countries with a certain degree of local knowledge capacities and large domestic markets, such as India and China (OECD, WTO & World Bank group, 2014, p. 18). The expanding integration of some developing countries into GVCs has been the outcome of numerous factors, “including new business strategies in the home and in the hosting countries, targeted policies to promote integration and internationalization, and new forms of public-private partnerships” (OECD, WTO & World Bank group, 2014, p. 18 from OECD, 2013).

However, not all developing countries benefited to the same extent from participating in GVCs, especially low-income countries and countries that are not in close proximity to international markets (OECD, WTO & World Bank group, 2014, p. 18).

As per OECD, WTO and World Bank group (2014, p. 4), benefits of GVCs can vary a lot if a country works at the high or at the low end of the value chain. Differences in comparative advantage between different countries lead to the involvement of developed countries in engaging in high-end intangible production activities, like design, research and development, and brand building, whereas manufacturing jobs are usually offshored to low technology, low wage countries. On the other hand, developing countries focus more on low-end, tangible production activities, like manufacturing and assembly, which could lead countries like this in getting stuck at the bottom of the GVC “smile curve”, as well as getting the wrong types of jobs (World Bank group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 68–69). The entire population will gain from developing countries deeply involved in GVCs, because it would experience enhanced trade and faster growth. However, not all countries will experience this to the same extent. On the other hand, the benefits of expanding international trade and investment in developed countries are heavily concentrated among the high skilled workforce and the capital owners. These two groups already sit at the higher end of the distribution of wealth and globalization is expanding their share of the pie (WTO, 2013).

How can developing countries deepen their involvement in GVCs? Low wages are not enough. Connectivity, regulatory requirements, and efficient logistics systems are essential. For competitiveness, unit labor costs are also an essential factor (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 4–5) and for the involvement of developing countries in GVCs, geography also matters. There are three interconnected production hubs worldwide for trade in parts and components. They are centered mostly in the United States, Asia (China, Japan, and the Republic of Korea) and Europe (particularly Germany). Developing countries (except China) are typically on the periphery and generally trade with the hub that is in geographical proximity. Some developing regions are involved very little. Most of the African countries still have a long way to be a part of a hub eventually. Large firms in developing countries tend to be involved in global production networks. For example, in Latin America, small firms very seldom trade outside the region (WTO, 2013).

Some countries can get stuck in the middle-income trap<sup>3</sup>, which tells how some countries that have made significant progress are now stuck in a position of middle income as a result of not being competitive in low-wage segments anymore and at the same time, not yet reaching a competitive advantage in higher-skilled activities. So, they find it difficult to climb away from being a middle-income country. To avoid being in the middle-income trap, countries attempt to move their comparative advantage to more sophisticated tasks with higher value-added, but the upgrading in GVCs continues to be a challenge for numerous countries in development (Berger et al., 2016, p. 11).

## 1.5 Smile curve

The rationale of the Smile curve<sup>4</sup>(Shih, 1996) has been used and discussed extensively in the context of GVCs. The smiling curve “represents a pattern of value-added along the value chain” (Shih, Kraemer & Dedrick, 2012, p. 90). It says that higher value (large portion of economic gain) is added both upstream (at the input end) and downstream (at the output end) – new technology and high-tech components, with the lowest value-added (less economic gain) in the middle of the value chain – lower-tech components and manufacturing (Shin, Kraemer & Dedrick, 2012, p. 90). A firm’s value chain activities can be generally categorized into three groups: “the upstream (input), the downstream (output or market) end and the middle” (Mudambi, 2008, p. 701). While upstream activities include design, basic and applied R&D, downstream activities typically include

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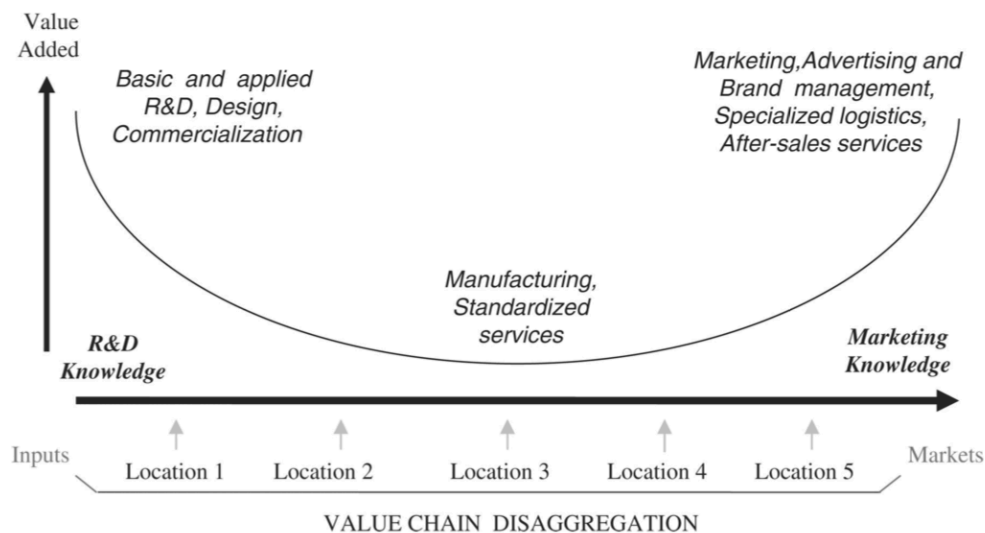
<sup>3</sup> *Middle income trap is a term made by Gill and Kharas (2007).*

<sup>4</sup> *The smile curve concept was first introduced by Stan Shih, the founder of technology company Acer.*

marketing, brand management, distribution, and after-sales services. Tasks that are in the middle of the smile curve contain manufacturing and assembly as well as a few other repetitious operations where prototypes are carried out on a mass scale (Taylor, 2017). “The major factors determining the level of value-added are entry barriers and accumulation of capability: the higher the entry barriers and the greater the accumulation of capabilities, the higher the value-added” (Shih, Kraemer & Dedrick, 2012, p. 91).

Smile curves aid in answering many questions on the economy level. They can contribute to understanding the country’s positions and value-added gains because of participating in GVCs. They can show the relationship between developed and developing countries in the value-added creation and distribution and what are job prospects in GVCs. Because developed countries have more lead firms and component suppliers, the smiling curve theory would assume that the gains obtained by firms in these countries are larger than those from firms in newly emerging countries which typically specialize in more labor-intensive assembly. The analysis of the Smile curve helps to shows how different value-added and job gains are for different countries and sectors when moving along the GVCs. It depends on the position of a country in GVC and their degree of participation. Countries that join the GVCs will expand their economic efficiency, but this may have a distributional effect (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 54).

*Figure 1: Conceptual framework of the smile curve*



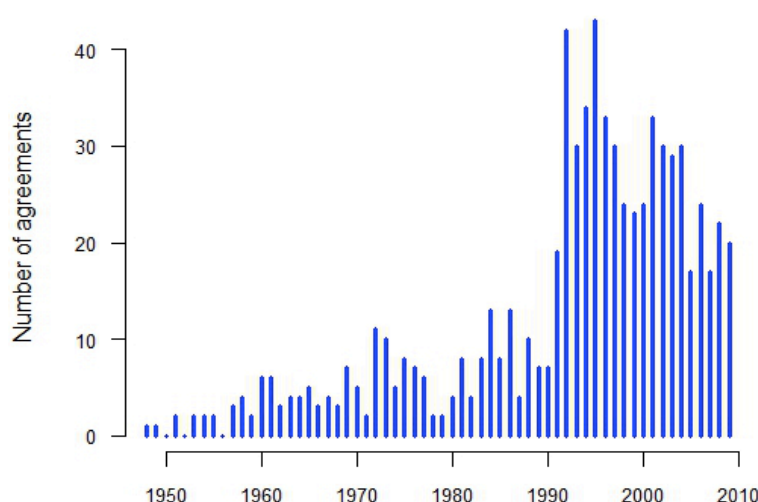
*Source: Mudambi (2008, p.707).*

## 2 DEEP PREFERENTIAL TRADE AGREEMENTS

Preferential trade agreements (PTAs), involve a group of countries which negotiate agreements on policy issues and areas that build on WTO commitments. They have

proliferated and are an essential part in today’s global trading system. PTAs are defined as “a trade pact between countries that reduces tariffs for certain products to the countries which sign the agreement. While the tariffs are not necessarily eliminated, they are lower than countries not party to the agreement” (Business Dictionary). PTAs evolved over the decades but only in about 1990 they began to proliferate rapidly and became more widespread as seen in Figure 2. In 1990, there were only 70 PTAs in force. However, in 2010, PTA participation accelerated to almost 300 (WTO, 2011. p. 6). Subsequently, the content of PTAs has transformed over time. The coverage of policy areas in PTAs has generally deepened, as new agreements started to go way “beyond tariff liberalization and include disciplines such as the movement of capital, investment, intellectual property, competition policy, services trade, and technical barriers to trade” (Orefice & Rocha, 2014, p.2) which reflected deepening integration of the global economy and the growing “globalization” of policies that were once viewed as local (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 12).

*Figure 2: Number of agreements signed*



*Source: Baccini, Dür & Elsig (2013).*

## 2.1 Evolution of deep preferential trade agreements

Since WTO commenced, liberalization and free trade agreements all worked under the rules of WTO. However, its members have had troubles with agreeing on an extensive set of new trade rules and commitments. As a result, some countries have stalled some negotiations in recent years. Correspondingly, trade rules are now being negotiated within a complex structure of preferential trade agreements because the direction of trade governance has moved away from WTO towards megaregional agreements. Modern PTAs are also defined as “deep” agreements – deep because they include economic governance that covers disciplines and commitments that go substantially beyond the rulebook of WTO (Baldwin, 2014, Berger et al., 2016, p. 1). Trade agreements which

generally cover deals which cover border measures are defined as “shallow” agreements and PTAs which include rules on other domestic policies are defined as “deep” agreements (WTO, 2011, p. 9), deeper “either in the sense that they commit members to a greater degree of market integration than the WTO (e.g. the removal of all barriers to service providers of PTA partners), or that some policy prerogative is delegated from a national to a supra-national level (e.g. the creation of regional standards)” (WTO, 2011, p. 44).

In 1947, the idea of a broader multilateral agreement came into existence with the creation of GATT. Initially, the GATT system involved only 23 countries in a plurilateral agreement. However, original GATT rules, designed to set up international selling were not sufficient enough to build on the complex cross-border flows linked to the supply chains which happened among rich nations in the 1960s and 1970s (Baldwin, 2012, p. 9). GATT soon began gradually evolving into the universal membership of WTO, which began in 1995 (WTO, 2011, p. 185). At the beginning of the stages of GATT, regional trade agreements (RTAs) were mostly about preferential tariff reduction. Today, this is no longer sufficient. Modern PTAs include characteristics that earlier PTAs did not have. Particularly, PTAs signed before 1995 dealt only with trade in goods and appeared in the form of free-trade areas or more rarely of customs unions which involved mainly tariff liberalization. After WTO commencement, after 1995, the multilateral trade agreements to trade in services and trade-related aspects of intellectual property rights proliferated. In 2001, the Doha Round put the emphasis on traditional trade issues. Because of WTO’s inability to move onto deeper disciplines, supply-chain trade rules started to become written outside the rulebook of WTO. Its governance gap is filled by uncoordinated developments in deep RTAs, bilateral investment treaties and emerging economies’ autonomous reforms, which drive the need for deeper disciplines (Baldwin, 2012, p. 9). Notably, the existing deep RTAs are signed between big outsourcing nations – especially, the US, Japan, and the EU. They have made a guideline for the disciplines that seem necessary (Baldwin, 2012, p. 10). Newer PTAs tend to cover these two subjects which are about regulatory issues more or less (Horn, Mavroidis & Sapir, 2009, p. 3). They concentrate on the lowering of non-tariff barriers to trade which involve many new disciplines that are essential against the background of increasing the international fragmentation of production (Berger et al., 2016, p.18).

The need for developing deep integrations arises from the fact that trade openness increases policy interdependency (spillovers) which makes unilateral decision-making inefficient in comparison with decisions that are taken collectively. Another reason is that these agreements might be important to advance trade in certain sectors and economic integration more comprehensively because international production networks require a governance structure past low tariffs (WTO, 2011, p.44). PTAs can obtain deeper integration with a few approaches, such as harmonizing policies between signing countries. In the case of developed-developing countries, they can introduce upgrading disciplines or even propose new policy areas for developing countries. Deeper provisions

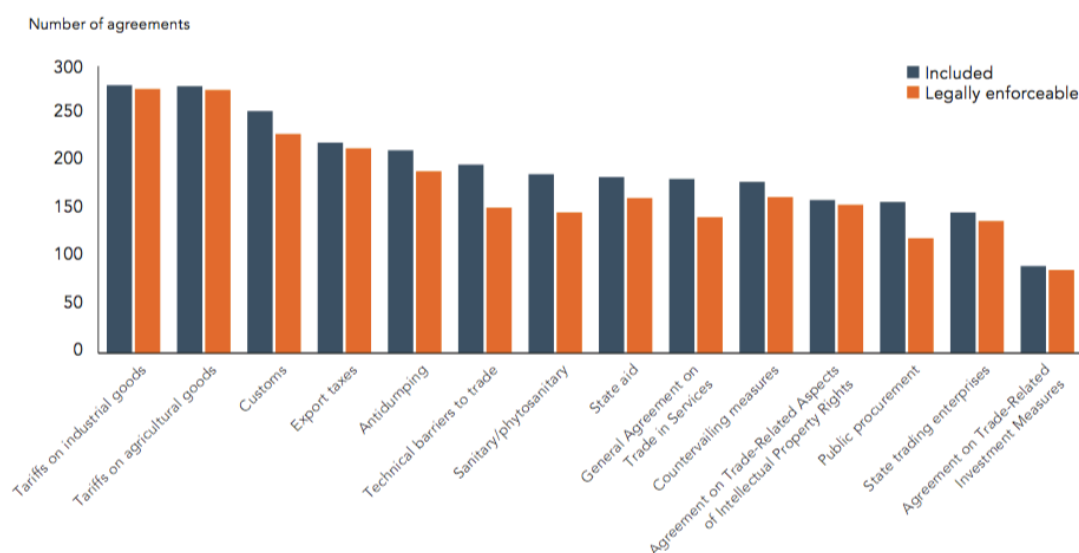
have started to be observed first by Estevadeordal, Shearer, and Suomien (2008), Horn, Mavroidis, and Sapir (2009), and Hofmann, Osnago, and Ruta (2016).

According to Horn, Mavroidis, and Sapir (2009, p. 12), deep PTAs today are different from PTAs in the past in two areas. In one area, deep PTAs cover obligations in areas that are part of the WTO's rulebook and are called as "WTO+". In the second area, there are deep PTAs cover obligations which are outside the current WTO rulebook and are often not directly related to trading and are called "WTO-X".

"WTO+" or "WTO-plus" areas include IPRs, technical barriers to trade and services liberalization, customs regulations, export taxes, antidumping measures, countervailing duty measures, and sanitary standards. "WTO-X" or "WTO-extra" areas include investment protection, competition policy, environment, and human rights.

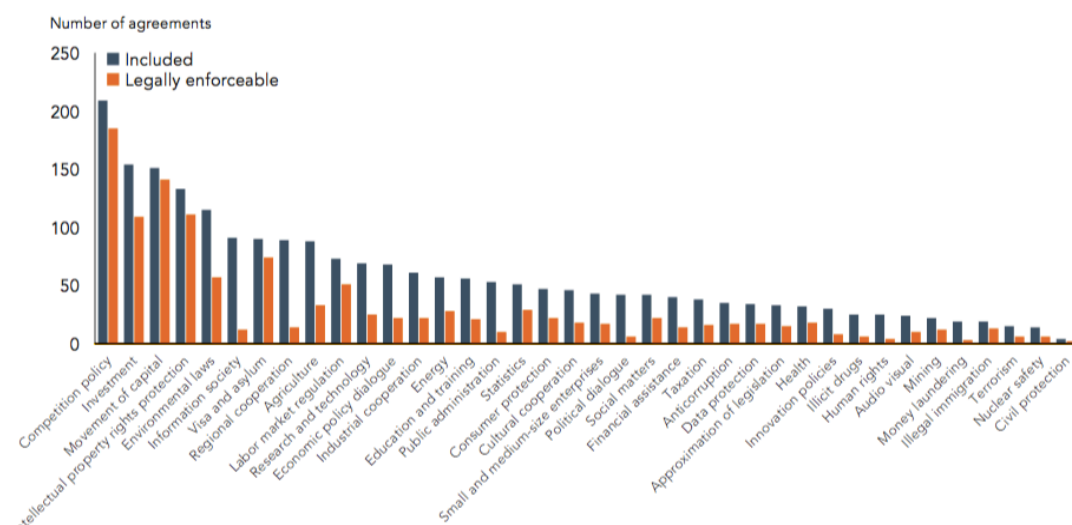
Agreements include many enforceable provisions. However, four behind-the-border policy provisions (they do not exist in WTO agreements) come up more often and have a bigger potential to affect GVCs, such as Investment, Capital movement, Intellectual property rights (IPRs), Competition Policy, and Services, which also matter (Rubinova, 2017, p. 6–7). "Evidently, deep PTAs go substantially further than the trade rules of the WTO and shift their focus to regulatory measures, whereas the focus of shallow PTAs rests under the WTO roof and mainly deals with tariff measures" (Berger et al., 2016, p. 19).

*Figure 3: "WTO-plus" policy areas in preferential trade agreements, 2015*



*Source: Hofmann, Osnago & Ruta (2016, p.11).*

Figure 4: “WTO-extra” policy areas in preferential trade agreements, 2015



Source: Hofmann, Osnago & Ruta (2016, p.11).

Table 1: Selected deeper than GATT provisions in RTAs

WTO-plus areas	
Technical barriers to trade	Affirmation of rights and obligations under WTO agreement on TBT; provision of information; harmonization of regulations; mutual recognition agreements
State trading enterprises	Establishment or maintenance of an independent competition authority; non-discrimination regarding production and marketing condition; provision of information; affirmation of Art XVII GATT provision
Trade-related investment measures	Provisions concerning requirements for local content and export performance of FDI
Services	Liberalization of trade in services
WTO-X areas	
Competition policy	Maintenance of measures to proscribe anticompetitive business conduct; harmonization of competition laws; establishment or maintenance of an independent competition authority
Intellectual Property (IP)	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
Movement of capital	Liberalization of capital movement; prohibition of new restrictions
Regional cooperation	Promotion of regional cooperation; technical assistance programmes

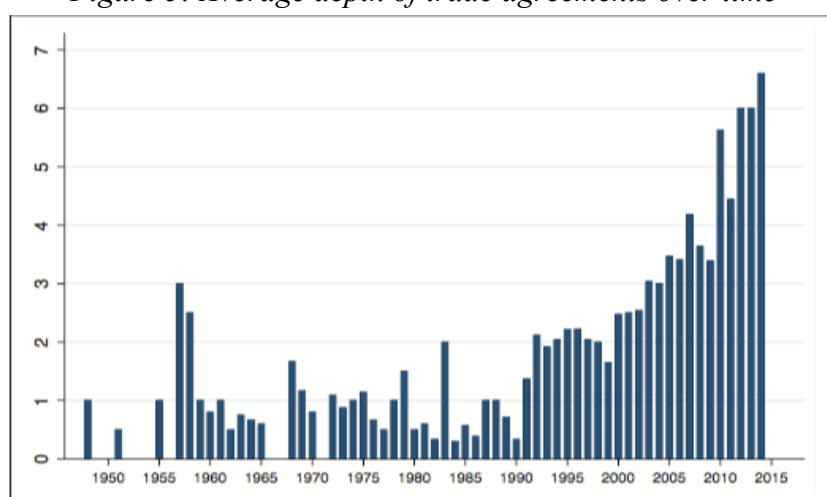
Source: WTO (2013, p. 42).

Based on Horn, Mavroidis, and Sapir (2009), the WTO created a database of deeper disciplines in all the RTAs which were announced to the WTO by 2010. Data covers more than 50 measures. However, only some of them occur often enough to be important. Table 1 above shows a selection of deeper-than-GATT disciplines that do appear quite often in modern trade agreements. “WTO-plus areas” show the issues that are covered by WTO disciplines but where the RTA involves commitments that go further. The “WTO-

X areas” show disciplines not mentioned in WTO agreements, so the RTA provisions create new rules and not only extending or deepening disciplines that already exist (WTO, 2013, p. 41).

Empirical analyses prove the expansion of deep PTAs in recent years, especially among developed and developing countries (Berger et al., 2016, p. 19). Baccini, Dür, and Elsig (2014) have created an indicator (an additive index) that computes the depth of PTAs along seven dimensions (elimination of tariffs, services trade, investment, standards, public procurement, competition, and intellectual property rights), covering about 600 PTAs signed between 1950 and 2015. Figure 5 below shows the growing average depth of PTAs over time, measured by a depth indicator spanning from 0 to 7 based on the seven dimensions listed above. The trend of deeper PTAs has been striking from the 1990s onwards. The spike 1957 has to do with the foundation of the European Community, which at that time covered a large number of areas (Bruhn, 2014, p 13). All the agreements with the highest score of seven have been signed in the 21<sup>st</sup> century (Berger et al. 2016, p.32).

*Figure 5: Average depth of trade agreements over time*



*Source: Dür, Baccini, & Elsig (2013).*

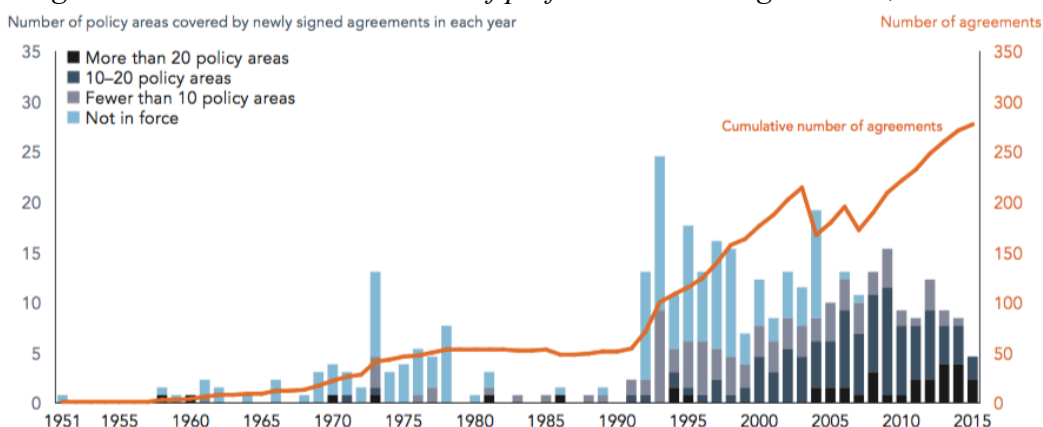
Yet, there are evident differences in the PTAs depth depending on the countries and regions engaged. The depth of integration across the world is consequently heterogeneous and the content of trade agreements varies widely. European countries have most of the signed PTAs and they are the deepest with the average total depth of EU agreements being 25 provisions (compared to countries and regions in South Asia). Deep PTAs are also quite prominent for member countries of the European Free Trade Association (average of 23 policy provisions), Japan (21), and the Republic of Korea (20). In particular, PTAs signed between North-North countries are relatively deep and include 22 provisions, since MFN (most favored nation) tariffs are already low between two or more developed countries. PTAs signed between North-South are also expected to be deep and include 20 provisions. Agreements between South-South PTAs (Hofmann,

Osnago & Ruta, 2016, p.17) where legal enforceability is normally weaker and agreements are shallower have an average total depth of 13 provisions (Hofmann, Osnago & Ruta, 2016, p. 3), focusing on the elimination of tariffs (Bruhn, 2014, p. 13, 15). (Hofmann, Osnago & Ruta, 2016, p. 21).

The policy motives for countries in development to adopt deep PTA provisions differ from country to country. Deep provisions are seen as important signaling and commitment tools that can upgrade local institutions in developing countries as well as promote FDI and trade flows. Moreover, deep provisions help developing countries' governments to lower the costs of future domestic reforms or to "tie the hands" of future governments (Hicks & Kim, 2015). Some countries in development have to accept deep provisions as a package deal so they can have start having access to countries with bigger trading power (Berger et al. 2016, p. 20).

Expanding on Horn, Mavroidis, and Sapir (2009) and WTO (2011), Hofmann, Osnago, and Ruta (2016, p. 2) gathered information on all active PTAs and notified to the WTO in 2015. Their data showed that within 189 countries, 52 policy areas in 279 PTAs were included and legally enforced. Figure 6 illustrates with the orange line the cumulative number of PTAs from 1951 to 2015, and with the shades of color in the histograms it illustrates the number of policy areas, that were covered by newly signed agreements in each year. As seen on the figure, the number of trade agreements that covers a large set of policy areas (more than 20) increases. Most of the PTAs signed recently include from 10 to 20 policy areas. Less than 10 signed PTAs focus on a few issues.

*Figure 6: The number and content of preferential trade agreements, 1951–2015*



*Source: Hofmann, Osnago & Ruta (2016).*

## **2.2 Differences between twentieth- and twenty-first-century free trade agreements**

In the past, trade and trade agreements used to be fairly simple. Trade was seen as predominantly trade as “made-here-sold-there goods”, so twentieth-century regional and multilateral trade agreements used to deal mainly with barriers to goods crossing borders – especially tariffs – the so-called shallow PTAs. However, twenty-first-century regionalism is fundamentally different, as it concerns “made-everywhere-sold-there goods” (Baldwin, 2014, p. 6). The difference is in how trade agreement is classified nowadays as deep, which means they cover deeper disciplines that go beyond preferential market access, beyond the rulebook of WTO. They include economic governance that covers disciplines and commitments, such as investment, competition and Intellectual Property Rights (IPRs) and requires significant adaptation processes by the participating countries.

Twentieth-century trade dealt with reductions of tariffs. This is what the well-known phrase “multilateralising regionalism” by Richard Baldwin focused mostly on. Multilateralising regionalism could be defined as “making regional trade agreements less preferential” (Baldwin, 2014, p. 5) in the process of removing tariffs globally. However, multilateralising twenty-first-century regionalism is a very different thing. The twenty-first-century trade deals with the reduction of non-tariff barriers. After the negotiations on the Doha Development Agenda, the newer and more complex disciplines experienced a big increase (Baldwin, 2014, p. 6–12; Shahid, 2011, p. 3).

Twenty-first-century trade is more complex than twentieth-century trade because today international production networks worldwide play a more extensive role, seen in the unbundling of stages of production across borders. MNEs play a part not to only distribute production stages to reduce costs and exploit comparative advantages but also to outsource services, which in turn makes global production networks today even more complex (WTO, 2011, p.111).

The comparative advantage in the twentieth-century was purely a national concept, as trade exports consisted of a bundle of national technology and production factors. The liberalization of twentieth-century trade allowed nations to exploit their comparative advantage better by exchanging more, focusing production on what they specialized in while importing products where they were not specialized, and creating bigger welfare for the nations. In the twentieth century, nations did not change their comparative advantage, but trade agreements strengthened existing comparative advantages (Baldwin, 2014, p. 17).

On the other hand, the twenty-first-century trade deals with more complex international flows of goods and services, capital, ideas, and people which appear when production processes are internationalized. However, trade is not the heart of the matter but the

recombination of technology and factors across nations. The twenty-first-century trade includes high-tech firms from high-wage nations that combine their managerial, marketing, and technical know-how with low-wage labor in developing nations. We can call this “technology lending” with many names, like foreign affiliates, joint ventures, contract manufacturing, offshoring, re-importing, etc. Comparative advantage is, therefore, a multinational concept and, consequently, twenty-first-century trade agreements can alter comparative advantages. Competitiveness of a nation comes from not so much on the easier movement of goods but from the easier cross-border movement and combination of several nations’ technology, labor, and capital in the context of internationalized production networks (Baldwin, 2014, p.17).

### **2.3 General impact of deep preferential trade agreements**

Deep preferential trade agreements impact the world globally. On the one hand, agreements like this can benefit everyone. On the other hand, however, the pressure to agree to some rules too rapidly can lead to rules that do not sufficiently reflect preferences and needs of certain countries, particularly if agreements do not follow an open, democratic process and political legitimacy. In that case, pursuit in achieving common rules and standards may end up disrupting international coordination. Historically, after 1980, pressures to achieve deeper integrations were starting to accumulate between the developed countries. The objective was to accomplish greater harmonization and reconciliation of domestic policies between countries and lowering barriers to trade. Today, much more intense commercial forces move the pattern towards deeper integration. Advancement in communications and transportation led to the possibility of being able to produce products by sourcing from multiple locations around the world and helped foreign firms to enter new markets through both, acquisition and new establishment. As developed countries moved towards deep integration, it also made pressure for deeper agreements to be made between the developed and developing countries as well. Developing countries had pressure for privatization programs and efforts to attract foreign investment capital, which, in turn, undermined the logic of preferential treatment for developing countries. Special treatment was usually made for the developed countries for trade agreements related to barriers at the border, as they could simply adopt lower tariffs than developing countries. Contrary, the only preference developing countries typically receive is in the form of a longer transition period to full reciprocity (Birdsall & Lawrence, 1999, p. 130–133).

Deep PTAs bring, first, the improved markets. A more open international market means bigger economic growth and reduced poverty for the developed and developing countries because open markets make local producers more competitive in global markets, bring greater access to new technology and foreign investment. Second, the increasingly clear international rules on measures to attract foreign investment and environmental and labor standards which characterize deep agreements can help all countries avoid a race to the bottom in international competition. Third, international rules of trade agreements help

all countries to limit the ability of large firms to exploit monopoly power, which is specifically important for developing countries as developing countries are not as likely to take advantage of market imperfections. Fourth, agreed on rules that preempt protectionists in their efforts to use the domestic political process to resist trade opening can help the developing countries. Fifth, harmonization of standards or mutual recognition of different product standards can realize economies of scale across countries. In this way agreements may allow countries, including poor countries, to better exploit their comparative advantage by realizing economies of scale. This improves the global market for everyone by reducing the average costs of production worldwide. Lastly, there is a more contestable international market because practices of existing producers or the natural monopolies could make it harder for new producers to enter and shield the current producers from the healthy threat of competition (Birdsall & Lawrence, 1999, p. 133–135).

Developing countries that participate directly in deep PTAs have many more additional benefits, such as benefits from adopting institutions and the associated infrastructure of rules and rulemaking without having to pay the costs of developing them. Secondly, enhancing domestic reforms because participation in deep trade agreements drives commitments to particular domestic policies, which can be in the interests of developing countries (beyond the trade benefits directly acquired) because the commitment can strengthen the internal reform process. Thirdly, there is more open and democratic decision-making for the creation of new mechanisms for developing political and social consensus for the new reforms. Fourth, the developing countries without much international power have a particular interest in seeing that the rules of the game are set in a multilateral setting where they can actively participate and that they are not at a negotiating disadvantage with a larger, more powerful trading partner. Lastly, active participation in the negotiation and ongoing monitoring of deep integration agreements can make developing countries actors rather than spectators on the world scene and thus putting them in a much better position to assert their interests (Birdsall & Lawrence, 1999, p. 135–139). For the developing countries, PTAs eliminate trade barriers and show commitment connected with FDI and trading activity (Bruhn, 2014, p.1).

Of course, there are not only benefits but also risks for the developing countries that participate in deep trade agreements. Those risks include lack of adequate resources of developing countries as many of them, especially small or poor countries, receive a disadvantage in the negotiating process. Developing countries can also fear that trade agreements that cover product standards will be utilized as a vehicle by politically powerful protectionist interests in the developed countries to deny access to developing country producers. It is unavoidable that there will be pressure on developing countries trying to join international arrangements to adopt rules and institutions that may not be appropriate given their level of development or needs. (Birdsall & Lawrence, 1999, p. 139–140). Binding commitments in PTAs can be seen as restrictive for policy-makers. It can tie government hands in pursuing national development policies (Bruhn, 2014, p. 1–

2), as well as create a bigger co-dependency of member countries which in turn can contribute to greater exposure to the volatility of the international environment. Risks associated with interconnectedness between economies and its macro-economic shocks could be accumulated along the GVCs (De Backer & Miroudot, 2013, p. 39–40).

### **3 THE LINK BETWEEN THE GLOBAL VALUE CHAINS AND DEEP PREFERENTIAL TRADE AGREEMENTS**

What connection do preferential trade agreements and global value chains have? Since the early 1990s, both the GVCs and PTAs gained importance and showed a rising trend. The growth of global value chains, seen as trade in parts and components, increased nearly six times from 1990 to 2015, faster than the 4.5 times from any other forms of trade. Preferential trade agreements also increased in number, as well as deepened in content. Their number increased from 50 in 1990 to 285 in 2018 (Ruta, 2017, p. 2, World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 175; WTO, 2018). So, what is the relationship between preferential trade agreements, particularly “deep” PTAs and GVCs?

Current studies find a clear positive connection between rising of GVCs and the parallel boost of deep PTAs, highlighting that “the pattern of deep agreements is shaping and is shaped by GVCs” (IMF, 2013, p. 32). Deep PTAs drive country’s participation in GVCs, which means that policymakers can use trade agreements to help them secure national producers to global and regional production processes (Ruta, 2017, p.2). “Recent evidence shows that deep preferential trade agreements boost GVC integration and that undoing this depth is likely to hurt GVCs” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 183). Signing deep PTAs can have a profound effect in building up countries’ economic prospects and their opportunities of participating and moving up to higher value-added tasks in GVCs (Berger et al., 2016, p. 1).

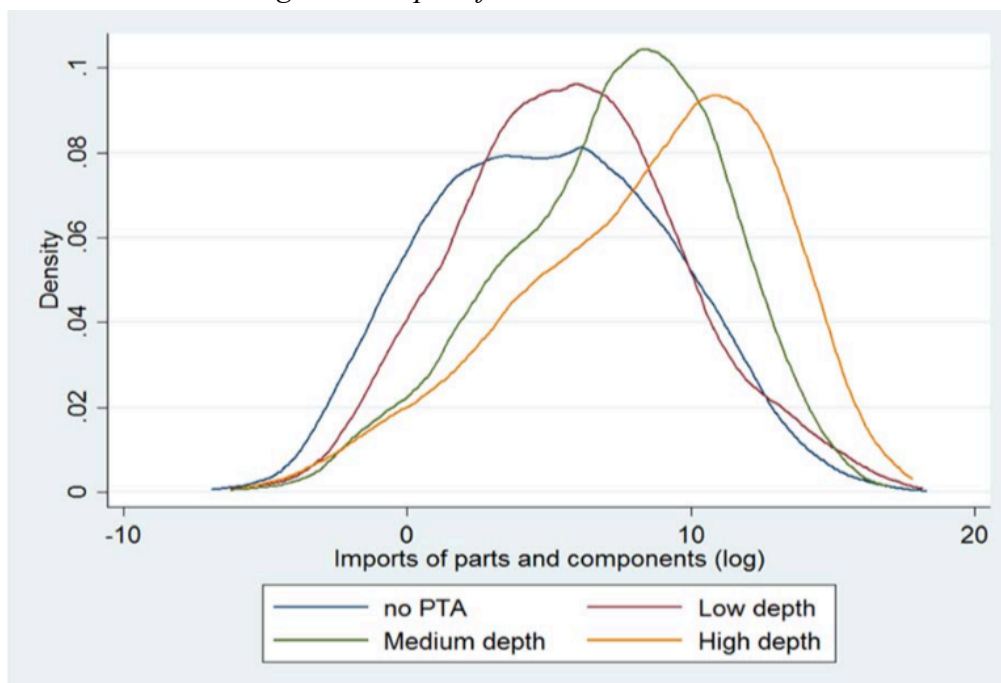
Despite the increasing number of literature on deep PTAs and a large number of literature on upgrading in GVCs, studies investigating the causal relationship between deep PTAs and upgrading in GVCs is still limited. This is surprising “because many developing countries have just signed – or are negotiating – deep PTAs with the prospect of entering or moving up the value chain in global production networks” (Berger et al., 2016, p. 27).

#### **3.1 Global value chains and motivation for trade agreements**

Motives for trade agreements, especially deep trade agreements, in a GVCs context, are many. Much of the literature in the past has focused on the trade agreements’ design, for which production is not fragmented internationally (and production is completely national). In the past, studies also focused mainly on cooperation on tariffs and how to internalize the terms-of-trade externality created by unilateral tariffs. However, Figure

shows that there is a “positive correlation between GVC trade (measured as trade in parts and components) and the “depth” of trade agreements (measured by the number of policy areas covered by the agreements)” (Ruta, 2017, p. 8).

*Figure 7: Depth of PTAs and GVC trade*



*Source: Ruta (2017, p.7).*

The GVC-PTA relationship, as seen in figure 7, can be clarified with some behind the border policies that have to be implemented in trade agreements so that GVCs can work proficiently. First, the unbundling of production stages across borders gives rise to new forms of cross-border policy spillovers that go beyond the traditional terms-of-trade externality. Second, governments could be confronted with credibility issues connected to behind the border measures with regards to GVCs. Lastly, in the presence of cross border production, the costs of coordination externalities (e.g. the costs of heterogeneous regulations) could be larger. The spillovers and credibility concerns mentioned produce a need for deeper models of integration (Ruta, 2017, p. 8).

Global value chain trade has established new motivations for signing deep PTAs, mainly for two arguments. First, trade costs (tariffs and non-tariff barriers) have a magnification effect within GVCs because goods cross borders multiple times with costs accumulating along the GVC. Countries that are already involved in GVCs can be more inclined to sign deep PTAs, since a need for deep provisions develops because of cross-border production. The second argument comes from the fact that GVCs are affected more by behind-the-border policies like an investment, IPRs, and competition, which puts more risks for the smooth operation of GVCs and are not dealt with adequately on the multilateral level (Antràs & Staiger, 2012). Thus, “from a GVC perspective, the motive

for signing deep PTAs is therefore to further reduce or eliminate trade costs and to fill the governance gap with respect to behind-the-border issues” (Berger et al., 2016, p. 20). The WTO (2011, p. 146) showed empirically that economies that have higher levels of trade in parts and components relative to total trade would sign deep agreements more likely. A study by Orefice and Rocha (2014, p. 1) showed that “a ten percent increase in the share of production network trade over total trade increases the depth of an agreement by approximately 6 percentage points” (Orefice & Rocha, 2014, p. 1).

### **3.2 Do deep agreements promote global value chains?**

Today PTAs are more numerous and deeper than they were a quarter-century ago. The next natural question is, then, whether deep agreements promote countries’ integration into global value chains and play a significant role in the presence of GVCs, which has not been thoroughly explored.

The logic behind the explanation of the formation of deep PTAs also holds the other way around. Deep PTAs advance GVC trade for countries by lowering the costs of trade. WTO (2011) finds that “preferential trade agreements increase trade in parts and components by 35 percent among country members an additional provision included in the PTA increases trade in parts and components by almost two percentage points” (WTO, 2011, p. 146). Noguera (2012), Baccini, Dür and Elsig (2014), Orefice and Rocha (2014, p. 3), and Berger et al. (2016) have similar findings. Building on database by WTO, Orefice, and Rocha (2014) showed that GVC trade grows with deeper trade agreements (defined by having deeper provisions). Osnago, Rocha, and Ruta (2016) empirically investigated the relationship between linkages in cross-border production and PTAs’ depth. Their findings showed that signing deep PTAs involves up to 25 percent more trade in parts and components and as far as to 23 percent more foreign value-added in gross exports. They also showed that including more provisions in PTAs creates more trade in parts and components and higher foreign value added in gross exports, and that trade between asymmetric partners has a positive effect on trade in parts and components. Rubinova (2017) illustrates that free trade agreements expand GVC driven trade between developed and developing countries. Deeper integrations support production fragmentation and even developing countries can participate in more upstream stages.

PTAs are just one of the numerous factors that can motivate upgrading in GVCs – other factors such as domestic business conditions, the advancement of FDI linkages, and the absorptive limit of domestic firms are of foremost significance which can promote social upgrading and cohesion. Consequently, rewards from economic integration and upgrading potentials depend upon an active and dynamic role of government (Hollweg, Smith & Taglioni, 2017, p. 124–126).

Osnago, Rocha, and Ruta (2016) showed that signing deep agreements gives a big and positive impact on trade in GVC. “Adding a provision to a PTA increases bilateral trade

in parts and components by 1.5% and re-exported value added by 0.4%. This means signing the deepest PTA in the sample doubles trade in parts and components and increases re-exported value-added by about 22%” (Ruta, 2017, p. 9). Osnago, Rocha, and Ruta (2016) also studied the indirect effects of third countries PTAs on GVC trade of other countries and discovered that “accounting for the depth of third-country agreements increases the impact of PTAs on global value chains” (Ruta, 2017, p. 10).

Deep PTAs can encourage the GVCs formation by supplying common disciplines that enable internalizing cross-border policy spillovers and focuses on credibility problems. Another way to determine the impact of deep trade agreements for GVCs is by examining how depth impacts different sectors. The impact of deep PTAs should be larger in sectors more integrated into global value chains. Osnago, Rocha, and Ruta (2016) illustrated that deep PTAs give a larger effect on sectors that are GVC-intensive.

A study by WTO (2011, p. 145) shows that the relationship between deep PTAs and GVC trade goes in both directions. PTAs encourage the production networks to be formed by facilitating trade between supply chain's potential member countries. However, countries already engaged in the GVCs want to sign PTAs with their partners to secure their trade relationships as providers of intermediate goods and services. Additionally, whenever there are significant differences in business laws and regulations between countries, deep PTAs help in overcoming those gaps and further help in developing the production-sharing activity.

Berger et al. (2016, p. 9), made a study on Viet Nam, a country actively participating in deep PTAs, like the TPP (Trans-Pacific Partnership) and the EVFTA (EU-Vietnam Free Trade Agreement). They found that deep PTAs can support Vietnamese firms to upgrade in GVCs – either directly, by implementing particular incentives for upgrading, or indirectly, by tackling some of the identified barriers to upgrading. Generally, deep provisions, like rules on investment and state-owned enterprises, effect upgrading potentials in more or less indirect way. Improving the overall business environment, attracting FDI, and establishing equal opportunities for all types of companies, will aid in setting up a framework necessary to enable Vietnamese firms to upgrade.

### **3.3 The Future of GVCs and Deep Trade Agreements**

Over the last 25 years, we have been observing deepening of PTAs and GVCs. The question that remains is whether this pattern will continue in the future. Because GVCs and PTAs reinforce one another, it is very likely that we will see the continuation of this pattern. The two-way relationship between GVCs and PTAs shows, on one hand, that deeper PTAs have triggered the development of GVCs because trade agreements make it possible for countries to internalize cross-border policy externalities, reduce trade costs, and bring deeper common disciplines which encourage the operation of economic activities and that helps to link different countries across the world. And on the other

hand, “GVCs have changed the political economy of trade policy, discouraging protectionism and creating a demand for deep integration” (Ruta, 2017, p. 17). Studies show that when domestic content of foreign-produced final products is higher, policymakers will set lower tariffs (Blanchard et al. 2016) and that when GVC trade with partners is higher, countries will sign deeper agreements (Orefice & Rocha, 2014, p. 3–4).

However, the future relationship between GVC and deep PTA should not be taken for granted because GVCs are the outcome of firms’ endogenous decisions as they rely on future assumptions of trade policies. Therefore, if firms expect a shift in future trade policy, it is possible that their decisions would lead them to re-nationalize their production processes, which could result in different outcomes and lead to coordination failures. On the other hand, choosing to opt for national production and no trade agreement which does not entail any other countries’ cooperation would result in a lower welfare (Ruta, 2017, p18).

“The future of the relationship between preferential trade agreements and GVCs will depend upon continuing trust and readiness of other partners to preserve an open trading system” (Ruta, 2017, p. 3). “Recent evidence shows that deep preferential trade agreements boost GVC integration and that undoing this depth is likely to hurt GVCs” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 183).

A study by the OECD (2018) shows that the overall level of GVC integration has been falling as of 2011, the year when it reached its peak, although it is still high. Different factors contributed to its decrease after 2011, including China’s shift from export-driven manufacturing toward its domestic markets, as well as its rising wages, and overall transformations in firm strategies connected to the digital economy, robotization, and servicification. However, even though the expansion is slowing down, the overall level of GVC integration continues to be high and is just slightly below the year 2005 (OECD, 2018).

In sum, signing deep PTAs is only one way to support upgrading in GVCs. A helpful policy environment would also need to include improved national business environment, support of the establishment of linkages with FDI firms and improved domestic firms’ absorptive capacities. Hence, receiving the benefits from economic integration and realizing upgrading potentials calls for enabling policies and an active role of the government (Berger et al., 2016, p. 17). According to ITC Chief Economist Marion Jansen, the key point in developing inclusive and sustainable GVCs is policy coherence. Trade and investment policies need to become more aligned in order for them to make a better fit for GVCs. In addition, if we want GVCs to be environmentally and socially sustainable, then, we also need to think how policies that target social or environmental domains are looked at from the GVC perspective. SMEs that participate in GVCs need to be attractive to supply managers in the lead firms, so you need to find a way for them to

become visible to the supply chain managers. They need to produce according to quality, quantity, and time requirements of the lead firms, which means they need to become competitive (ITC, 2017). Countries that aim for upgrading in GVCs will face the pressure of signing deep trade agreements or joining existing agreements, as many developing countries will seek the first mover advantage. However, PTAs are just one of many pieces in order to upgrade in GVCs successfully. All in all, every country is influenced by the global value chain in some way. It is important to understand it to reach economic and social upgrading and rising standards of living.

#### **4 EMPIRICAL ANALYSIS OF THE ROLE OF DEEP FREE TRADE AGREEMENTS ON PARTICIPATION IN GLOBAL VALUE CHAINS**

In this section, I aim to empirically analyze the role of deep FTAs on participation in GVC and their connection, using a static and dynamic regression on panel data. This should allow me to test and answer the hypotheses, as well as to draw further policy implications.

The key research question is how deep trade agreements countries have signed affect participation in GVC both in terms of the degree of involvement and the position along the GVC.

Almost all countries participate in GVC in some way but where exactly countries are positioned along the GVC? Discovering of countries' location in GVC is important for policy implications and guidelines, both at aggregate and sectoral level. Findings of van der Marel, (2015, p. 3) show that large countries, such as China, France or Italy, have smaller participation in GVCs compared to small countries because of their domestic production of inputs is higher, so smaller countries trade more. However, the relative positions of these countries diverge a lot and require a different set of policies in order to receive higher gains from participating in GVC (van der Marel, 2015, p. 3).

Based on the literature review I form the following hypotheses:

H1: The more free trade agreements a country has signed, the higher is its GVC participation.

After 1990, there was a rapid proliferation of a number of free trade agreements (WTO, 2011, p. 6) and, at the same time, the spread of GVCs gained importance and showed a rising trend (IMF, 2013, p. 32), reflecting deepening integration of global economy. Signing agreements makes sense from a border costs point of view, as tariffs can add very quickly when moving along the value chain. On the other hand, trade agreements help countries to create more uniform disciplines and help to address externalities that come with GVC activities (OECD, 2018, p. 3).

H2: The deeper the agreements are on average the stronger is their impact on participation.

According to World Bank Group, IDE-JETRO, OECD, UIBE & WTO (2017, p. 183), deep preferential trade agreements increase GVC integration. Ruta (2017, p. 8) illustrates a positive correlation between the depth of free trade agreements and GVC trade. Signing deeper agreements also make sense from non-tariff measures as they can also add up quickly when moving along the value chain (OECD, 2018, p.3).

H3: The deeper the agreements are on average the bigger is the distance to final demand.

Distance to final demand also increased for many countries, according to De Backer and Miroudot (2013, p. 15). Countries, where the distance to final demand has increased, have increased specialization in the production at the upstream end of the curve (De Backer & Miroudot, 2013, p. 15). The connection with the smile curve shows how upstream and downstream countries capture gains along the value chain.

H4: The deeper the agreements are on average the longer are GVCs.

According to De Backer and Flaig (2017, p. 8) and De Backer and Miroudot (2013, p. 14), the average length of GVCs has increased.

H5: EU countries have deeper agreements and are, therefore, more involved in GVCs.

Since European integration processes are regarded as the most complex and deepest forms of regional economic integration, I expect EU membership to positively contribute to GVC participation. Furthermore, the EU has signed many deep and comprehensive free trade agreements with third countries. Geographical proximity is also important when signing deeper agreements (WTO, 2013), which accelerates GVC integration.

## **4.1 Variable description and empirical model specification**

To test the above hypotheses, I will employ regression analysis for various aspects of GVC participation and position as a dependent variable. I start with defining dependent and independent variables, followed by specifying empirical models.

### **4.1.1 Dependent variables**

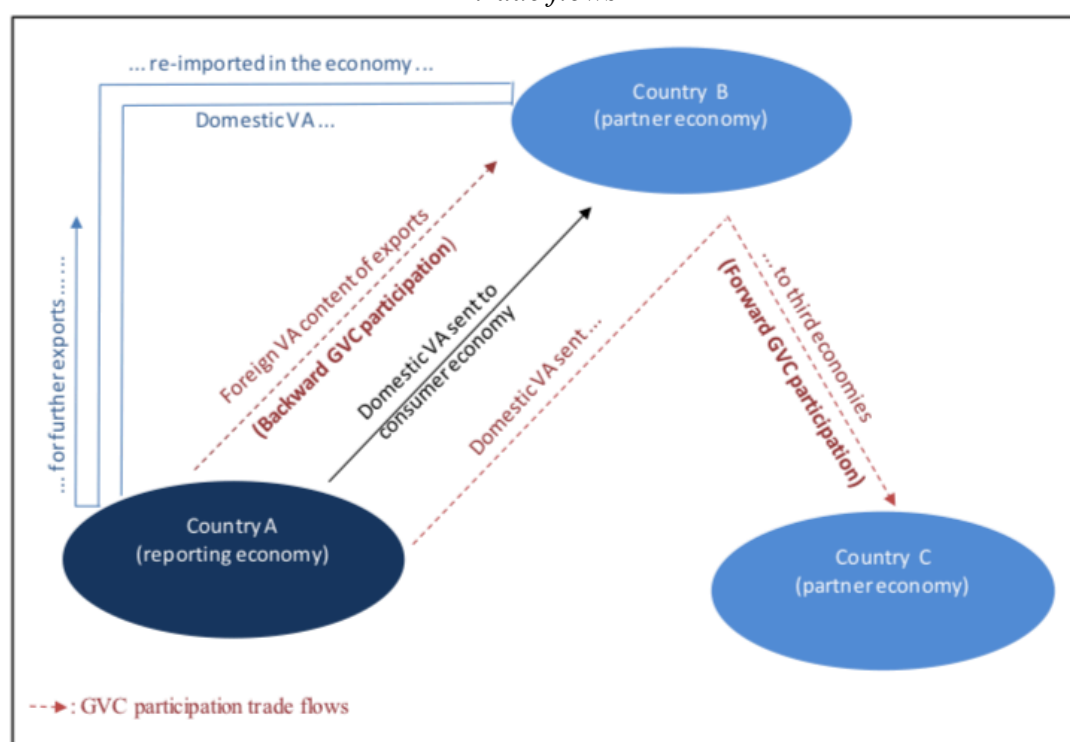
In order to examine factors behind the relative position of a country in terms of its reach in GVC and its location in terms of where exactly a country trades in a production process I used the OECD database which contains data on, first, participation index which shows the extent to which each country participates in a vertically fragmented production process and, second, the index of distance to final demand which measures how far countries are located from the final downstream industry in the production process that deals with final demand in the supply chain as well as with index of number of the

production stages that shows the length of the entire supply chain (van der Marel, 2015, p.3).

#### a) Participation index

The most common approach for measuring GVC participation is approach by Hummels, Ishii, and Yi (2001), who made an indicator of “vertical specialization”, later refined by Koopman, Powers, Wang, and Wei (2010). Participation in the value chain “is defined in terms of the origin of the value-added embodied in exports both looking backward and forward from a reference country” (Kowalski, Lopez-Gonzalez, Ragoussis & Ugarte, 2015, p. 13). These indicators are one of the most important metrics needed in explaining the empirical findings for measuring GVC activity using harmonized systems of inter-country input-output tables (hereinafter: ICIOs). “The OECD TiVA database released in 2013 is based on this approach and provides, amongst other indicators, a decomposition of gross trade flows into various types of foreign and domestic value added. It offers calculations of measures of backward and forward participation by country and broad sector” (Kowalski, Lopez-Gonzalez, Ragoussis & Ugarte, 2015, p. 13).

*Figure 8: A visualization of the value-added components of gross exports and GVC trade flows*



*Source: OECD-WTO TiVA Database (n.d.).*

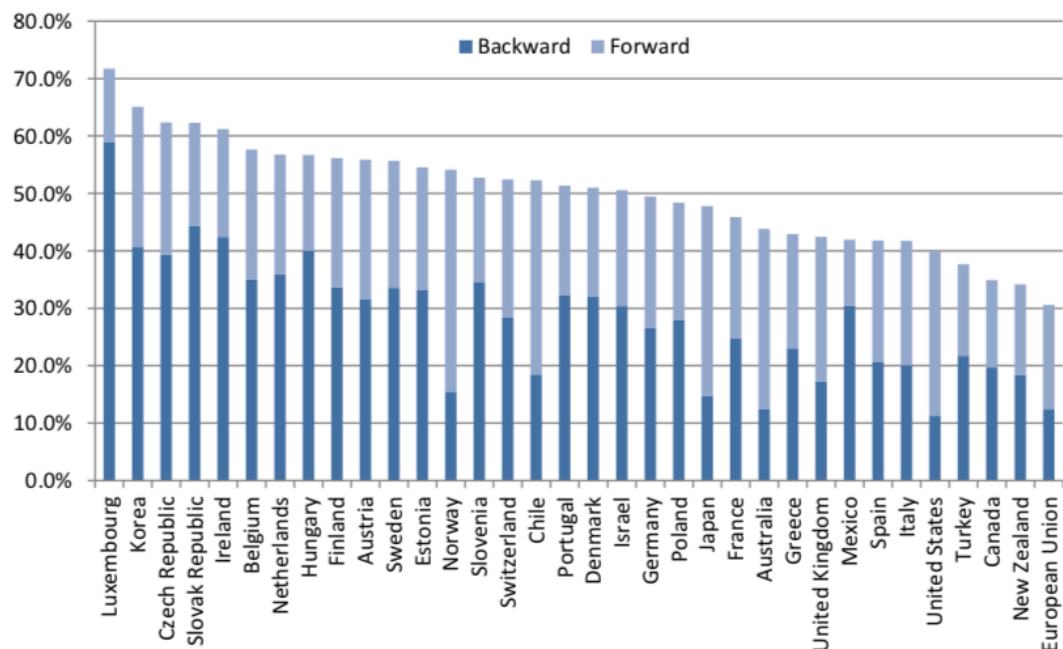
The GVC participation index incorporates two elements that represent the upstream and downstream links in the chain. Therefore, a country can participate in GVCs in two ways. Firstly, by importing foreign inputs in order to produce the goods and services they export (backward GVC participation measured by foreign value-added embodied in exports) and

secondly, by exporting domestically produced inputs to partners responsible for downstream production stages (forward GVC participation defined by domestic value-added which is used as inputs to produce exports in the destination country). Both ways are seen in Figure 8. “The index is expressed as a percentage of gross exports and indicates the share of foreign inputs (backward participation) and domestically produced inputs used in third countries’ exports (forward participation)” (De Backer & Miroudot, 2013, p.11).

Both forward and backward participation indexes present shares of the reference country’s exports. However, they measure different forms of participation. As an example, on one side, a country that mostly assembles and exports products into final goods will have a strong index of backward participation but a small index of forward participation. On the other side, a country that mostly supplies intermediates to an assembler will have a strong index of forward participation but a small index of backward participation (Kowalski, Lopez-Gonzalez, Ragoussis & Ugarte, 2015, p. 14). “These participation measures therefore give us a metric of engagement in the form of buying from (backward participation) and selling (forward participation) to GVCs or the demand and supply sides of the value chain activity” (Kowalski, Lopez-Gonzalez, Ragoussis & Ugarte, 2015, p. 14).

*Figure 9: GVC participation index in OECD countries (2009)*

Foreign inputs (backward participation) and domestically-produced inputs used in third countries’ exports (forward participation), as a share of gross exports (%)



*Source: De Backer & Miroudot (2013, p.12).*

The higher participation index, the deeper is country participating in the value chain by trading inputs that are “either imported from abroad (so called-backward linkages) or are produced domestically and are exported for a third country’s exports (so-called forward

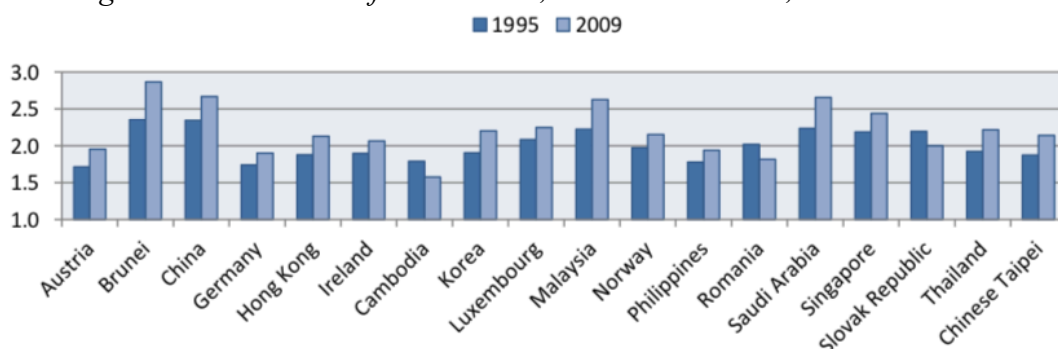
linkages)” (van der Marel, 2015, p. 3). As seen in Figure 9, small open economies like the Slovak Republic and the Czech Republic get more inputs from other countries and will have higher backward linkages compared to larger economies, like the United States or Japan, which have higher forward linkages (De Backer & Miroudot, 2013, p. 12).

#### b) Index of distance to final demand

Index of distance to final demand shows where exactly a country’s location is within the supply chain. Antras, Chor, Fally, and Hillberry (2012) and Fally (2012) call this index ‘upstreamness’ because an industry is classified more upstream, the longer the distance it is from its final demand. In other words, “the further away a country is located from final demand in the production chain, the more upstream its GVC activities are” (van der Marel, 2015, p. 4). Index of distance to final demand, therefore, shows how many stages of production are left before a product reaches the final consumer. Based on a country’s specialization, a country can be classified as upstream or downstream. Upstream countries create the raw materials or intangibles that are take part at the beginning of the production process, such as design of industrial products and R&D. Downstream countries assemble the processed products or they specialize in customer services. The two activities lie on extreme ends of the supply chain and they both specialize in a different part of the production process. As a result, we can determine the quantity of value-added that a country can gain (van der Marel, 2015, p. 4).

Figure 10 below shows the average value of the distance to final demand by country (overall industries) for the selected OECD and non-OECD countries. It shows the change in the index value between 1995 and 2008 and includes only countries where the value has increased by more than 8% to reveal the most important changes. If “upstreamness” increased, it means that these countries have increased specialization in the production of inputs at the beginning of the value chain, for example, countries like China, Hong Kong, Malaysia or Thailand, as well as countries in EU, for examples Austria, Germany, Luxembourg or Ireland. Few countries, such as Cambodia, Romania and the Slovak Republic that faced a decrease in distance to final demand, have intensified specialization in the production of goods and services in stages that are placed more downstream. Overall, more countries move upstream. This finding “is consistent with the overall increase in the length of GVCs and the outsourcing phenomenon” (De Backer & Miroudot, 2013, p. 16). The distance to final demand rises whenever the production of some inputs is outsourced because countries expect that their value-added will move back to the industries that provide intermediate inputs (De Backer & Miroudot, 2013, p. 15).

Figure 10: Distance to final demand, selected countries, 1995 and 2009<sup>z</sup>



Source: De Backer & Miroudot (2013, p.16).

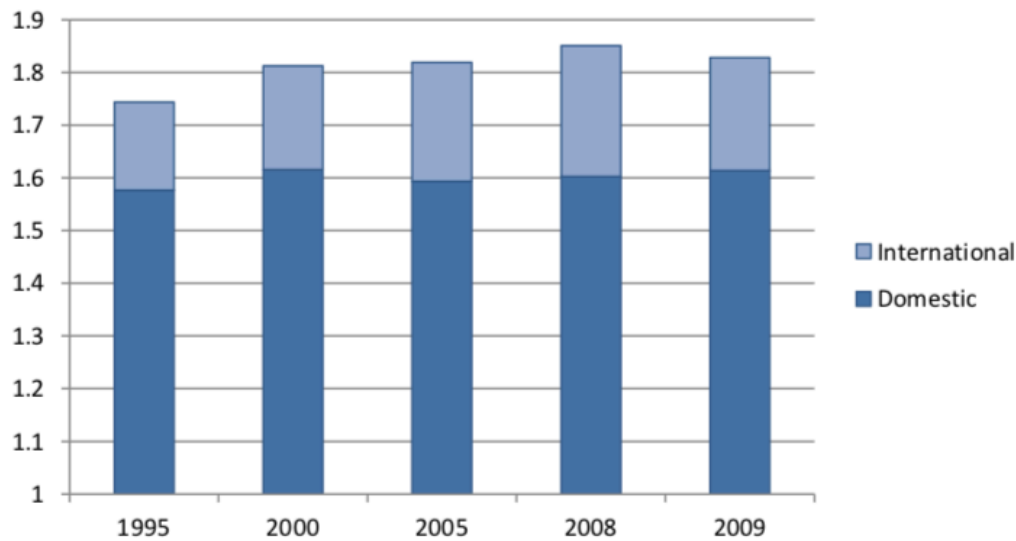
c) Index of number of the production stages (domestic and international)

Index of a number of the production stages measures the actual fragmentation of the production process. It shows how long value chains is and measures the (average) number of production stages a country is involved in across all sectors (van der Marel, 2015, p. 10). Therefore, it can demonstrate all the possibilities a country can achieve to ultimately export value-added. If there is only one stage of production in a final industry, this index will have a value of 1, and its value will increase when intermediate inputs from the same industry or other industries are used in the production of the final good or service (OECD.Stat, n. d.).

Index of a number of the production stages also shows the domestic and international parts of the GVCs. More of domestic value-added is gained if a production stage is performed inside the domestic country. Smaller open countries, however, usually source more foreign inputs that they can use domestically to produce other inputs which can then be used in exports from other countries (van der Marel, 2015, p. 10).

Figure 11 below demonstrates that on average, the length of value chains across all industries between 1995 and 2008 increased. The length of GVCs decreased slightly in 2009 after the financial crisis. The domestic length did not change a lot during this period; the international part explains the overall increase of the value chain. There was a small increase in the domestic length in 2009 (De Backer & Miroudot, 2013, p. 14). This finding confirms “that some companies have switched back to domestic suppliers in the context of the lack of availability of trade finance and the risks associated with international suppliers” (De Backer & Miroudot, 2013, p. 14).

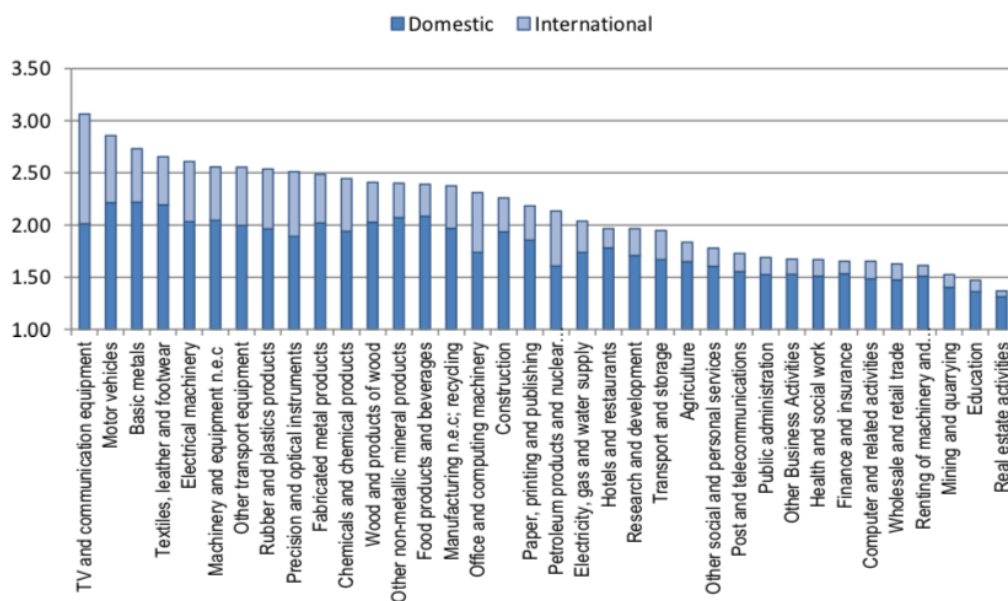
Figure 11: Average length of GVCs across all industries



Source: De Backer & Miroudot (2013, p. 14).

Even bigger variation in the length of GVCs is observed on the industry level, seen in Figure 12. Industries that had the biggest level of fragmentation are television and communication equipment, basic metals, motor vehicles, leather and footwear, and, electrical machinery and textiles. Services have shorter value chains on average, with notable exceptions, such as storage and transport. Only the sectors, like real estate activities and education are not involved in any significant fragmentation of production (De backer & Miroudot, 2013, p. 14).

Figure 12: Length of GVCs by industry, 2008



Source: De Backer & Miroudot (2013, p.15).

#### 4.1.2 Independent variables

My key explanatory variables refer to the number and depth of the free trade agreements. The variable *no\_FTA* denotes the number of free trade agreements that country has signed based on a database by Baccini, Dür, and Elsig (2014), while *FTA-deep-avg* variable measures the average depth of the free trade agreements. *FTA-deep-avg* is calculated as:

(1)

$$FTA\_deep\_avg = \frac{Depth1 + Depth2 * 2 + Depth3 * 3 + Depth4 * 4 + Depth5 * 5 + Depth6 * 6 + Depth7 * 7}{no\_FTA},$$

where *Depth 1* to *Depth 7* are additive indices counting the number of enforced agreements of particular depth considering 7 most important provisions that can be included in PTAs. *Depth 1* captures those agreements that foresee all tariffs (with limited exceptions) to be reduced to zero (i.e. whether the aim is to create a full free trade area). *Depth 2* to *Depth 6* categories capture agreements that go beyond tariff reductions in areas, such as services trade, investments, standards, public procurement, competition, and intellectual property rights. For each of these areas, Baccini, Dür, and Elsig coded “whether the agreement contains any substantive provisions. A substantive provision, for example, is a national treatment clause in the services chapter. A statement that the contracting parties desire to open their services markets, by contrast, does not count as a substantive provision” (Baccini, Dür & Elsig, 2014, p. 9). A higher index means deeper agreements on average.

Other controlling explanatory variables are selected according to the literature review.

- Rule of law (*Ruleoflaw*): “Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.” (The World Bank, n. d.). Studies (World Bank) find positive correlations between legal variables (rule of law) and measures of social and economic development. The assumption here is that this legal variable captures characteristics of legal systems of the countries and its power of law. The measure could be seen as a proxy for the institutional quality and results by Amendolagine, Presbitero, Rabellotti, Sanfilippo, and Seric (2017) show “that the effect of GVCs involvement is higher in countries with stronger institutions” (Amendolagine, Presbitero, Rabellotti, Sanfilippo & Seric, 2017, p. 25).
- The developmental level measured by “GDP per capita is gross domestic product divided by midyear population (BDPpc). GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural

resources. Data are in current U.S. dollars” (The World Bank, n. d.). In the model, this variable is defined in its log form  $\ln BDP_{pc}$ , respectively. GDP per capita measures the total amount of the economic output created in a country per person in a given year. It is a useful indicator of economic performance, living standards, and overall economic wellbeing. UNCTAD (2013) showed there is a positive correlation between participation in GVC and GDP per capita growth rates. Furthermore, the fastest growing GVC countries have GDP per capita growth rates at about 2 percentage points above average (UNCTAD, 2014, p. 18).

- Foreign direct investment (% of GDP) (*FDInetInflow*): “Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP” (The World Bank, n. d.). FDIs can be a significant source of external financing of developing countries where it can promote economic growth, the productivity of a country, and import new technologies. According to Taglioni & Winkler (2016), FDIs are a common way to connect developing countries to GVCs. During the last 15 years, developing countries faced a parallel increase in an upsurge of FDIs and bigger involvement in GVCs (Amendolagine, Presbitero, Rabellotti, Sanfilippo & Seric, 2017).
- Tertiary School Enrolment (% Gross) (*SchoolEnroll*): “Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level” (The World Bank, n. d.). Countries with the very skilled workforce will be in a better position to improve GVC participation (World Bank group, IDE-JETRO, OECD, UIBE & WTO, 2017).
- Openness measured by the share of exports of goods and services in GDP (*Exports*): “Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.” (The World Bank, n. d.). This variable shows the openness of the country and tells about aggregate international trade. It promotes bigger growth, innovation, and production. More than 70% of today’s trade involves GVCs and shows that economies are more

connected than ever (OECD, 2018). Trade is more and more structured around GVCs and it is seen also in growing share of international trade (Gereffi & Fernandez-Stark, 2016).

- High-Technology Export intensity (*Hightech*) defined as a share of high tech exports in Manufactured Exports. “High-Technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery” (The World Bank, n. d.).
- D\_EU: is a dummy variable that takes the value 1 if a country is an EU member state. Being a member of EU, having the most signed PTAs with the deepest and average total depth (Hofmann, Osnago & Ruta, 2016, p.17) and geographical proximity (WTO, 2013), would accelerate GVC integration and participation.

The data for the above-defined variables are taken from The World Bank’s database The World Development Indicators.

#### 4.1.3 Empirical model specifications

The regression equation of GVC indexes for the static model is:

$$GVC_{index, it} = \beta_0 + \beta_1 noFTA_{it} + \beta_2 FTA\_deep\_avg_{it} + \beta_3 Ruleoflaw_{it} + \beta_4 SchoolEnrollment_{it} + \beta_5 Exports_{it} + \beta_6 HighTech_{it} + \beta_7 \ln BDP_{it} + \beta_8 dEU_{it} + \sum \beta_{9,t} dyear_t + u_{it} \quad (2)$$

where subscripts i refers to countries and subscript t refers to years, respectively. GVC index refers to seven indexes (and therefore 7 models): participation index, participation index forward, participation index backward, index of distance to final demand, index of a number of production stages total, index of the number of production stages domestic, and, the index of the number of production stages international. Independent variables are the same in all 7 models and were described more precisely in chapter 4.1.2. The term  $u_{it}$  consist of  $u_{it} = \mu_i + v_{it}$ , where  $\mu_i$  is unobservable, individual effect and  $v_{it}$  is a disturbance term.

I will also estimate the dynamic version of the above specified empirical model which additionally contains the lagged dependent variable among regressors. In the dynamic specification, HighTech explanatory variable will be replaced by FDIinflow regressor. Among explanatory variables, those measuring the rule of law, school enrolment, EU membership dummy, and annual dummies are treated as exogenous, while FTA-deep-avg, noFTA,  $\ln BDP_{it}$ , FDIinflow, and Exports are considered as endogenous.

## 4.2 Methodological issues

In order to investigate the impact of deep integration on GVC, I made an econometric analysis, using panel data regression approach. Panel data methodology allows me to incorporate into the analysis of the effects of individual countries and a defined period of time (Labra & Torrecillas, 2018, p. 33). The usual recommendation to make a good model with panel data is to “use a large number of individuals and a small period of time in order to have adequate degrees of freedom and avoid overidentification” (Labra & Torrecillas, 2018, p. 33) so I used 58 individual countries and 5 years over a specific period of time. First, I used a model using OLS, both fixed effects (FE) and random effects (RE) model and, second, I performed a Hausman test with which we test whether to use FE or RE model (RE will be preferred under the null hypothesis because of higher efficiency; under the alternative FE is at least as consistent and will be preferred, therefore). Essentially, the test looks to see if there is a correlation between the unique errors and the regressors in the model. The null hypothesis is that there is no correlation between the two. In all my models, the Hausman test showed p-value was less than 0.05 so I used the fixed effects model.

Static models are limited with consideration of the endogeneity, which is a problem I faced in my model. Endogeneity is the existence of a correlation between the explanatory variable and the error term. “It can be interpreted as the effect of the past on the present, both on the model (dependent variable) and the independent variables, or as the causality relationship between regressors and explained variable along the time” (Labra & Torrecillas, 2018, p. 34). In my specification, it is highly likely that FTA regressors are endogenous, given the strong empirical evidence on two-way causality between GVC involvement and deep FTA agreements. Furthermore, GDP per capita, exports, and FDI variables are potentially endogenous as well due to simultaneity. However, dynamic panel data allow us to treat the endogeneity of variables and model. To address this problem, I used a dynamic IV (instrumental variable) estimator, more specifically, in order to estimate the dynamic growth models based on a panel consisting of many countries and a small number of time periods, I used the System GMM estimator. It was developed by Arellano and Bover (1995) and Blundell and Bond (1998) that use additional moment conditions compared to the estimator proposed by Arellano and Bond (1991). “The system GMM estimator for dynamic panel data models combines moment conditions for the model in first differences with moment conditions for the model in levels” (Bun & Windmeijer, 2009, p. 1) from which the country-specific effects are eliminated by the transformation, and for which endogenous lagged variables for two or more periods will be valid instruments (provided there is no serial correlation in the time-varying component of the error term). It controls for the presence of unobserved country-specific effects and the endogeneity of the current-dated explanatory variables.

To test for zero autocorrelation in first-differenced errors, first, I made an Arellano-Bond test (1991), which tells us that “the differenced unobserved time-invariant component

should be unrelated to the second lag of the dependent variable and the lags thereafter. If this is not the case, we are back to the initial problem, endogeneity” (The Stata Blog, n. d.). In case of “rejecting the null hypothesis of no serial correlation in the first-differenced errors at order, zero does not imply model misspecification because the first-differenced errors are serially correlated if the idiosyncratic errors are independent and identically distributed. Rejecting the null hypothesis of no serial correlation in the first-differenced errors at an order greater than one implies model misspecification” (STATA.com, n. d.). Secondly, I checked also the validity of instruments in an over-identified context with a Sargan test of over-identifying restrictions (Sargan, 1958). In the case of rejecting the null hypothesis of such a test, the data suggests that instruments used are not valid and there is an overidentification in the model that means that one or more instruments do not appear to be uncorrelated with the disturbance process (Labra & Torrecillas, 2018, p. 48). Everywhere in the model, the Sargan test suggested that I have no problems with the adequacy of instruments in my model and Arellano-Bond test suggested that its assumptions were justified.

### 4.3 Data

Primary data were combined from different databases, such as OECD, World Bank, and WTO. The analysis of GVCs indexes will cover the years 1995, 2000, 2005, 2008, and 2009 for OECD and non-OECD countries. Countries covered are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, European Union, Brazil, China, India, Indonesia, Russian Federation, South Africa, Argentina, Brunei Darussalam, Bulgaria, Cyprus, Cambodia, Chinese Taipei, Hong Kong-China, Latvia, Lithuania, Malaysia, Malta, Philippines, Romania, Saudi Arabia, Singapore, Thailand, and Viet Nam.

Countries used in my thesis are all part of Inter-Country Input-Output (ICIO) table created by the OECD and the WTO. It is “a new database of trade flow in value-added terms based on a global model of international production and trade networks<sup>5</sup>” (De Baker & Miroudot, 2013, p. 10) and, internationally, it connects input-output tables from 58 countries (which are also all the countries I used). “It allows the analysis of GVCs from a truly global perspective detailing all transactions between industries and countries for

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<sup>5</sup> See <http://oe.cd/tiva> for more information on the TiVA database.

37 industries” (De Baker & Miroudot, 2013, p. 11). Before ICIO was made, input-output data was used for a limited or even single country, so the whole GVC story could not be told (De Baker & Miroudot, 2013, p. 10–11).

Based on ICIO model, I cover five years, which were available for three GVC indexes: 1995, 2000, 2005, 2008, and 2009. Because there was a financial crisis in 2009, the indicators are different from previous years. This is also a reason that year 2008 was added to the model, providing additional insights on the effect of that financial crisis had on GVCs (De Backer & Miroudot, 2013, p. 10).

Connectively I used these same years for the rest of the indicators which I took from The World Bank and World Development Indicators. The depth indicators I have calculated based on Baccini, Dür, and Elsig (2014) calculations, which are part of DESTA (Design of Trade Agreements) project.

Below, there are descriptive tables and their explanation.

*Table 2: Descriptive statistics for 7 GVC indexes, 1995-2009*

Variable	Obs	Mean	Std. Dev.	Min	Max
participation	295	49.58508	10.94921	23.9	76.4
forward	295	21.91661	7.480585	4.8	51
backward	295	27.66746	12.12857	1.8	59.5
dist_fin_demand	295	1.964746	.2610377	1.5	3.1
no_stg_total	295	1.858305	.1923463	1.3	2.6
no_stg_domestic	295	1.513559	.1602057	1.2	2.3
no_stg_internat	295	.3437288	.1623163	.1	.8

*Source: Own work.*

Table 2 shows descriptive statistics for 7 GVC indexes from the period 1995-2009 for 58 countries. There were 295 observations for all of them. The average participation index which shows the extent to which each country participates in a vertically fragmented production process was 49.6%, which means that almost 50% of all the trade is connected to the global value chains. Out of this, average forward participation, showing that domestic value-added used as inputs to produce exports in the destination country was 21.9% and average backward participation, showing foreign value-added embodied in exports was 27.7%. This means that, on average, more of participation comes from

foreign value added in exports (backward index). There are big differences between individual countries. Average distance to final demand was 2. This means that, on average, there are 2 more production stages left before the product reaches its final consumer. The total average number of production stages a country is engaged in, showing the length of the production of the value chain was 1.9. If there is only one production stage in a final industry, this index will have a value of 1 and its value increases when intermediate inputs from the same industry or other industries are used in the production of the final good or service (OECD.Stat, n. d.). The number of domestic production stages that shows if more of domestic value-added is created inside the domestic economy was 1.5 and the number of international production stages that shows if a country produces other inputs which are used in other countries' exports was 0.3. This means that more value-added was created domestically.

*Table 3: Descriptive statistics for FTA variables*

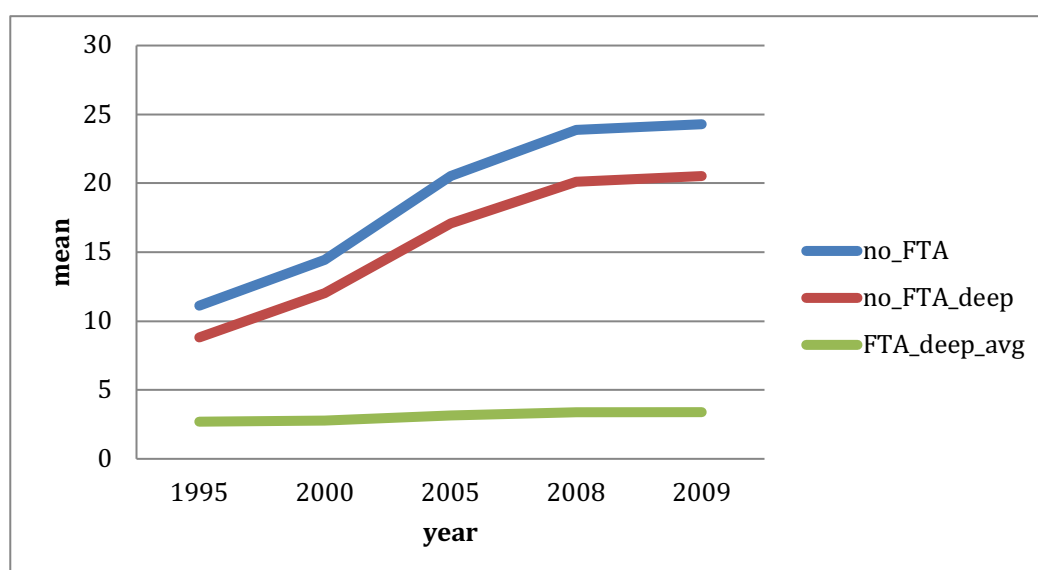
Variable	Obs	Mean	Std. Dev.	Min	Max
no_FTA	295	18.84746	16.52293	1	55
no_FTA_deep	295	15.71864	14.1132	1	45
FTA_deep_avg	247	3.089273	1.027463	1	6.5

*Source: Own work.*

Table 3 shows that, on average, each country has signed 18.8 agreements, out of which 15.7 agreements are classified as deep. The average depth is 3.08 provisions. Max values are the ones for the EU countries.

The below Figure 13 shows that the number of agreements per country has increased throughout the period observed from 11 agreements in force on average in the year 1995 to 24 enforced agreements in 2009. Agreements also became deeper, from 8 agreements classified as deep in 1995 to 20 in 2009. The average deepness increased as well, from 2.7 provisions in agreements in 1995 to 3.4 provisions in 2009. The proliferating number of FTA and deepening of FTA in the time period 1995-2008 shows how countries became more and more involved in GVCs.

Figure 13: Mean values for the number of FTA variables



Source: Own work.

Table 4: Descriptive statistics for independent variables, 1995-2009

Variable	Obs	Mean	Std. Dev.	Min	Max
Ruleoflaw	280	.1807143	.0477395	.1	.4
SchoolEnroll	238	47.53025	22.92483	1.4	104.2
Exports	285	49.41404	37.64578	7.5	231.2
Hightech	273	16.88388	14.71696	.1	93.7
BDPpc	285	22173.82	19498.06	275.7506	114293.8
FDInetinflow	278	7.130935	23.46372	-3.6	341.1

Source: Own work.

Table 4 shows the descriptive statistics for the rest of the variables. Almost 48% of the population in these countries completed at least secondary education and enrolled in tertiary education and the value of exports of goods and services account almost 50% of GDP. 16% of goods and services exports are high technology exports. The average GDP per capita in these countries was \$ 22.173. The ratio of net FDI inflows to GDP was on average around 7%.

#### 4.4 Empirical results

Table 5 below shows the results of the static model. With panel data, the Hausman test helps to decide whether to use a fixed or random effects model. The null hypothesis is that the preferred model is random effects. The alternate hypothesis is that the model is fixed effects (Green, 2008, chapter 9). Essentially, the test looks to see if there is a correlation between the unique errors and the regressors in the model. The null hypothesis is that there is no correlation between the two. In all of my models, the Hausman test showed that p-value was less than 0.05, so I used the fixed effects model.

The results in Table 5 show that the strongest and the most significant effect on participation index for both forward and backward integration is found for the depth of the FTA. However, the effect is more significant for forward participation. If *deep\_avg\_FTA* increases by 1 provision, then GVC participation increases by around 1.5 structural points. *Deep\_avg\_FTA* also has a positive but less significant effect on a number of production stages coming from the international part. On the other hand, I have not found any significant impact of the number of FTAs neither on GVC participation nor on position along the GVC but again, there is weakly significant evidence that signing more agreements positively affects the length of the international part of GVC.

The degree of trade openness has a strong positive and significant effect on participation index, which is exclusively driven by backward integration. Additionally, high tech intensity of exports increases, as well as GVC participation through backward integration in GVCs. Furthermore, trade openness contributes significantly to more upstream GVC position and on further international fragmentation of production processes as well. Development level tends to reduce the number of production stages, in particular internationally, which is a bit surprising result. EU membership interestingly affects forward participation negatively.

Table 5: Static fixed effects panel data model for 7 GVC indexes

	participation	forward	backward	dist_fin_dem	no_stg_total	no_stg_dom	no_stg_int
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
no_FTA	0.123 (0.0833)	0.0388 (0.0644)	0.0831 (0.0885)	0.000438 (0.00230)	0.00157 (0.00182)	-0.00158 (0.00177)	0.00225* (0.00117)
FTA_deep_avg	1.478*** (0.564)	0.845** (0.426)	1.117* (0.593)	0.0221 (0.0152)	0.00858 (0.0120)	0.00169 (0.0117)	0.0134* (0.00788)
Ruleoflaw	-13.77 (8.982)	-3.028 (5.921)	-9.991 (8.873)	0.0127 (0.214)	-0.0330 (0.169)	0.0206 (0.170)	-0.0307 (0.122)
SchoolEnroll	0.0270 (0.0341)	0.0375 (0.0265)	-0.00484 (0.0363)	-0.000709 (0.000945)	-0.00118 (0.000748)	-0.000639 (0.000725)	0.000449 (0.000479)
Exports	0.137*** (0.0224)	-0.0247 (0.0196)	0.153*** (0.0249)	0.00268*** (0.000686)	0.00169*** (0.000546)	-0.000895* (0.000510)	0.00313*** (0.000320)
Hightech	0.126*** (0.0436)	-0.0258 (0.0328)	0.156*** (0.0457)	0.000289 (0.00117)	0.000134 (0.000927)	-0.000743 (0.000905)	0.000162 (0.000608)
lnBDPpc	-0.260 (0.768)	0.915 (0.668)	-1.198 (0.847)	-0.0153 (0.0234)	-0.0311* (0.0186)	-0.00732 (0.0173)	-0.0343*** (0.0109)
d_EU	-5.193** (2.529)	-4.875** (1.972)	-1.126 (2.703)	-0.0863 (0.0703)	-0.0693 (0.0557)	0.0210 (0.0540)	-0.0549 (0.0356)

Table continues

Table 5: Static fixed effects panel data model for 7 GVC indexes (continued)

2000.year	6.750*** (0.984)	3.046*** (0.659)	3.578*** (0.980)	0.0200 (0.0238)	0.00453 (0.0188)	-0.0203 (0.0189)	-0.00425 (0.0134)
2005.year	9.229*** (1.099)	4.880*** (0.799)	4.302*** (1.127)	0.0561** (0.0285)	0.0403* (0.0226)	-0.00174 (0.0221)	0.00224 (0.0152)
2008.year	8.195*** (1.308)	4.013*** (0.992)	4.106*** (1.364)	0.0679* (0.0353)	0.0808*** (0.0280)	0.0106 (0.0271)	0.0192 (0.0182)
2009.year	4.363*** (1.305)	2.545*** (0.979)	1.639 (1.356)	0.0640* (0.0349)	0.0601** (0.0276)	0.0318 (0.0268)	-0.00794 (0.0181)
Constant	34.65*** (6.779)	9.227 (6.377)	24.46*** (7.730)	1.905*** (0.221)	2.070*** (0.177)	1.679*** (0.161)	0.433*** (0.0979)
Observations	204	204	204	204	204	204	204
Number of drzava	50	50	50	50	50	50	50
(df)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
Hausman $\chi^2$	49.98	138360.40	13313.70	2.46e+08	4.14e+08	2.85e+08	3.11e+08
(p)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Note: Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.01$ .

Source: Own work.

Table 6 below depicts the results of the estimation results of the GMM estimator of the 7 GVC indexes together with the Sargan test and Arellano-Bond test. There are 165 observations in all models and 46 countries in all models. The Wald test that shows the null hypothesis, which says that the estimated coefficients of all regressors are zero is rejected. Sargan test of over-identifying restrictions clearly indicates that I cannot reject the null hypothesis due to large p values in all cases, which means that instruments used are valid. Arellano-Bond test shows that I can reject no autocorrelation of order 1 and cannot reject any autocorrelation of order 2 and Arellano-Bond model assumptions are satisfied. The test for autocorrelation presents no evidence of model misspecification. I used one lag of the dependent variable.

In all dynamic models from Table 6, the regression coefficient of the lagged dependent variable is statistically significant, i.e. it makes sense to include a lagged variable in the model because it is heavily determined by its past level exhibiting strong persistence. In the dynamic specifications, the impact of the number of FTAs becomes significant. On one hand, signing additional FTA positively affect backward participation in GVCs and the number of international production stages while it reduces the forward participation. The impact of the average depth of the agreements a country has signed on GVC participation remains positive but only significant for backward participation. If *deep\_avg\_FTA* increases for 1 provision, then, the participation increases for 0,563 structural points. Deeper agreements also positively affect the distance to final demand and the number of domestic production stages.

The level of development measured by GDP pc exhibits a negative and significant effect on backward participation, as well as a negative, strong and significant effect on distance to final demand and number of international production stages suggesting, that developing countries tend to have higher backward participation with more downstream position and lower number of international stages compared to the developed economies. FDI net inflows has a negative string and significant effect on participation both backwardly and forwardly, on the distance to final demand and number of international production stages. Meanwhile, exactly the opposite holds for the trade openness of the economy which tends to promote the degree of participation, more upstream positioning, and length of international production processes. The rule of law in dynamic specifications comes with a strong and significant effect on participation, coming from the backward index. The rule of law also has a negative effect on a number of production stages coming from domestic part and positive effect coming the from international part. Tertiary school enrollment has a positive effect on forwarding GVC integration and negative effect on a number of stages international. In dynamic specifications which take care of endogeneity, a dummy variable for the EU membership becomes insignificant with the only exception of slightly significant effect for backward index. Year effects are significant and positive. Considering the base year 1995, the effects have been increasing, however. After the financial crisis, the increase is, in general, slowing down.

Table 6: Dynamic model for 7 GVC indexes

	participation	forward	backward	dist_fin_dem	no_stg_total	no_stg_dom	no_stg_int
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
y-1	0.649*** (0.0328)	0.751*** (0.0300)	0.776*** (0.0331)	0.618*** (0.0355)	0.448*** (0.0341)	0.462*** (0.0446)	0.548*** (0.0365)
no_FTA	0.0405 (0.0487)	-0.138*** (0.0353)	0.113** (0.0534)	-0.000151 (0.00120)	0.00417*** (0.00107)	-0.000238 (0.000894)	0.00195** (0.000805)
FTA_deep_avg	0.563*** (0.201)	0.212 (0.317)	1.330*** (0.291)	0.0233*** (0.00679)	0.0250*** (0.00544)	0.0241*** (0.00482)	0.00927 (0.00588)
lnBDPpc	-0.586** (0.263)	0.126 (0.259)	-1.839*** (0.310)	-0.0182** (0.00810)	-0.0388*** (0.00652)	0.0149** (0.00745)	-0.0414*** (0.00765)
FDInetinflows	-0.0359*** (0.00323)	-0.0145*** (0.00395)	-0.0233*** (0.00404)	-0.000536*** (9.63e-05)	0.000310*** (5.38e-05)	0.000189** (8.74e-05)	-0.000211*** (4.81e-05)
Exports	0.0495*** (0.00537)	0.00993*** (0.00356)	0.0458*** (0.00533)	0.000968*** (0.000193)	0.00147*** (0.000163)	-0.000514*** (0.000146)	0.00153*** (0.000133)
Ruleoflaw	25.29*** (5.463)	-6.547* (3.810)	27.38*** (6.613)	-0.0550 (0.161)	-0.113 (0.0782)	-0.403*** (0.0570)	0.316*** (0.0740)
SchoolEnroll	0.000675 (0.0217)	0.0548*** (0.0193)	0.0111 (0.0211)	-0.000599* (0.000353)	-0.000613 (0.000449)	-0.000381 (0.000315)	-0.000788** (0.000398)
d_EU	-2.212 (1.727)	1.363 (1.229)	-2.776* (1.674)	-0.0413 (0.0408)	-0.151*** (0.0335)	-0.0260 (0.0359)	-0.0297 (0.0290)

Table continues

Table 6: Dynamic model for 7 GVC indexes (continued)

_Iyear_2000	6.994*** (0.447)	2.849*** (0.291)	-0.626** (0.304)	-0.0489*** (0.0118)	-0.0655*** (0.0121)	-0.00797 (0.00878)	-0.0588*** (0.00828)
_Iyear_2005	6.156*** (0.307)	2.068*** (0.245)	-0.895** (0.412)	-0.0279*** (0.0106)	-0.0332*** (0.00622)	-0.00218 (0.00514)	-0.0331*** (0.00767)
_Iyear_2009	4.197*** (0.180)	-1.096*** (0.145)	-4.720*** (0.431)	-0.0328*** (0.00482)	-0.0431*** (0.00487)	0.0221*** (0.00413)	-0.0567*** (0.00728)
Constant	13.24*** (2.571)	4.229** (2.048)	13.81*** (3.542)	0.905*** (0.106)	1.305*** (0.0752)	0.715*** (0.0866)	0.458*** (0.0584)
Year Dummies	yes	yes	yes	yes	yes	yes	yes
Observations	165	165	165	165	165	165	165
No of drzava	46	46	46	46	46	46	46
(df) Wald $\chi^2$	(12) 7889.19	(12) 44496.51	(12) 6209.51	(12) 254679.50	(12) 7612.67	(12) 5953.10	(12) 18679.56
(p)	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006
(df) Sargan $\chi^2$	(48) 29.18098	(48) 29.45697	(48) 33.23682	(48) 33.77925	(48) 36.64361	(48) 27.78382	(48) 36.41634
(p)	(0.9854)	(0.9839)	(0.9481)	(0.9402)	(0.8842)	(0.9914)	(0.8895)
AR(1) z(p)	-2.5467 (0.0109)	-2.5727 (0.0101)	-1.839 (0.0659)	-3.2888 (0.0010)	-3.2533 (0.0011)	-2.0667 (0.0388)	-3.8747 (0.0001)
AR(2) z(p)	-.62463 (0.5322 )	-.26337 (0.7923)	-.77515 (0.4383)	.01285 (0.9897)	.99517 (0.3197)	.20784 (0.8354)	1.3879 (0.1652)

Note: Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: Own work.

## 4.5 Discussion of the results

Based on all seven models, we can see that it is the deepness of the agreements that is more important, whereas the number of FTAs which countries have signed does not have a robust impact on involvement and position in GVCs.

H1: The more free trade agreements a country has signed, higher is its GVC participation.

In the static model, I fail to find any significant impact of the number of FTAs countries has signed neither on participation nor on the position in GVCs. However, I find a weakly significant positive impact on the number of international production stages. Once I control for endogeneity and dynamics, the impact of the number of FTAs on the number of international production stages strengthens. Moreover, the number of FTAs turns out to have a significantly positive impact on backward participation in GVC while it reduces forward participation. Hence, I can only partially confirm hypothesis 1 for the backward integration. The results suggest that the number of FTAs signed contributes to a larger share of foreign value added in the country's exports while discourages domestic value-added sent to the third countries. This means that a number of agreements play a more important role for countries which mostly assemble components into final goods and export them, i.e. the countries with relatively high backward participation but lower forward participation index.

H2: The deeper the agreements are on average the stronger is their impact on participation.

The average depth of FTAs has a strong and significant effect on participation index as total. If *deep\_avg\_FTA* increases for 1 provision, then, the participation will increase for 0.563 structural points. This means that countries that have signed deeper agreements will participate in GVCs more. This is in line with this hypothesis 2. This evidence is in line with previous studies confirming that deep PTAs boost GVC integration (Ruta, 2017, p. 3; World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, p. 183; Osnago, Rocha & Ruta (2016). However, the impact of the depth of the agreements holds a more robust and significant impact on backward participation.

H3: The deeper the agreements are on average the bigger is the distance to final demand.

*Deep-avg\_FTA* also has a strong and significant effect on the distance to final demand. If *deep\_avg\_FTA* increases for 1 provision, then, the distance to final demand will increase for 0.0233 structural points. Therefore, I confirm the hypothesis 3. The distance to final demand measures how far away a country is located from the final consumer in the production chain and it also says that "the further away a county is located from final demand in the production chain, the more upstream its GVC activities are" (van der Marel, 2015, p.4). This means that these upstream countries will produce raw materials or intangibles involved at the beginning of the production process, such as design of

industrial products and R&D, rather than to be a downstream country that assembles processed products or specializes in customer services. This makes all the difference in quantity of value-added that a country can gain (van der Marel, 2015, p.4). Therefore, we may speculate that these upstream countries will achieve a higher value added. The same can be shown through the concept of the smile curve, discussed in chapter 1.5. Smile curve, illustrating a pattern of value-added along the value chain, also shows if a country is positioned upstream or downstream. Smile curve arguments that the biggest gains come from the front end of the curve (new technology and high technology components) and at the back end of the curve (sales and marketing) with smaller gains coming from the middle part of the smile curve (manufacturing and lower technology components) (Taylor, 2017). Upstream countries, as well as the lead firms in these countries, will, therefore, achieve a higher value added, as well as bigger job gains.

H4: The deeper the agreements are on average the longer are GVCs.

*Deep\_avg\_FTA* has a strong and significant effect on a number of total production stages. If *deep\_avg\_FTA* increases for 1 provision, then, the number of production stages will increase for 0.0250 structural points. However, the effect comes from the domestic part. It means that these countries use most of their intermediate inputs from domestic sources. Index of the number of production stages shows how long value chains are and measures the (average) number of production stages a country is engaged in across all sectors, highlighting domestic and international part of GVCs (van der Marel, 2015, p. 10).

H5: EU countries have deeper agreements and are, therefore, more involved in GVCs.

In most dynamic model specifications, the impact of EU membership has a negative sign. However, the negative impact is significant only for the degree of backward participation and the number of production stages. The results suggest that EU member states exhibit below average backward participation in the GVC. This might come as a surprise. Especially given the fact that being a member of EU, having the most signed PTAs with the deepest and average total depth (Hofmann, Osnago & Ruta, 2016, p. 17), and geographical proximity (WTO, 2013), these variables would accelerate GVC integration and participation. However, the EU member states are relatively highly developed economies which are characterized by lower backward and higher forward participation on average. Thus, we cannot confirm that membership in the EU contributes to more integration into GVC. Therefore, based on results, I reject hypothesis 5 because of the negative correlation between EU countries and GVC participation.

Empirical results suggest which policy implications can a country invest in order to achieve bigger standards by knowing what promotes forward and backward participation. Based on forwarding participation, countries should target investing in education and high-technology exports while investing in high-technology exports and the rule of law based on backward participation.

## **4.6 Limitations and further research**

This thesis has certain limitations in the quantitative part of the research. The first limitation presents potential sample selection bias related to the choice of the countries in the analysis. Data are only available for OECD countries and few non-OECD countries. It would be interesting to see more of less developed countries in the calculations. Further, the data in the 1995 to 2009 period were presented with a 5-year gap. This could present a problem in dynamic model specifications because of the lags. The third limitation comes from the fact that the analysis has been done on the aggregate level. One might expect that there is considerable variability across different industries.

The limitations of this thesis point to research directions that could be further studied in the future. Bigger availability in the data set for the time frame and bigger choice of countries could show better results and help in better understanding of FTA-GVC relationship. Another venue of future research is to better understand the implications of various trade policy measures for GVC integration and to study the optimal policy mix for the wellbeing of the open economies in the globalized world.

## **CONCLUSION**

Goods and services today are “Made in the World” and two phenomena that help to achieve this are growing importance of global value chains and deepening of preferential trade agreements.

In this thesis, I have connected theoretical and empirical knowledge of GVCs and deep PTAs in order to better understand their impact on today’s economy. By understanding, first, the location and position of countries in GVC through several GVC indexes and, second, by understanding how and which deep PTA provisions matter in influencing on participation of countries in GVCs, I have attempted to answer the question: How deep trade agreements countries have signed affect participation in GVC both in terms of the degree of involvement and the position along the GVC? By making an empirical analysis using a dynamic panel data regression approach for OECD and non-OECD countries in the time frame 1995-2009, my results suggest that it is not the number of trade agreements that is so important but rather the deepness of the agreements.

Earlier studies show that GVCs and PTAs have a positive correlation. Like other previous studies, I have also found that deepness of PTA agreements does contribute toward a bigger GVC participation. Provisions that capture cooperation that goes beyond tariff reductions in areas, such as services trade, investments, standards, public procurement, competition, and intellectual property rights, are the ones that help with the integration of countries into GVCs the most. Trade agreements ought to include as many dimensions of GVCs as possible, ranging from customs barriers to rules of origin to trade facilitation to services. That would benefit developing countries by creating new opportunities because

of network and scale effects in GVCs. It means that the gains of trade agreements in implementing disciplines are bigger when more countries participate and markets are opened on a multilateral basis (OECD, 2018). “On the other hand, in the longer term, consolidating and multilateralising RTAs would help turn the “spaghetti bowl” of preferential agreements into a clearer and more efficient trading regime for all actors in GVCs” (OECD, 2018).

Deeper trade agreements help countries to participate in GVCs more. On average, they will have a bigger distance to final demand and make the length of the whole value chain longer. By studying and knowing these examples, the countries and their policymakers can analyze how a country can benefit the most by knowing where a country is positioned on the GVC map and which provisions utilize to further deepen their relations. Furthermore, by understanding the principles of GVC-deep PTAs relation, countries can achieve higher value-added and overall better standards of living.

Conclusions based on the results of my empirical analysis can be used as a starting point for further research on the relationship between GVCs and deep PTAs. As well, they suggest implications for both, theory and practice. For instance, a methodology to better quantify the level of depth of PTAs should be developed. It can also help policymakers to consider which policies in PTAs are important for GVC growth and which provisions are to be utilized to further deepen their relations. New techniques should be proposed in order to better characterize GVCs and to better understand the overall complexity of an economy and its relationship with deep integration. And finally, further research on how they both complement each other should be done.

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## **APPENDIX**



## **Appendix 1: Povzetek v slovenskem jeziku**

Mednarodna trgovina danes vse bolj povezuje svetter odpira meje globalizacije do te mere, da si nobena država ne more več privoščiti živeti v izolaciji. V zadnjih nekaj desetletjih dva fenomena pomagata poganjati današnjo globalno ekonomijo: globalne verige vrednosti ter poglobljanje preferencialnih trgovinskih sporazumov.

Globalne verige vrednosti predstavljajo princip delitve dela na mednarodnem oziroma globalnem nivoju. Produkcija dobrin in storitev v globalnih verigah vrednosti nastane z razdelitvijo produkcije na več manjših delov, kjer je vsak del prisoten v drugi državi in vsak del prinaša dodatno vrednost končnemu izdelku. Tehnološke inovacije in napredki na področju transporta, interneta in logistike so omogočile ločevanje faz proizvodnih procesov v času in prostoru ter omogočile lažjo, bolj specializirano in produktivno delitev vrednostnih verig (Ferrantino, n. d.).

Na drugi strani se povečuje število preferencialnih trgovinskih sporazumov prav tako pa njihova globina. Sodobni preferencialni trgovinski sporazumi so opredeljeni kot „globoki“ sporazumi – globoki, ker vključujejo discipline in zaveze, ki bistveno presegajo pravilnik WTO (WTO, 2011, str. 98). Vključujejo discipline in zaveze, kot so gibanje kapitala, naložb, politika konkurence in varstvo pravic intelektualne lastnine, ter zahtevajo pomembne procese prilagajanja s strani sodelujočih držav (Ruta, 2017, str. 3; IMF, 2013, str. 31).

Kakšno povezavo imajo torej preferencialni trgovinski sporazumi in globalne verige vrednosti? Od začetka devetdesetih let prejšnjega stoletja so globalne verige vrednosti in preferencialni trgovinski sporazumi pridobili pomen in imeli naraščajoči trend. Trenutne študije odkrivajo jasen pozitiven odnos med rastjo globalnih verig vrednosti in vzporednim naraščanjem globokih preferencialnih trgovinskih sporazumov, pri čemer poudarjajo, da se “vzorec globokih trgovinskih sporazumov oblikuje in je oblikovan s strani globalnih verig vrednosti” (IMF, 2013, str. 32). Globoki sporazumi spodbujajo udeležbo držav v globalnih verigah vrednosti, kar pomeni, da lahko trgovinski sporazumi pomagajo državam pri uveljavljanju nacionalnih proizvajalcev v globalnih in regionalnih proizvodnih procesih. “Nedavni dokazi kažejo, da globoki sporazumi o preferencialni trgovini spodbujajo integracijo globalnih verig vrednosti in da bo razveljavitev te globine verjetno prizadela globalne verige vrednosti” (World Bank Group, IDE-JETRO, OECD, UIBE & WTO, 2017, str. 183). “Prihodnost odnosa med preferencialnimi trgovinskimi sporazumi in globalnimi verigami vrednosti bo odvisna od trajnega zaupanja in pripravljenosti držav članic, da ohranijo odprt trgovinski sistem”(Ruta, 2017, str. 3).

Namen magistrskega dela je prvič omogočiti globlje razumevanje uspešnega vključevanja držav v globalne vrednostne verige in njihove posledice za gospodarski razvoj in oblikovanje politike. Drugič, namen je pregledati literaturo o preferencialnih

trgovinskih sporazumih in kako so se sčasoma poglobili. Tretjič, name je vzpostaviti povezavo med obema s pregledom teoretične literature o odnosu med globalnimi verigami vrednosti ter preferencialnimi trgovinskimi sporazumi in njihovi prihodnosti. Na koncu sem opravila empirično analizo s panelnimi podatki o njuni povezavi.

S to diplomsko nalogo želim prispevati k razumevanju vpliva, ki ga imajo globalne vrednostne verige tudi na njegove determinante. Moj cilj je, da preučim, kako integracija v GVC in širjenje globokih PTA prispevajo k oblikovanju trenutne trgovine na nov način in k oblikovanju novih trgovinskih pravil za prihodnost. Natančneje, cilj mojega magistrskega dela je najprej opredeliti in meriti udeležbo držav v globalnih vrednostnih verigah. Z analizo indeksa udeležbe GVC (indeks udeležbe nazaj in naprej), indeksa razdalje do končnega povpraševanja in indeksa števila proizvodnih faz (domačih in mednarodnih) iz baze podatkov OECD sem preučila: a) raven / stopnjo udeležbe države v GVC in b) položaj države v GVC. Indeks udeležbe GVC kaže, v kolikšni meri vsaka država sodeluje v vertikalno razdrobljenem proizvodnem procesu. Indeks razdalje do končnega povpraševanja kaže, kje je točno lokacija države v dobavni verigi ali kako daleč so države od končne industrije na koncu proizvodne verige. Indeks števila proizvodnih faz kaže dolžino celotne dobavne verige. Drugi cilj je preizkusiti determinante globalne integracije vrednostnih verig in tretji cilj je preučiti vlogo, ki jo imajo globalni trgovinski sporazumi v vertikalni integraciji držav v globalne vrednostne verige. Empirični del je sestavljen iz ekonometrične analize z uporabo regresije na panelnih podatkih.

Ključno raziskovalno vprašanje je: Kako globoki trgovinski sporazumi, ki so jih države podpisale, vplivajo na udeležbo v GVC tako glede stopnje vključenosti kot tudi položaja GVC? Na to vprašanje bom odgovorila s testiranjem naslednjih hipotez: (i) Več kot ima država podpisanih sporazumov, bolj je država vključena v globalne verige vrednosti. (ii) Bolj kot so sporazumi v povprečju poglobljeni, večja je participacija v globalnih verigah vrednosti. (iii) Bolj kot so sporazumi v povprečju poglobljeni, večja je razdalja do zadnjega kupca. (iv) Bolj kot so sporazumi v povprečju poglobljeni, daljše so globalne verige vrednosti. (v) EU ima bolj globoke sporazume in je zato globlje vključena v globalne verige vrednosti.

Empirična analiza z dinamično regresijo na panelnih podatkih za OECD in nekatere ne-OECD države med leti 1995-2009 je pokazala, da ni toliko pomembno število podpisanih sporazumov, temveč globina sporazumov. Bolj poglobljeni sporazumi pomagajo državam pri vključevanju v globalne verige vrednosti. Države z globljimi sporazumi imajo večjo razdaljo do končnega kupca. Prav tako je dolžina globalnih verig vrednosti povprečno daljša. S temi spoznanji lahko države in politiki analizirajo, kaj je za državo najbolj koristno, če vedo, kje točno na zemljevidu globalnih verig vrednosti je njihova država ter katere določbe je treba izpolniti za nadaljnje poglobljanje njihovih odnosov. Poleg tega lahko države z razumevanjem načel globalnih verig vrednosti in njihovo povezavo s prostotrgovinskimi sporazumi dosežejo višjo dodano vrednost in boljše življenjske standarde za vse.