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Rise of Preferential Trade Agreements (PTAs):

Their Effects on Economic Complexity

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Abstract

In this study, we propose a unique stylized fact in the global pattern of trade agreements: we delve into a novel research argument and try to evaluate the relationship between trade agreements and country's competitiveness. Economic complexity reflects a nation's production capabilities and export proficiencies based on its diversity and product ubiquity, a particularly suitable measure to capture fine-grained decision on trade and welfare (Hausmann and Hilalgo, 2010).

While evaluating existing Preferential Trade Agreements (PTAs) and their effects on economic performance we introduce a structured corpus of PTA's full description drawn from the WTO Regional Trade Agreement (RTA) database, and apply linear regressions to track their design and economic consequences. To determine competitiveness of a nation, we consider the economic complexity index (ECI) of 125 countries, as this measure is highly related to economic growth (Zhu and Li, 2017).

Our empirical findings demonstrate that almost all PTAs' types have a positive effect on ECI. In addition, economic indicators such as GDP, GDP *per capita*, HDI together with other political indexes are commonly associated with a country's complexity, and thus related to its structural growth and economic development.

Introduction

A sophisticated production structure entails the selection of suitable skills and the capability of adapting to growing technological demands. The unanimity around the consent advocating

free trade is not an astonishing event. Economists might hold different opinions regarding several issues, except for free trades' preeminence over protectionism. "The principle of comparative advantage and the case for the gains from trade are crown jewels of the economics profession, so the nearly unanimous support for free trade in principle is understandable" (Rodrik, 2018). Indeed, Dunning argues that economies are increasingly and more substantially knowledge-based, which brings about new globalization patterns, both at the micro-economic (firm) level and specifically at the macro-economic stage, pushing nations to diversify their networks of expertise and connections (Dunning, 2009). 'Knowledge acquisition', 'intellectual property rights', 'product complexity', 'expertise' are now buzzwords in the international business jargon. However, the responsibility of complexity in production and its association with world trade agreements together with its ramifications on economic performance, are still uncharted.

Ever since the rise of internationalization at the turn of the century, firms have been undergoing a rapid expansion of business around the globe. As emerging economies pick up their growths and that of advanced nations are coming to a plateau, outward investments have been increasingly initiated by developing countries as contrary to the generalized belief (Bhaumik, Driffield & Pal, 2010). Free trade, an economic policy that is defined by the non-discrimination of imports and exports originating from foreign states has been an ongoing trend that has continued to liberalize economies across the world for the past seventy years (WTO, 2011).

In essence, we regard liberalization through "narrow" or "shallow" trade agreements to be unsuccessful in yielding the same outcome in terms of competitiveness and performance. Research on trade agreements provide evidence that the use of limited agreements or "weak ties", in general, may be less advantageous than extensive arrangements that carry broad

relationship or "strong ties" within members (Dür, Baccini and Elsig, 2014). By that we contrast timid participation and limited openness to a predicted ungenerous progress that is consistent with (Fratianni et al., 2009), who considered inclusion in loaded agreements as the only viable option for expanding trade and securing investment, specifically when coupled with deadlock in World Trade Organization (WTO) negotiations or multilateral talks failure (Rugman and Verbeke, 2004).

Despite the entire productive outcome that globalization and free trade have endeavored, it was also coupled with opposed reactions affecting certain groups (Coy, 2016). Governments have taken all initiatives to promote and to compensate disadvantaged people; however, accruements were still ineffective (Coy, 2016). Hence, damage was occasionally due from automation rather than imports. Exaggerated imposed regulations within agreements, have forced some countries as Chile to stay "out of the game" by conducting bilateral agreements and accomplishing sustainable achievements (Benito et al., 2003). The same case applies to the United Kingdom today: requesting more control, and less bureaucracies, are some of the main reasons behind the Brexit event (Hobolt, 2016). However, exposed to globalization's wave, countries including the UK need international cooperation now more than ever before!

In this essay, we will select a number of reasons to explain why countries should constantly enter several forms of trade agreements in order to maintain their power in terms of trade bargaining as argued by Fiorentino et al., (2007), to expand their competences through learning and accessing complex capabilities defended by Felipe, et al., (2012), to reduce the high costs of inequalities resulting from poor structural transformation while remaining 'masters' of their own means of production tackled by Hidalgo et al. (2017), and to avoid the high transaction costs used in tariffs arbitration or trade barriers' legislations described by

Baccini et al., (2011).

Lastly, we will explore the effects of preferential trade agreements on economic complexity (EC). Economic complexity is based on diversity, which is related to the number of products that a country is connected to i.e. export diversification, and ubiquity, which is related to the number of countries that a product is related to, known as product ubiquity. (Hausmann, Hidalgo et al, 2014). As such, the mix of goods that a country produces have important implications for its economic growth (Hausmann et al., 2005), in considering that it is the complexity of production that drives the economic development of a nation (Inoua, 2016). Building on these insights, the purpose of this paper is to demonstrate how countries' participation in world trade agreements, would allow them to gather knowledge, expertise, and know-how which in return would help them produce diverse and sophisticated products, granting them the possibility to evolve into a strong diversified economic base with knowledge intensive sectors. Such events would potentially determine a nation's economic performance and push the international business to reconsider their strategies (Ferrrarini et al., 2013).

We use data of the WTO-notified Regional Trade Agreements official database and focus primarily on the promotion of free trade through preferential agreements, that foster trade liberalization and bAenefit economic development by integrating less developed countries into the world economy and by increasing production complexity through the initiation of complex networks englobing expertise and huge flow of knowledge to account for differences in economic performance. We use data on EC from Simoes and Hidalgo's Economic Complexity Observatory (2011).

The paper is organized as follows. The first section provides a literature review organized in two parts: (i) EC Literature; (ii) Trade Agreements Literature. Section 3, refers to our major

contributions regarding trade agreements, economic complexity and competitiveness achieved through the rise of PTAs. Section 4 presents our hypothesis related to the effects that different types of PTAs have on country's Economic Complexity around the world. Section 5 presents our model and reports the results of the analysis. Finally, section 6 presents a discussion of our finding as well as possible avenues for future research on the subject.

1. Economic Complexity Index (ECI) & Trade Agreements

(i)   Structural transformation, capabilities and economic complexity index

Economic development pioneers have long underlined the importance of "structural transformations" and the crucial aspect it takes when linked to an economy's development and growth (Hartmann et al., 2016). By that we refer to pioneers like Rosenstein-Rodan and Hirschman that have denoted the progress through which the resources of a country, or its economy, expand from agriculture or any other extractive activity towards more complex approach of manufacturing or services (Hartmann et al., 2016). As such, products combination or its mixture anticipates its successive stream of diversification and economic improvement.

However, verifying a nation's productive structure is not an easy task. For many years, scholars were only able to test it through quantitative methods such as calculating an economy's portion involved in manufacture, services, or cultivation. All along the 20th century, researchers continued to assess a nation's economic structure whether by evaluating a country's diversity in related and unrelated varieties, which means its diversification in identical or differing products, or whether by adopting a collection of methods to weigh concentration and diversity. Nonetheless, all these measures were unsuccessful in

considering the complexity of a nation's product or to define the different industrial structure that would include big industries but also small clusters of products (Hartmann et al., 2016).

Elaborated analysis concerning characteristics of the global trade network have yielded novel comprehension about economic development strategies between nations. As such, the recent adoption of several measures of economic complexity, have given the possibility to specify a nation's productive structure (Hartmann et al., 2016). Additionally, the Economic Complexity Index (ECI), have showed success in demonstrating cross-country differences in GDP per capita and the prediction of future economic growth (Mealy, Farmer, Teytelboyn; 2018).

For several years, theories and empirical studies regarding economic growth made lots of efforts trying to understand the gap difference between poor and rich countries while mutually analyzing the reason behind the rapid development of some economies while others stagnate (Albeaik, Kaltenberg, Alsaleh, Hidalgo; 2017). Why does the wealthiest countries produce highly diversified product, precisely extremely complex ones, when on the other hand, the poorest countries make very primitive and few ones? (Inoua, 2016).

Initial research centralized on the collection of several elementary variables equal to human capital, social capital, technological change, and institutions; thus, when identifying a country's wealth, comparing its financial stand or trying to depict its future growth,

traditional literature generally adopted GDP as a leading aspect for estimation (Albeaik, Kaltenberg, Alsaleh, Hidalgo; 2017).

Yet, the complexity of production, takes on the most fundamental role as it has the ability to forecast the rate at which a country will grow while being the main driver of economic development, mutually (Hausmann, Hidalgo et al, 2014). To add, scientists have assured that the Economic Complexity Index (ECI) is a good approximation of the global measure of complexity of country's economy outperforming the most classical variables that would explain economic development (Inoua, 2016).

As such, each country is defined by a certain economic complexity index (ECI) based on its level of product diversity and ubiquity (Figure 1). The economic complexity index infers information about a country's diversity linked with the number of products that a country produces or is associated with (Figure 2); which is also positively correlated with a country's productive knowledge, which refers to the extent of its product complexity that, in return, highlights the number of countries that produce or export that same product (Hausmann and Hilalgo, 2010).

Put in a simplest way, countries vary notably with the way they diversify their exports, while products alternate with the number of nations that export them, defined as product ubiquity (Hausmann and Hilalgo, 2010).

Figure 1: ECI Ranking Map as of 2014.

Source: The Atlas of Economic Complexity. Mapping paths to Prosperity

Rank

| 1   128
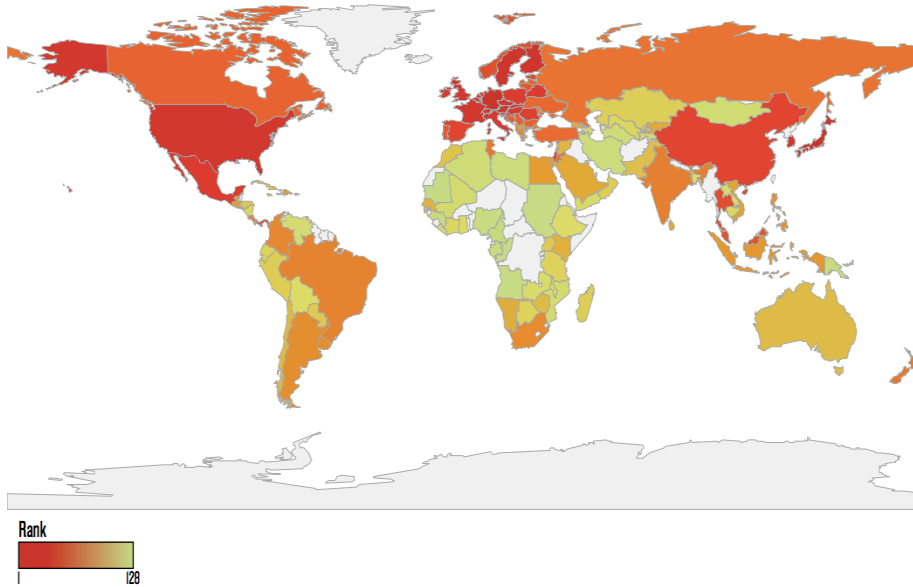
Figure 2: Graphical explanation of diversity and ubiquity.

Source: The Atlas of Economic Complexity. Mapping paths to Prosperity

DIVERSITY ($k_{c, 0}$):
Diversity is related to the number of products that a country is connected to. This is equal to the number of links that this country has in the network. In this example, using a subset of the 2009 data, the diversity of Netherlands is 5, that of Argentina is 3, and that of Gana is 1.

NETHERLANDS (NLD)

X-RAY MACHINES

MEDICAMENTS

ARGENTINA (ARG)

CREAMS AND POLISHES

CHEESE

GHANA (GHA)

FROZEN FISH

UBIQUITY ($k_{p, 0}$):
Ubiquity is is related to the number of countries that a product is connected to. This is equal to the number of links that this product has in the network. In this example, using a subset of the 2009 data, the ubiquity of Cheese is 2, that of Fish is 3 and that of Medicaments is 1.

Collective literature developed by scholars and scientists in the middle of the 1950s and 1960s confirms our interpretation. Starting with Lewis in his book about the theory of

economic growth in 1955 moving to Simon Rostow in 1959 when he studies the stages of economic growth and describes its history, leading to Kuznet's studies which articulates the modern economic growth and its aspects in 1966, at a time when Kaldor's book in 1967 analyzed the strategic factors in economic development, ending it with Chenery and Taylor who prepared thoroughly their book on the development patterns among countries and over time in 1968. These authors collectively summed up their opinion by stating that development and growth (which can be measured by economic complexity) are the main channels for structural modification of a country's specific productive scheme, through which resources are shifted from low productive activities towards activities with higher productivity (Felipe et al., 2012).

Following these events, and through a sequence of research papers, Hidalgo et al. (2007), together with Hidalgo and Haussmann (2009), revived these concepts and defined economic development as the continuum of a country's progress to learn how to achieve additional complex products but also exporting them. We take the Netherlands (figure 3) for illustration: in 2017, the Netherlands exported \$416B, making it the 8th largest exporter in the world. Its exports were highly diversified and complex (ECI Rank: 18th: Appendix 6), led by Refined Petroleum which represents 8.06% of its total exports, followed by Broadcasting Equipment, which account for 3.27% (Simoes and Hidalgo, 2011).

Adopting the network theory approach, they demonstrated that the improvement pathway of a nation is settled in its ability to learn and acquire the capabilities needed for the production of complex and more advanced items (Felipe et al., 2012).

Thus, the comprehensive complexity level of a specific nation's productive framework is the main feature to identify a country's growth and development. As such, nations' differing competency in accumulating capabilities would allow for comparison between performances.

Figure 3: Netherlands Exports 2017

Source: MIT's Observatory of Economic Complexity

https://atlas.media.mit.edu/en/resources/about/
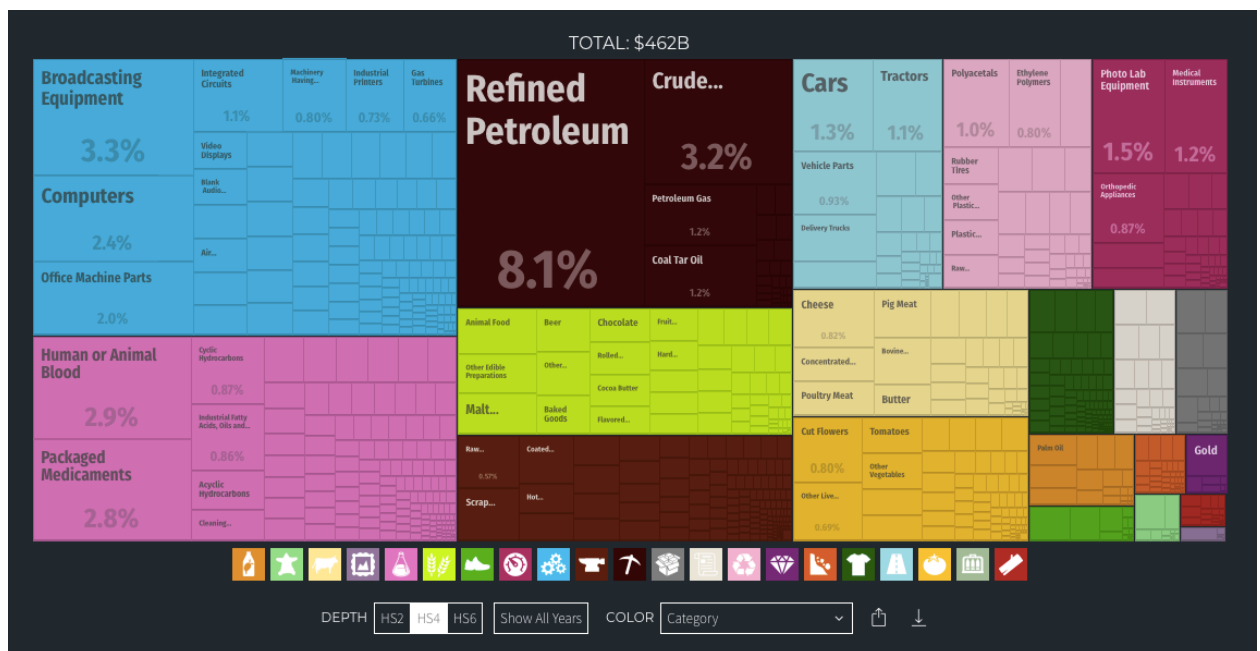
Forward, relying on Felipe, Kumar, Abdon, and Bacate in their "Product Complexity and economic Development" article in 2012 and as many authors have agreed on the usefulness of capabilities in several frameworks, this literature have been claimed numerously. For instance, Acemoglu and Zillibotti (1998) argue that the absence of information in less developed countries will lead to poorer economic relations and weak institutions, thus

countries would differ by the amount of information they get, emphasizing on the idea that nations or a society accrue information by repeating a specific task. Therefore, both authors conclude that: "Poor societies may therefore have less information partly because the scarcity of capital restricts the repetition of various activities". As a result, one can presume that the increase in information accessibility can offer crucial aspects for institution development which includes modification to risk-sharing, capital markets improvements, managerial achievements evolution and most importantly advancement in the structure of production (Felipe et al., 2012).

On his part, Kremer (1993) in his O-ring theory of economic development highlights how capabilities play an important role when referring to growth and development of a country. His theory demonstrates that all tasks must be well accomplished and consistent for a product to earn complete value. Also, Lall (1992) looked at it from an innovation and national perspective, while setting up a specific framework to show that technological capabilities are crucial for growth and development of a nation or a firm, as such, technological or any other field of advancement in capabilities is needed for countries to grow on a national or market level. Next, Sutton (2002) analyzes it from a firm angle and confirms that: "if you don't start out with a firm that has the appropriate capabilities, installing capital equipment won't help. The scarce resource most important to the process of industrial development lies in the capabilities of firms". He continues by distinguishing the two "real" meanings of capabilities by relying on ideas from his Industrial Organization Literature that he wrote between 1991 and 1998.

At the first level, capability by itself is only considered as a continuation of the classical assumption that relies behind a "world of productivity" where quality is vital in productivity.

On the other hand, a firm's "underlying capability" consists of a "know-how" lot or other "working practices" that are retained mutually by the group of people composing a company. Sutton (2005) finally concludes, by taking a close look at the massive economic conversion that has settled the departure point of several nation's success story; concluding that richness of industrialised economies relies on the chain of companies that own and savor "scarce capabilities".

More modern point of view, as of Hidalgo and Haussmann (2009) in their capabilities' argument, support the fact that economic development is achieved not only through the mechanism of enhancing the production of specific set of items, but rather a procedure that necessitates the collection of much more complex capabilities pointing to the creation of novel activities combined with superior levels of productivity. Specifically, they referred to capabilities as a series of physical and human capital, linked to the legal system, the country's institutions, and all other aspects that are "product-specific", hence, essential for the creation of a specific product. In parallel with Sutton (2002) they resumed the second definition of capabilities as the "know-how" directly linked to a firm's group of people in charge, while adding a third interpretation to capabilities being the organizational proficiency that offers the ability to design, administer, and conduct activities involving a big amount of human beings. Still, Sutton (2005), reassures that capabilities express themselves as: "a quality-productivity mixture".

However, this quality-productivity connection is not a continuity of zero events, instead, a minimal foundation is unavoidable, otherwise, that company would not even exist or would be easily ruled out the market. As such, capabilities are principally non-tradable inputs (Felipe et al., 2012)!

It is important to clarify that the complexity of a product is a measure of the amount of capabilities it needs, whereas a country's complexity is defined by the sum of national capabilities' availability. However, countries' capabilities are not determined through any theoretical deduction but rather are illustrated by their Revealed Comparative Advantage (RCA), we refer to the literature on the Balassa's index of RCA: a country has Revealed Comparative Advantage in a product if it exports exceeds its fair share; thus, countries that possess an RCA in typical products, possess those capabilities (Felipe et al., 2012).

These information and history gradually suggest that a country with a productive system adapted to minor activities together with a lower wage framework, will coexist with a very slow development pattern. The latter will be expressed by the production of largely low-valued products or agriculture commodities. Under other conditions, a nation that is triggered in the direction of high-productivity pattern and increased productive program that calls for well paid workers will result with a fast pace development outcome.

To that end, the modern Product Space that has been defined by Hidalgo et al. (2007) summarizes this concept, a notion that has been further developed by MIT's Observatory of Economic Complexity, and by the Atlas of Economic Complexity in 2011.

This product spade is a presentation of the total products that are being exported in this universe, in which products are being associated depending on their level of similarity for their needed capabilities (Haussmann; Hidalgo et al., 2014). For instance, the tie between shorts and T-shirts is deeper than the link within shorts and cell phones (Figure 4,

Netherlands again for illustration). The most important conclusion that one's need to admire in the Product Space is how this loss of relatedness between the products that are placed at the outer edge, which are products of low-productivity demand, in relation with those products that are stationed at the heart of this space, the ones with high-productivity features, help us understand the complications that poorer countries will always face, set side by side with higher income nation or wealthier economies (Felipe et al., 2012).

Haussmann; Hidalgo et al., (2014), guaranteed that the two variables: diversification and ubiquity are the simplest forms to calculate the complexity of a nation or a product. As such, a more diversified country, that exports more products with RCA is more complex in contrast with a less diversified country, that exports less products with RCA (Hidalgo et al., 2007). Correspondingly, a minor ubiquitous product, connotes an item that is being exported by less countries with RCA, thus outlined as a more complex product compared to items of higher ubiquity, which are products that are being exported with RCA by a lot of countries (Figure 5). The culmination behind this reasoning was made clear, a country can only export a specific product with RCA if only it has the mandatory and exact capabilities going from equipments, instruments, institution systems, labor expertise, various inputs, etc. To that end, it becomes obvious that a highly-diversified nation would possess more capabilities. In the same sense, an item being negatively ubiquitous would necessitate a bigger number of exclusionary capabilities. Put this way: "Complexity, therefore, is associated with the set of capabilities required by a product (product complexity) or with the set of capabilities that are available to an economy (economic complexity)" (Felipe et al., 2012)!

Figure 4: Economic Complexity of the Netherlands

Source: MIT's Observatory of Economic Complexity

https://atlas.media.mit.edu/en/profile/country/nld/
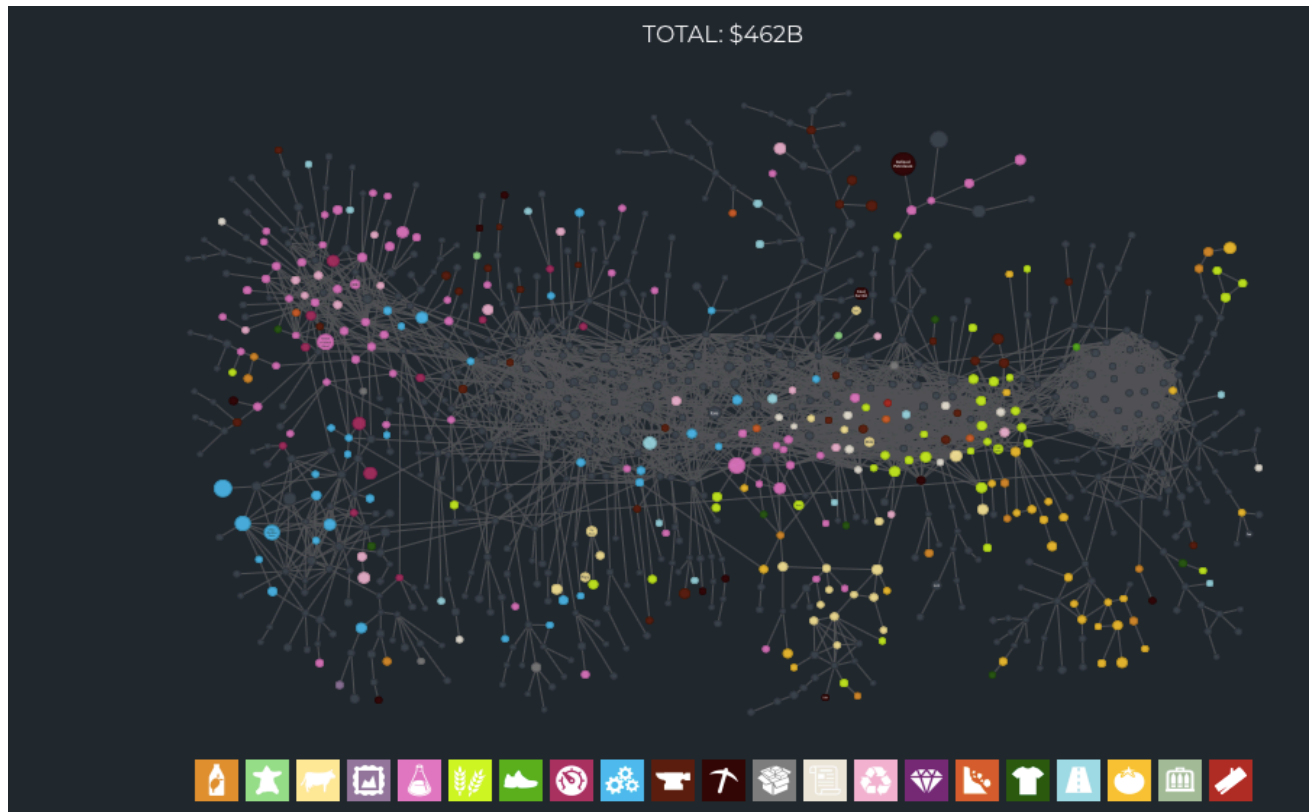
In accordance with Hidalgo et al. 's (2007) product space, Felipe, Kumar, Abdon, and Bacate (2012) showed that the more complex products as machinery or chemicals are situated at the heavily linked core of the network, while the less complex ones, for example, petroleum, raw materials, agriculture, etc., are settled at the "periphery" of the global economy.

Additionally, they concluded that top 10 products with the ultimate complexity are attached to the machinery and chemicals, while the least sophisticated ones are majorly stemming from raw materials, agriculture, or commodities.

Figure 5: Example of proximity measures in a Product Space

Source: The Atlas of Economic Complexity. Mapping paths to Prosperity
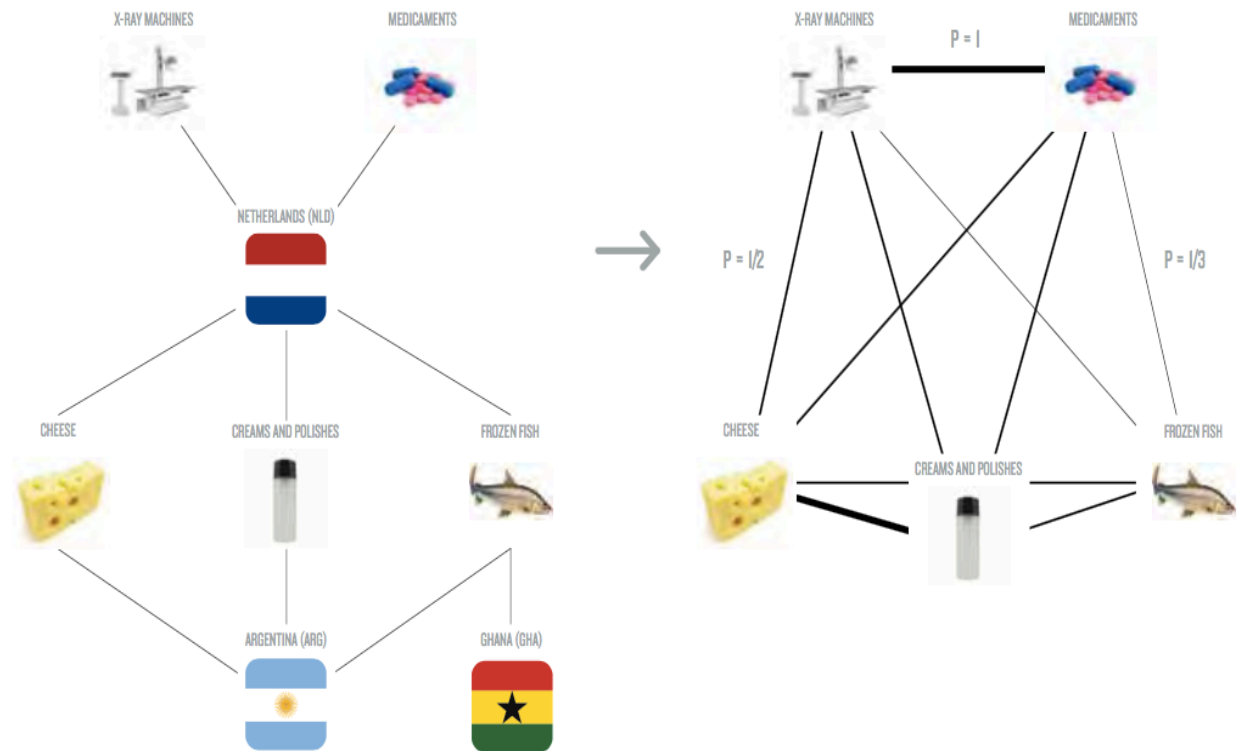
However, Haussmann et al. (2007) demonstrated that each product has distinct ramification in regards to economic development: "there are products whose capabilities can be easily redeployed into the production and export of other products (which facilitates development), while there are other sources that embody capabilities that can hardly be used for the production of other goods". These pioneers additionally emphasized that wealthiest countries export "rich-country products", and that the Economic Complexity Index is a prime forecast variable for growth. Their study included data on income including knowledge about nations' network structure, what they export and how much do they export.

Later, Hidalgo and Haussmann (2009), have extended their work by disconnecting their database on income with the data related to network structure of nations and to the items they exported. Doing so, they criticized their fellow by stating that using income information can only lead to that conclusion: "rich countries export rich-country products" repeatedly. Hence, Hidalgo and Haussmann (2009), determined diversification as being the number of items that a nation exports with RCA, and classified ubiquity as the total sum of countries that export that same product with an RCA.

In contrast, Felipe, Kumar, Abdon, and Bacate (2012) built on Hidalgo and Haussmann's (2009) hypothesis and showed that the leading exporting countries of the 10 ultimate complex products are from countries with high income, whereas the main exporters of the poorest complex items derive from low-to middle-income countries (See Appendix A6). Thus, a clear positive correlation within income levels and product complexity. They concluded that: "richer countries are the major exporters of the more complex products while the poorer countries are the major exporters of the less complex products".

Next, Alexander Simoes and César Hidalgo building on their Economic Complexity Observatory (2011), assure that information cannot be valuable unless inside a brain. Yet, brains, cannot store a huge amount of raw data similar to the ones collected by societies and markets. Thus, continuation is only attained through theories' evolution. As such, solving the issue of economic development comes from extended diversification rather than accumulation and as both scholars affirmed: countries tend to be highly inclined to export items that are alongside with previous products they exported in their Product Space, where in this case trading activities become crucial! These authors, guarantee the effectiveness of

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their economic Complexity Observatory in helping policy makers and guiding decision making as novel research have proved that nations' level of income mostly follow their productive framework. As such, country's productive scheme would be a true representation of its economic status.

To this end, ingoing debates about what precisely shapes outcomes in the spatial economy are very useful; making sense of how the global economy is evolving is a difficult task (Sturgeon et al., 2008). The growth and development of societies is carved into clusters and pools of knowledge that have only been made possible through trading activities taking place all around the world. Thereupon, trades have become a focal point for existing studies of regime's complexity (Allee, 2017). As such, learning about trade agreement's history would reveal trade liberalization evolution while capturing country's assistance in different trading arrangements that in return expose a nation's economic performance, just as, its economic complexity (Hartmann et al., 2016).

(ii) *Preferential Trade Agreements: History and Classification*

a. *Preferential Trade Agreements (PTAs) chronicle events*

All through modern history, people in every community have assured the strengthening and sheltering of their own country's benefits through trade relations made via alliances and completed within distinct agreements that started within colonial selection and moved to bilateral commercial treaties and then got directed toward extended regional arrangements (WTO, 2011).

These agreements have long lapped over each other, while combining some of their design formats, forming a global trade environment characterized rarely by clear distinction between multilateralism and regionalism, where even competition amidst multiple trade regimes appear. Notwithstanding the complex structure and intricate maturation, diverse longstanding trends are detectable.

To begin, global trade collaboration had broadly grown into an expanded and more comprehensive partnership including lots of countries acceding conclusive agreements while numerous rules were being integrated into the progressively international or global architecture of the World Trade Organization (WTO).

Second, trade agreements are developing into "deeper" made up of wider objectives by touching into recent guidelines in different areas such as government procurement, foreign investment, services trade and intellectual property. This could be expressed as the deepening demonstration of the world's economy as well as the burgeoning of globalization of rules that were once treated as national issues.

Third and most importantly, global trade has matured to reach a widely open and low discriminatory environment over the past years. However, as regional and bilateral agreements continue to grow, although the importance of preferences is decreasing, shows that countries are much more driven into several interests going beyond the elementary decision of joining similar agreements.

Even though the classical tendency has been directed towards increased openness and deep integration policies in the world's trade arrangements; taken away and distant from protectionism inclinations; development has not occurred smooth, the road toward progress has lived supreme complication and turnarounds through the way. To that end, however hard to conclude, the tension to reverse direction into more protective and conserved trading arrangements has been detected mostly during terms of shrinking economy, financial doubtfulness, and geopolitical instability. As an example, beginning 1870s the economic depression has stagnated the active development of bilateral trade bonds within the European network. As follows, the so called Great Depression, also beginning of 1930s was accompanied by several set-backs which led to a decline in treaties' expansion and a diffusion for opposed and defensive commercial blocs within wars.

As a result, the drive for a broad and comprehensive trading networks has been robust in the middle of economic enlargement and universal peace. A compelling illustration is the formation of the multilateral GATT in the post-war age following the defensive and unfair trading systems of the 1930s which have provoked the economic collapse that in return have led to the Second World War crash (WTO, 2011).

The contemporary outbreak of regional plus bilateral agreements has repeatedly prompted the argument regarding the causes and consequences of Preferential Trade Agreements (PTAs) respecting their advantages or disadvantages. On one hand, many contend that it undermines the effectiveness of international engagement into multilateralism principles, which in return portend an inverted reaction leading to an increased disintegrated trading world. On the other hand, some believes that the following template has inaugurated and been identified since the

Second World War in which regional and bilateral agreements play a major role in dispensing a pathway to a "fast" and "deep" policy-creation than the vast WTO, contributing to a coherent alternatively to a more paradoxical path to manage a "unified" world, in other words a less fragmented world trade.

b. History: Going from Empire toward international agreements

To regard historical events of universal trading as a sharp distinction among regionalism and multilateralism or within preferential and non-preferential agreements is overly simplified (WTO, 2011). Almost all trade agreements in recent history are relatively constrained by geographical ranges; normally bounded by the colonial control or domination, correlated to empires, or to mutual commercial treaties, primarily within European potentials. It was exclusively through the General Agreement on Tariffs and Trade (GATT) establishment in 1947, a legal agreement between several countries whose overall purpose was to promote international trade, that the ideology of a broader, deeper arrangements have led multilateral agreements to the vanguard of international trade relationships (Dür, Baccini and Elsig, 2014). However, at that time the reach was narrow implicating nearly 23 nations' participants in a plurilateral agreement that progressively evolved into becoming a member at the current WTO (Allee, 2017).

Correspondingly, the difference between preferential and non-preferential agreements is first and foremost based on degree rather than on the kind of preference (WTO, 2011). Factually, trade agreements whether bilateral, regional or multilateral are examined as preferential in a

way that their interests and commitments are taken into account to members solely, in which non-members are to be precluded (Krueger, 1997). This is mutually comparable to the contemporary WTO where even today, some nations are still out of the organization. In fact, what has certainly defined the phases of the international trading system is each countries' determination to broaden or to restrain their trade associations.

Empires were one of the most primitive methods to secure trading concerns and benefits. Dominant nations, starting from the Romans to the Ottomans, ending with the British; benefited from their control and power to form colonial authorities or "spheres of influence" which enabled them to offer their dealers together with their producers, protected connections and entries to markets overseas, where some were even exclusionary (Dür, Baccini and Elsig, 2014). The prevailing concept of international arrangements that could assure and maintain trading interests is relatively novel, despite the fact that bilateral commercial treaties have existed a century ago (Trebilock et al., 1995).

Initial commercial treaties were not concerned similarly, to access different markets or to liberalize their commerce; they were much more worried about protecting their country's traders from random constraints or any seizure in arbitrary offshore nation (WTO, 2011). In the same way, almost every European country did oftently blocked the amount that external ships can import to and from their ports. Thus, previous bilateral agreements were less concerned with attempting to solve national protection, yet sought to guarantee that a foreign shipper is being served in an equivalent manner as any other overseas shipper which led to the formation of the so called: Most Favored Nation (MFN) that showed up in early articles, treaties, or agreements (Dür and Elsig, 2013).

c. *The 19th century: Road toward Trade Growth and agreements broadening*

This century witnessed a massive development in the essence and in the extent of bilateral trade treaties favoring increased openings and acceptance together with decreased restrictions, thus more liberty in economic or political systems (WTO, 2011). This period was inspired by an immense extension in global trades and by Great Britain's expeditious climb to become the world's leading economics' influencers and a devoted supporter for trade opening which has led them to conduct trade policies that no longer required security from external challengers. Great Britain has also concluded that defensive trade laws have solely pushed opponent nations to omit the British transports from their business (Dür and Elsig, 2013).

In conjunction with compelling tariffs cutbacks for independent or "one-sided" arrangements within this stage, Britain took a radical initiative by signing the Reciprocity of Duties Act in 1823, a mutual trading agreement with foreign powers that has highly removed constraints or any restriction on the British carry trade, and has additionally eased mutual discounts of imported tariffs of similarly minded countries (WTO, 2011).

Another prominent move by Britain and Spain in 1860 was the Cobden-Chavalier Treaty signature, which encompassed important duty reduction within these states which further enclosed a significant MFN section, a conventional part that features the need of non-discrimination within dealing participants (Dür, Baccini and Elsig, 2014).

Intended to elaborate the political collaboration within the two parts by strengthening the economical relations, this treaty has additionally triggered an upsurge in bilateral discussions within European neighbors that carried related economic influence; which has mutually signaled an illustration for an introductory movement toward a competing universe of trade liberalization, or what is labeled presently as the domino effect (Dür, Baccini and Elsig, 2014).

Unambiguously, this accord assisted in boosting a broadened system of bilateral Most Favored Nations trade accords in the European continent. First, charges were cutback partly or even halved following this agreement, secondly, and since they remained for a 10-year stage, an increased sentiment of trust spurred into trading alliances (Shafaeddin, 1998). As this network of arrangements is commonly mutual and comprehensive through the MFN provision, and undoubtedly interconnected, it has incidentally initiated a new pattern of "plurilateral" preferential trade agreement which meant at that time, an unrestricted MFN behavior toward the complete treaty signatories, that has also signaled the main architecture of the multilateral network which took place 100 years later (Brown et al., 2011).

By the end of the 19th century, the push to additional openings together with a diminished interest in preferential trade agreements started to stagnate. The first Great Depression in 1873-1877 or the "Panic of 1873" is a financial crisis that sparked a sustained, long-term downturn in economic activities in Europe and North America that has brought with it a stronger tension related to national conservation or "protectionism" together with a decrease in external market entry (Shafaeddin, 1998). The consolidation of Germany and Italy beginning 1870s has created additional tension in the European clubby system in terms of the

trading relationships during a time that both countries wanted to unify their attained

communal deal by elevating their foreign charges through external barriers (Trebilcock et al.,

1995).

Another complication is the case of the United States that was unwilling to become member

of the European complex made up of non-discriminatory pacts, but rather focused on its

individual reciprocated and preferential bilateral arrangements. While the American exports

developed, Europe's trading associates advanced while being limitedly open to grant

unconditioned MFN conduct to the United States free-riders attitude in the absence of equal

behavior towards European in the American market (WTO, 2011).

An extended menace to trading broad-mindedness, excluding discrimination was a constant

chase between the dominant nations or economic leaders, that included the US, ending the

19th century and early 20th century, in order to settle or enlarge their foreign colonies and

circle of control (Dür and Elsig, 2013). The motives behind this behavior was not only to

capture unique markets for exporting activities but to protect their nations abundance in raw

materials. Similarly, the British predominant openness in trading was actually confronted by

a thriving community longing for trading through preferential arrangements as lowered tariffs

to be offered for British dominion overseas (Dür, Baccini and Elsig, 2014).

A set of segregated trading conflicts occurred within this era, and has led to additional

tensions in the trade networks. Despite the fact that the trading stream maintained its

expansion and progress at that time, the strength in relation to the network formation of

trading policies has started to disappear, strictly with the surge of the WWI in 1914 (WTO, 2011).

d. WWI, Economic Depression, and the revived regional theory

The Great War between 1914 and 1918 had destroyed all efforts toward greater openness and a unified world in terms of trading network that has been initiated in the preceding years. Notwithstanding several try that started early 1920s in order to reinstall what have been attained previously and to rejuvenate global economic collaboration, most specifically in 1927, an international economic conference has been created to reconsider different approaches for global barriers removal, showed that the readjustment of a growing world prosperity including trading and payment networks was becoming slower and provisional.

This stagnant activity was a result of a weakened economic success, a persistent uncertainty in exchange standards, and the American hesitation to take the lead of the financial system at the time that the British economy was depleted (Brown et al., 2011).

To this end, each and every improvement in these years was directly interrupted by the Great Depression that has started beginning 1930 together with its catastrophic outcomes. A strong acknowledgment through history is that this period of economic decline in 1929 matured into the Great Depression primarily caused by a sequence of policies' mistakes, whether related to financial or fiscal issues. These monetary gaffes were aggravated by the expansion of the "beggar-thy-neighbour" approach, an attempt to cure a country's problems by means that harm the economic interests of its trading partners; where nations attempted to protect

themselves from declining requests and rising layoffs by elevating their import barriers and by developing their preferred trading markets, which has resulted in the breakdown of global trading and the enlargement of trading discords (Irwin et al., 2008).

Part of the recent trading alliances were highly characterized as conservative. Hence, in September 1930 the governments of Sweden, Denmark, the Netherlands and Norway attempted to protect their nations from the ongoing financial mess by forming the Dutch-Scandinavian Economic Pact. An economic agreement that was designed to coordinate tariff policies and promote trade (WTO, 2011). As such, in few years the British Empire engaged into a proposed structure of "Imperial preferences", a reciprocally-enacted tariffs or free trade agreement between the dominion and its colonies, that signaled the termination of the British engagement in non-preferential trading systems that has took place for the last century. Hence, different alliances had a more defensive attitude; following 1936, Germany intended to secure its resources and economic self-reliance decided to initiate a protective trading combination by the formation of a system of mutual arrangements bounded by the South and East of Europe. Consequently, this has led the following nations' trades to be directed toward the German fields, being far from the world's dynamics (WTO, 2011). Similarly, the Japanese authorities referred to an "expansionist" program by creating the Greater East Asia Co-Prosperity Sphere, that went with the sentence: "Asia for the Asians" which was principally designed to give total sufficiency and absolute control to Asians countries guided by Japan without any European or American intervention (Duffield, 2002).

The only optimistic outcome was the American initiative to finally get into safe policies of trading that liberalized or removed the excess of restrictions that have taken place few years

ago following the Smoot- Hawley Tariff Act that was put into action to implement protectionist trade policies and raise the American tariffs on imports to a marked level (Dür, Baccini and Elsig, 2014).This movement into liberalizing trades and more openness gave hope and signalized a new stage directed by an international trade network. To this end, by 1934 the American president Franklin D. Roosevelt signed the Reciprocal Trade Agreement Act (RTAA) that give the US the ability to negotiate bilateral or reciprocal trade agreements with different nations, at a time where European were enacting protectionism policies. This administration had completed twenty and even more trading arrangements around the 1930s that included British, Canadian and Latin participation (Irwin et al., 2008). This slight movement that has led to the formation of some reciprocal or bilateral agreements may not have a huge impact on the world's trading system but in return, this gave hope to more liberal behaviors in this specific area, that has advanced the foundation of the today well-known General Agreement on Tariffs and Trade (GATT) following WWII, (Dür and Elsig, 2013).

e. MFN & GATT foundation

The starting point of the latest multilateral agreements were settled directly following the WWII. This era was suitable to make serious moves in terms of global trading openness and collaboration (Dür, Baccini and Elsig, 2014). The US had undoubtedly come up from the past struggle as the financial leader, where it had several motives to push for a more integrated global network directed towards extended multilateral agreements. Furthermore, the two post-war winners, specifically American and British, had both recognized the main reasons behind all economical and constitutional disorder that have existed in the period between the two world wars, and hence, decided to form a global economic structure that would help

avoid the reappearance of any economic uncertainty or trading alliances competition that could cause a sudden war wave (Brown et al., 2011).

In 1994 and more specifically at the United Nations Monetary and Financial ("The Bretton Woods") Conference, was a meeting of 730 delegates from all 44 countries to discuss several policies related to the post-war or Second World War regulations of international monetary system and financial orders (WTO, 2011). The latter anticipated the formation of an international trilateral of different economic institutions that have determined the foundation of a novel economic structure. First, the International Monetary Fund (IMF), an international organization that was created to foster global monetary cooperation, manage and protect exchange rate stability as well as simplifying global trades and maintain economic prosperity. Second, the International Bank for Reconstruction and Development or the World Bank, an international financial institution that would grant loans to middle-income for war-torn or developing countries. Finally, the International Trade Organization (ITO), an international institution that would control the trading regulations. However, the ITO has failed to develop as the American Congress had doubts regarding critical topics as autonomy, independence, and control (Trebilcock et al., 1995). As a result, nations had brought back the transitional GATT arrangement, that has been consulted earlier within 23 countries in 1947, which in return had conclusively contributed to the creation of an enlarged multilateral trading network, till it was finally presumed by the World Trade Organization (WTO) in 1995 as the largest international economic organization in the world (WTO, 2011).

Despite a common understanding regarding the "new world" of trading systems after WWII, specifically related to tariff reduction and non-discrimination case, Americans and British

still had some disagreement with reference to the way a novel structure could be adjusted including the existent regional agreements (Dür, Baccini and Elsig, 2014). The main conflict that had existed during and following the war's financial consultations, was the British Empire eagerness to retain their proposed scheme of Imperial Preferences between their dominions and colonies. The United States expressed disapprovement as the opposite result this could have on American's exports to Canada and the UK, two major targets(WTO, 2011). Britain and the United States administrators disagreed again as to the techniques to attain increased openness in trades. The result was a "multilateral-bilateral" combination where tariff reduction would occur in bilateral agreements, and multilateralization completed along the MFN fundamental (Irwin et al., 2008). A main adjustment was the fact that this current GATT absorbed the bilateral structure into a unique multilateral accord, in which the two forms reflected and reinforced the engagement within participants to a broader range of trading collaboration that has never happened before. This time, and exclusively, multilateralism grow into becoming the starting point of trades and not the substitute (Dür and Elsig, 2013).

f. *The Regionalism trend: a ruling term*

The GATT foundation has not reduced in any way the interest in bilateral or the attractiveness of regional arrangements into global connections. The inverse has been proven specifically in Europe where the drive towards the formation of additional regional arrangements rose again just few years following the GATT formation, proving a continued duration of original pressures among regionalism and multilateralism, which in return led to marked advancements in the two proposals (WTO, 2011).

Despite the fact that the European Union's broadness and deepness has been a major player at the succeeding phases of regionalization, the North American continent together with the Asian neighbors have both engaged in the same trend. Meantime, each phase used to coexist or directly be pursued by a compelling advancement in the GATT integration, which has led many to affirm that a certain movement of competing liberalization or the so called "domino effect" (every time a random event caused another similar event) existed, not only between several regional arrangements, but more specifically, within multilateral and regional agreements (Dür and Elsig, 2013).

However, the European Union was not the only regional agreement with big influence and importance, the image also included the US, on one hand, by cause of its ongoing concerns regarding the European pact development, and on the other hand due to the continuing postponement in initiating and progressing the 8th round of multilateral trade negotiations: the Uruguay round that started from 1986 and remained until the 1994 (Fiorentino et al., 2007). Nevertheless, the United States had avoided regionalism to the advantage of multilateralism for nearly forty years, it had unexpectedly switched plan, to embark on a determined approach of bilateral arrangements that comprised a FTA with Israel in 1985, pursued by a Canadian-American FTA in 1988, which was followed by a trilateral NAFTA agreement that included Canada, US, and Mexico in the 90s beginnings (Anderson and Blackhurst, 1993). For all that, the United states had integrated collective multilateral topics in their bilateral/regional area such as the investment chapters, trading services, property rights, public procurements etc., which has been later adopted and discussed in multilateral round meetings (WTO, 2011).

Subsequently and throughout history, regional arrangements have been taken to developing countries this time as they sought to enhance and build their very private regional organizations (Dür and Elsig, 2013). Some previous alliances were reinstituted striving for an extended and more committed Latin American market, reflecting the European and North American arrangements' accomplishments. A major example was the establishment of the South American trade bloc through MERCOSUR to promote free trading and a smooth movement of goods, people, and currency (de Gouvea Neto, 1998).

These recent "developing-developing" agreements have helped revived African regional alliances that have already existed, but have also encouraged the formation of brand-new ones as the Common Market for Eastern African Community (COMESA), EAC, ECOWAS and the South African Development Community (SADC) which all aimed at advancing the social and economic networks, expanding the regional infrastructure, supporting mutual decision makings and assisting peaceful and secure environments (Dür, Baccini and Elsig, 2014). Similarly, Asia promoted regional arrangements starting with the creation of the Association of Southeast Asian Nations (ASEAN) that was launched through an ASEAN Free-Trade Area (AFTA), an agreement that seeks the reduction or the elimination of tariffs within members, the strengthening of collaborations in new trading topics such as technology, tourism, financial businesses, and foreign direct investment (WTO, 2011). In addition, identical trade arrangements were initiated sometimes due to political tightness as in the case of India and Pakistan that reached the South Asian Association for Regional cooperation that was converted to the South Asian Free Trade Area (SAFTA), an agreement that reaches 2.08 billion people by 2018.

During that time, several advanced structures of regionalism took place even at the Oceanian sub-region, asserted by the fact that participant would go farther rapidly in order to reach deep integrated agreement's than through wide and slow multilateral or GATT networks. The latter was also followed by continuing unease regarding the slow-footed behavior of the Uruguay Round together with the growth of competing regional trading alliances (Dür, Baccini and Elsig, 2014).

One more time, progression at the multilateral stream was paralleled with, or more specifically, took advantage of the 2nd wave of regional pacts (WTO, 2011). Following several unsuccessful attempts, the Uruguay Round was finally started in 1986 and included newly chapters related to investments, intellectual property and services. Unconcerned with the ongoing doubtfulness regarding the GATT progress, whether obscured by regionalism, or benefiting from it, the Uruguay Round was favorably completed in 1994, rewarded with the formation of the WTO – the World Trade Organization; which has clearly reduced the excitement of the most recent stream of regional deals (Dür, Baccini and Elsig, 2014).

Moving in time, another stream of regional arrangements was taking place, guided as usual by huge trading authorities as the European Union and the US, however surprisingly involving some Asian participants who previously supported multilateral pacts heavily as well as non-discriminatory arrangements (WTO, 2011). This alteration to regionalism have resulted partly from several international collapses but more specifically following the Asian financial crisis in 1997 (Dür and Elsig, 2013).

The latest movement of regionalism surpassed a broader structure of partners that went beyond bilateralism to plurilaterlism and cross-regionalism which in return enclosed various

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level of economic growth that include developed and developing combinations. Those alliances grew into a more widespread and complex arrangements as policies moved outside the limits of reducing tariffs limitations toward the contest of deeper policies amalgamation (Duffield, 2002).

Hence, many trading specialist consider the dramatic increase of PTAs recently as a negative outcome when linking the rise of regional and bilateral agreements to the complications of the Doha Round (WTO, 2011). On the other hand, some professionals are more confident, assuring that the expansion of regionalism and bilateralism will, in time, demonstrate a "domino effect", which consecutively will accelerate bargaining at the multilateral level. At the end, numerous people claim that no association exists among multilateral and regional deals, mentioning that some regional pacts took place following the Uruguay's completion and not even when the Round was postponed (Freund, 2000). As a matter of fact, there is also proof that the current multilateral and regional drive have moved alongside each other.

g. *PTA's expansion and classification*

It would be important to note that throughout history, PTAs have evolved in several ways. The most common method to categorize these arrangements is through their level of development by referring to their country's classification being: 'developed' 'developing',

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'least developed countries', or an 'economy in transition'; what are their geographical coverage, whether agreements cover nations within a specific area or across regions (i.e., cross-regional); which type of PTAs do they belong to starting with the degree of their market integration for instance a Free Trade Agreement (FTA) or a Customs Unions (CU); moving to their sub categories such as bilateral or plurilateral/multilateral, by also including their subject coverage, for example: goods, services, etc. (Baccini et al., 2011)

When estimating the impact of trade agreements, an enthralling question relates to their design divergence and ramifications across trade flows. Precedents studies on the design of trade agreements had put emphasis on pattern variation or deviating outlines that are frequently appointed as their differing "depth" (Alschner et al., 2017)

Several studies operated the altering design of treaties in distinct approach. Some academics evaluate depth using dummy variables thus assessing the agreement's type going from FTA, customs unions, etc. (Baier, Bergstrand and Clance, 2015). Numerous others, categorize and differentiate deep from shallow arrangements using binary elements (Aichele, Felbermayr and Heiland, 2014). While others, describe an additional classification relying on the total amount of provisions within a contract, as an approximation for its depth (Dür and Elsig, 2015).

An increased effort toward an additional fine-grained analysis of design deviation (or alteration) within trade agreements entails a precise examination employing hand-codding techniques and also the mapping of treaty content; which as a result, recognize depth in three distinct approach.

To begin, some scholars adopted the WTO text as a criterion , thus classifying aspects in PTAs similar to "WTO-equivalent", where PTAs and WTO agreement are nearly identical in function, engagement and meaning; WTO-plus in a situation where PTAs grant more ambitious commitments compared to the WTO's; "WTO-minus" in a case where WTO agreements provide more enthusiastic promises than PTAs and "WTO-extra" in a position where PTAs policies' scope are unveiled in WTO agreements together with their legal enforceability. Second, researchers have given importance to the different types of economic integration agreements while using dummies to differentiate between one-way preferential trade agreements, two-way preferential trade agreements, free-trade agreements, and remaining divisions' agreements that gathers several types of "deeper" economic integration agreements including economic unions, customs unions, and common markets (Baier, Bergstrand and Feng, 2015). As a result, the more "deep" agreement were, the better effect they had on trades. Lastly, many others determine a complete measurement of depth based on specific characteristics, for instance, the Design of Trade Agreements Database: DESTA (Dür, Baccini and Elsig, 2014) while extending further efforts to try to achieve results by their own rights, thus, not referring to the WTO as benchmark.

Preferential Trade Agreements have surpassed regional borders and while Regional Trade Agreements (RTAs) and Preferential Trade Agreements (RTAs) are selected reciprocally in literature, the growth of Regionalism is much attributed to the description of the PTA expansion (WTO, 2011). In such a way, more than half of present PTAs are not within the same region or "regional" or more specifically they involve nations from different geographic field, in accordance with the typical regional description selected by the WTO framework. This alteration is not very old, as activities inside a unique region were still predominant not long ago. The current tendency toward a wider geographic area is more noticeable within

current PTAs under negotiations or newly registered ones but not in force yet, which included mainly cross-regional pacts. Several statistics show the way each region advanced in time. The European continent had actively targeted intra-regional arrangements (countries within the same region), however it has mutually focused on increased cross-regional activities, starting with the Middle Eastern countries as well as the African ones. This was not the case for Asia, PTAs are more separated in terms of geography while African countries were more active in PTAs within their continent. The following divergence in timing and directions regarding PTA formation is caused by many probable justification in each case. However, for the moment it is important to note that very few arrangement involve more than two regions (WTO, 2011).

To this end, it would be crucial to underline the different types of PTAs as they have overlapped in many ways. Following the World Trade Organization Report 2011, Preferential Trade Agreements included: Free Trade Agreements (FTAs), Customs Unions (CUs), Partial Scope Agreements (PSAs), Economic Integration Agreements (EIAs), FTAs & EIAs, CUs & EIAs.

Table 1 restates the standard definitions of each type rerieved from the World Trade Organization's Report (2011).

Table 1: Type of Preferential Trade Agreements (PTAs).

World Trade Organization Report 2011 (WTO Secretariat, page 64).

FTA – Free Trade Agreement	Agreement between two or more parties
	Tariffs and other trade barriers are eliminated on most or all trades

	Each party maintains its own tariff structure in relation to 3rd parties
CU – Customs Union	Agreement between two or more parties
	Tariffs and other trade barriers are eliminated on most or all trades
	Common commercial Policy vis-à-vis 3rd parties.
	== > Initiation of a common external tariff
PSA – Partial Scope Agreement	Agreement between two or more parties
	Parties offer concessions on a selected number of products or sectors
EIA – Economic Integration Agreement	Agreement between two or more parties
	Trade in services including preferential market access to each other

As a reminder, a "Preferential Trade Agreement" (PTA) is used to denote any reciprocal preferential agreements in general. Figure 6, reveals the statistics of PTAs' categorization for the year of 2019 (Data retrieved from the official WTO database for trade agreements).

PTAs are also arranged (subdivided) in a bilateral way, which means within two nations or between many countries which is called plurilateral (or multilateral) but also within one or diverse PTAs that already took place. Yet, there exists an increasing number of several bilateral pacts that are being combined to a plurilateral agreement or to an existent regional bloc.

Figure 6: World Trade Agreements by Type as of 2019.

Data Retrieved from: http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx
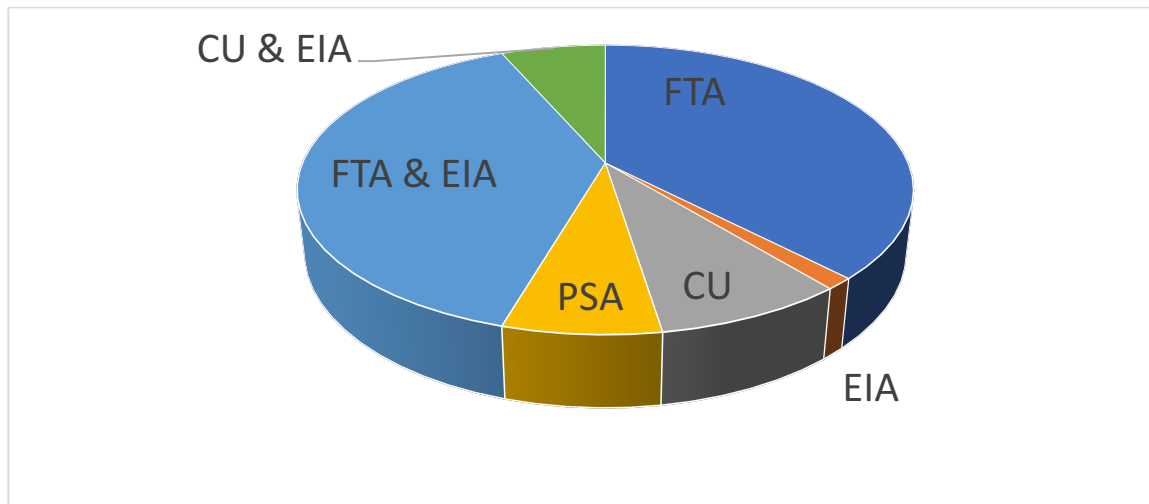
Another approach that could simplify the interaction of people, goods and services would be through Regional Economic Integration that englobes several phases (table 2), starting with the initiation of a Free Trade Area, a convention that simply reduces or removes barriers; moving to Customs Union, an agreement that mutually reduce/remove barriers but also launches a common external tariff vis-à-vis third parties; heading to Common Market, an arrangement that adds the free movement of goods, people and capital; reaching to Economic Union where common economic policies are included; and finally getting into political unions where all previous privileges are combined together with an economic and political integration.

Table 2: Degrees of regional economic integration

	Free Trade Area	Customs Union	Common Market	Economic Union	Political Union

Reduce/ Remove barriers	X	X	X	X	X
Common external tariffs		X	X	X	X
Free movement of goods, people and capital			X	X	X
Common economic policies				X	X
Political and economic integration					X

We follow our analysis, by taking the European Union (EU) as an illustration of a political union but also because the starting point of regionalism was at the heart of Europe and (later) the European Union (EU). The principal objective of regional economic integration relies on maximizing economic efficiency, accommodating resource allocation, and strengthening a region's economic and political bargaining power in the global economy (de Gouvea Neto, 1998). It is conceived as the ability of divers states to form partnership, union, and to structure well-balanced governmental and practicable arrangements.

But what does really matter? Why do nations join such agreements? One explanation could be illustrated by the rising competition allowing adverse effects that not all firms were able to survive (Benito et al., 2003). Thus, interrelation between regions has promptly started in the mid-90s aiming for the development of a secure combination, due to the challenges of deeper integration. (Doctor, 2007).

It all begun in 1950 with the European Coal and Steel Community (ECSC), the major reason for its creation was purely economic being the principal energy source at that same time. The

other part of the project was mainly political, through the foundation of this economic co-dependence, the plan was to stop the war between Germany and other European nations. The theory at that time would guarantee that, by creating this huge common dependency, the risk of a war inflation was reduced, as it becomes less profitable for each nation, being co-dependent. In 1957, rumors about a common market led to the Treaty of Rome that had generated the European Economic Community (EEC), in which customs union and the EURATOM were established. This advancement has pushed the formation of the opponent European Free Trade Association (EFTA) in the same year within nations that did not participate in EEC (WTO, 2011).

Europe's consolidation had triggered the creation of several other regional alliances within this term specifically reaching developing countries in South/Central America, Africa and the Caribbean. Nonetheless, the majority of these agreements had fallen apart ending the 1970s (de Melo and Panagariya, 1993). Similarly, as the European continent continued to integrate, elevated tension was felt in regard to multilateral status' improvement. Many nations attempted to achieve similar results to the European preferential pact by diminishing MFN tariffs within each other's.

Hence, the initiation of the sixth session of the GATT: the Kennedy Round between 1964 and 1967 that took place following the European Economic Community approval of a shared external standards, a movement that has stimulated participants to ask for mutual tariffs decline from their trading associates, heading into an extended multilateral level (Dür, Baccini and Elsig, 2014). At the same time, the Dillon Round coexisted with the EEC's expansion which included additional participants, accompanied with the United States doubtfulness regarding their exclusion from a vast European empire and a consolidated

market that is being shaped (Anderson and Blackhurst, 1993). As a result, GATT's tariffs cut and participants' increase developed alongside with the broadening and deepening of the European combination scheme, in conjunction with additional regionalism activities.

In this manner, the following phase, started around the middle of 1980 and remained until the 1990s. The European ongoing effort to broaden, extend and integrate their financial system was at the heart of the "single market" initiative that took place in the middle of the 1980s. Aiming to dismantle any practical, physical or tariffs obstacles along the present association has led to switch the community's title in 1992 from European Economic Community (EEC) to European Community (EC), within the Maastricht Treaty held in the Netherlands, to further the European integration. The EC was also thriving to the formation of additional clusters aiming at reaching the remaining countries in the Centre and East of Europe. The resulting events were succeeded by major changes that arose as the fall of the Berlin Wall in 1990, the fall of the Soviet Union in 1991, and finally the creation of European Union in 1993.

It is important to note that with every single treaty there was more and more policies, economic configurations and changes that took place (WTO, 2011). The following agreements were centered on lowering tariffs, forming homogenous policies or Rule of Origins (RoOs) that determine the country of origins of a product and finally develop persistent administrative means to regulate services, principles, and transition rules regarding purposes of international trade. In essence, there was a political wheel and an economic root to create a common market for Europe and to encourage the access of several countries (WTO, 2011); in 2004, the whole eastern front enters the EU, all these nations that were

previously under the communist movement, are now considered as liberated and the EU was ready to accept them (known as the biggest enlargement).

In this fashion, between 1999 and 2003 EU members have signed several agreements such as the Treaties of Amsterdam and Nice that helped reform the EU institutions and assure the free movement of people, goods, accessibility of capital investment, and the accommodation of the industrial and labor landscape through the Union (WTO, 2011).

Starting 1999, the European Union adopted a single monetary policy under the European Central Bank (ECB) authority which has led in 2002 to the creation of the Eurozone, introduction of a common currency in twelve countries that made Europe more institutionally integrated (Blevins et al., 2016).

The EU was later known for its multilevel structure, as many agreements were in place and overlapped. For instance, some countries may not be part of the EU as Norway, but could still participate in some of the treaties as the Schengen Agreement (Dür, Baccini and Elsig, 2014).

Along these lines, the EU community has become more and more complex, amendments have advanced the EU toward an extra competitive market, granting companies the possibility to relocate activities in the value chain to an economically suitable location, to lower transaction costs through economies of scale and comparative advantage, to recruit talents from a diversified area and decrease expenses in terms of currency variation and inter-country comparisons and deals. (Blevins et al., 2016)

Then, 2009 marked the deepest level of integration, the whole notion of supranational component of the EU, the nation-state portfolio, or EU identity become stronger and stronger which led to the merger of the EU three pillars: economic, social and environmental policies into a single legal entity (WTO, 2011). A common identity was created to ensure a good level of integration in all matters together with a permanent president of the EU council that can voice opinions on behalf of whole Europe. In addition, an "executive Europe" for the European Union now exists. The latter was also empowered by strengthening the position of the High Representative of the EU for Foreign Affairs and Security Policy (Blevins et al., 2016). Through this development, EU was distinguished from other regional integration agreements like NAFTA or the African Union, where we speak about pure intergovernmental base that created an authority that facilitates trade flows and investment flows. For instance, one can be member of the African Union but still totally run its own policies while harmonizing common tariffs and economic issues as part of the union (Dür and Elsig, 2013).

However, the EU was remarkable, being the only regional institution where all policies must be harmonized with the European protocol, a fully integrated system almost like a nation state.

Thus, when EU integrated it has provided stability and ensured political and economic evidence for its members. Being secured, members tend to target acquisition versus strategic alliances (Blevins et al., 2016). As follows, multinational enterprises (MNEs) yielded distinctive outcome when correlating their performance with their degree of integration: members of a deep integration proved to be much more gainful enjoying a wider range of value-added activities and developing higher level of competence compared to members of a shallow integration which are limited with lessening tariff barriers solely (Benito et al.,

2003).

As such, "deep" integration promoted economic integration in relation to market size and MNEs performance, together with the adjustments of a firm's strategies deriving from regional integration (Benito et al., 2003). Convincingly, assigning and developing different subsidiary roles was much more beneficial within a regional bloc than outside it. Therefore, when examining the connectedness between the size of regional trade agreement and its responsiveness to regionalization strategy a thriving correlation was found (Fratianni et al., 2009).

Yet, when discussing the significance of dimensions, expanding regional-trade agreements (RTAs) had a positive effect on profit for insiders and a negative effect for outsiders which is a clear incentive for outlander to join RTAs. In this manner, expanding RTAs offered improved building blocks by developing excessive trade creation that exceeds trade diversion (Feils et al., 2007).

Finally, the World Trade Report (2011) shows that most of cross-regional agreements are of bilateral origin, whilst plurilateral ones are more involved into the same region. In return, bilateral acts have been active within developed and developing countries whether in Europe, in large countries like the United States, in medium ones as Singapore or in bigger ones such as Japan which have all contributed heavily to the bilateral growth. An important outcome, would be highlighting the effects of PTAs on Economic Complexity and country performance by going beyond the traditional ideology of regionalism and neighboring countries through a complete transformation that breaks the borders "theory" and focuses on every economical, political and social benefit.

3. The effects of PTAs on Economic Complexity and country performance

Through the last centuries, humankind have been able to accomplish things that were once called impossible or were even unimaginable. Going backward, human accomplishments are infinite or inestimable. The prevailing era we live in, has provided us with a much simpler life accompanied with a flourishing period, through an uncountable number of attainments. Tons of advancements that we benefit from, without even noticing, starting with airports facilities, progress at the pharmaceutical level, Internet expansion, Uber transportation, airplane Wi-Fi, water distillation, etc. All these evolutions have been achievable as we human being became wiser. Throughout these years, the sum of productive knowledge that we retain have increased strikingly. Nonetheless, this could be never assumed to be a singular reality. This was a cumulative phenomenon, that have been gathered by a pool of knowledge (Hausmann et al., 2016). Considering human kind today, we are not, by any mean more gifted or skillful than our ascendants; yet, through societies we were able to develop the competency of merging know-how, capabilities, and knowledge through humanity. Modernized communities manage to aggregate a huge volume of productive knowledge due to their internal allocation of chunks and fragments within members. However, to be useful, these talents need to be invested together within organizations and markets. As such, a particular specialization generates diversity nationwide but also worldwide. Our current fruitful and successful societies are "smarter", not as a result of new generations being genius, yet, for societies' ability of holding a variety of knowhow plus being capable of recombining them for the creation of exceeded diversity, of exceptional, and of improved products (Haussmann; Hidalgo et al., 2014).

Nevertheless, this event has not touched all parts of the world, it was clearly not a global occasion. Some states have taken part in it while others have not reached such level. But whenever this occurred, it has been a building block for a substantial upsurge of living norms.

In places it did not happen, communities' livelihood standards were comparable to the ones 200 years ago services (Hausmann et al., 2016).

Thus, the immense income disparity that we recognize within wealthiest and poorest countries are well explained by the great variation of productive knowledge collection by several countries. These differences are also revealed in the distinction, innovation, and sophistication of each party's product (Hartmann et al., 2016).

Conforming to countries, products too varies in regards to the load of knowledge they detain. The needed chunk of expertise for the creation of a certain item may alter largely between a product and another. As such, most of current items necessitate much experience and skills that one individual could possess. No person has the knowledge, even the most genius one, that would allow him to produce a ship on its own, or even a cell phone, for instance. That person would have to build on others' know-how and proficiency, for him to employ its own information. For instance, creating a boat would require motorboat mechanics and service technicians, ship engineers, marine engineers and naval architects, fiberglass laminators and fabricators, fishing, captains, mates and pilots of water vessels, etc.

That is the reason behind, why average employees that are located in a wealthy nation, will be employed in a company that would not only be greater in size but also in connection, in comparison with these found in a poorer place. Therefore, for societies to perform at their superior level of complete productive knowledge, entities need to experience and know many tasks. Despite that, variation in production knowledge is not sufficient. To utilize knowledge in the most appropriate and constructive manner, markets and societies must commit to the aggregation of the many scattered chunks and bring them together via groups, firms, markets, and communities.

However, accruing productive knowledge is challenging. Practically most of it is neither found in published documents nor on the computer network. It is ingrained in human's mind and individual networks; hence, it isn't easily accessible, it is implicit, and difficult to be transmitted. Productive knowledge stems from long duration of expertise rather than education, which consequently, could not be assimilated quickly or effortlessly. It calls for structural change, adjustment and development, as we have mentioned earlier in this text, where we highlighted the importance that scholars gave to this specific element. "Just like learning a language requires changes in the structure of the brain, developing a new industry requires changes in the patterns of interaction inside an organization or society" (Haussmann; Hidalgo et al., 2014).

Hence, we have so far showed how the world can be perceived in two different angles. One could conceptualize the world as being a set of items made of devices, raw materials and job efforts. While others, would assert that the world's we live in, is made out of knowledge and "know-how", that is embedded in each and every product in this universe. Haussmann, Hidalgo et al., in their Atlas on Economic Complexity in 2015, manifested that idea by considering toothpaste as an example. They questioned: "Is toothpaste just a paste in a tube?". According to them, a toothpaste is not only a paste used on toothbrush for cleaning the teeth, but a bunch of knowledge and expertise found in it, including formulas linked to the specific chemicals in use, and its particularity in preventing bacterial action, etc. Thus, when looking at products through this corner, we adjudge markets in a distinct approach. Said in other words, markets enable us to connect to a huge amount of knowledge in dispersion through many people. Also, products are instruments that help us attain knowledge and encrypt it into people that do understand that knowledge. Haussmann and Hidalgo affirm

that: "We owe to Adam Smith the idea that the division of labor is the secret of the wealth of nations".

According to Smith, incomes depends on the productivity of its labor, which in return defines the wealth of nations: specialization and the division of labor. These principles have led to the modern economics; lots of rational choices, efficiency, technological evolution, modernization, industrialization.

Correspondingly, today's perception of this belief, is the one that enables us to reach for a large amount of knowledge that a singular person can have solely. For instance, we do not lay much emphasize on learning how to fix our own car, or how to produce a certain medicine, or how to filter the water, etc. We do rely on other's specialization, and whenever we don't have it around, countries find ways to get it, whether through trades, imports, international staff, technology adaptation, and many others. As such: "Markets and organizations allow the knowledge that is held by few to reach many" (Haussmann, Hidalgo et al., 2014).

Though, the fixed amount of knowledge found in a specific market or in societies, does not refer to the single amount found in every person that lives in it, on the contrary, it is calculated as the sum of their knowledge, how diverse it is, and their power of combining it and transferring it from one to another via complex networks that would enrich this society.

The improvement of present-day society is our accomplishment in using cooperatively and jointly the big amount of knowledge that every individual share a small portion of it.

"Societies functions because its members form webs that allow them to specialize and share their knowledge with others" (Haussmann, Hidalgo et al., 2014).

As mentioned earlier, there are two knowledge classification, one that is explicit, which is simply transmitted, and the other major part is related to tacit knowledge, an implicit

understanding that is hard to be transferred; otherwise, the universe would be constituted differently, nations would match together and income inequality would be very far from present (Ferrarini; Scaramozzino, 2013).

As tacit knowledge is difficult to transmit, it restrains a country's progress of growth and development. In the end, countries differ in their level of prosperity and this is emphasized with the volume of implicit knowledge a society restrains. Being a difficult, expensive and time consuming process, individuals decide to specialize, and people are qualified for precise activity.

Nearly all products, demand a significant number of knowledge that no unique individual can master. As a result, most of them would necessitate many capabilities to be combined. But as normal individual has a certain limit in grasping as many information as possible, how would the creation of a specific product that requires knowledge from different fields of experience, would be formed? The only solution, would be through the grouping of many human beings possessing different skills, or through a chain of organization/markets that have the possibility of aggregating these knowledges. Each product requisites many kinds of knowhow, going from the "know-who", referring to the ideal person that should be in charged, moving to the "know-where", pointing at the best location for a specific activity (Haussmann, Hidalgo et al., 2014). These authors took shirts as a referee to show that some ingredients can be imported, but other knowledge could not: "Yet some of the knowledge required cannot be accessed through shipped inputs. The people with the relevant knowledge must be near the place where shirts are made". Hence, knowledge would hardly be accumulated, transmitted and conserved, only in the case of being fixed within a long chain of skillful people and organizational performance leading to a useful productive output.

Otherwise stated, nations not only create the products that they demand, but they create the ones they are able to.

In essence, complex economies are defined by their ability to aggregate huge volumes of consistent knowledge collectively, among massive networks of individuals, in order to produce a varied weave of deep knowledge outputs. In opposition to simple economies that possess a limited foundation of productive knowledge and produce less and elementary items, that only demand fewer network connections. To sum up the main idea, human beings are restrained by what they know, thus, the single solution for societies to extend and grow their knowledge ground is by simplifying the interactions of individuals, whether by promoting the free movement of people, goods, or services or by reducing, as much as possible, internal-external tariffs and barriers to trade. These elements could only be achieved through a country's participation in different types of agreements specified earlier.

Technology is at its highest peak, the emergence of digital age is an alert signal welcoming the new world (Kobrin, 2015). Cross-border collaboration has become necessary and nation's consciousness was reflected by the expansion in the number of participants of GATT/WTO or intra-regional agreements. Understanding that globalization is not a selected choice is crucial. "Men do not make their own history" (Kobrin, 2015); compelling incidents were unmanageable. Globalization is an unstoppable adventure; the world's progression is an uncontrollable event, technological potentiality and the enlargement of global production networks have led to the development of borderless production systems; making devolution or national autonomy merely impossible.

The new century is entirely focused on scientific knowledge, technical expertise and hi-tech development combined with tremendous costs that no single country could resist; international distribution is at that point a necessity to achieve competitiveness. Openness is the key foundation of success, progress, improvements and development; leading to the growth of real incomes, world trade, and the integration of the world economy. Therefore, the motivation to join world trade agreements or intra-regional trades is vital to assist a nation's prosperity using access to a bigger portion of the world and an enormous universal connection (Blevins et Al., 2016).

4. HYPOTHESIS

a. Free Trade Agreements (FTAs)

As mentioned earlier, a free trade agreement is a treaty among two or more countries that aims at facilitating trade and eliminating trade limitations known as trade barriers (Dür and Elsig, 2013). FTAs play a major role in creating open and competitive international markets by removing tariffs, quotas, preferences, and duties that nations place on imports and exports; which in return affect international trading and correspondingly place it as one of the most popular type of PTAs (Couillard and Turkina, 2015). Henceforward, as international business became so complex, countries needed to become more and more sophisticated: they needed to understand the new trends, detect current challenges, think theoretically, increase analytical skills, and get informed about advanced businesses practices (Buckley et al., 2001). As such, FTAs do not only help government reduce tariffs but also allow global firms' access to new business opportunities, advance in technology transfer, progress in expertise

development, benefit in welfare through economies of scale exploitation and increase motivation for a dynamic business climate (Dür and Elsig, 2013). Therefore, these improvements will award countries with higher knowledge and proficiencies compared to their market rivals which would consequently rise a nation's competitive edge, increase its expertise, shrink its production costs and provide this productive entity with a competitive advantage that would contribute to a broader distribution network and diversity. Along these lines, expertise, sophistication, know-how and export diversification, are all elements leading to a nation's Economic Complexity Index (ECI) raise; thus, we hypothesize:

H1: ECI is associated positively with FTAs

b. Economic Integration Agreements (EIAs)

Over the past 25 years, outstanding events have marked the global economy expansion, and one of the most distinguished case referred to EIAs (Bergstrand et al., 2013). "One of the main policy sources of trade-cost changes is the formation of an economic integration agreement, which potentially affects an importing country's welfare", (Baier, Bergstarnd, and Freng; 2014). As mentioned earlier, liberalization of trade in goods has becomes the basis of trading proliferation. Nonetheless, liberalization of trade in service has become no less important than that in goods (Nugroho, 2007). EIAs are treaties between countries to diminish the control barriers to the flow of goods, capital, labors, but most importantly services. The majority are included in regional agreements and tend to be linked with FTAs (Bergstrand et al., 2008). Additionally, EIAs are determined in a competitive environment

and have been proved to prompt economically and compelling effects on members' trades: "Nevertheless, deeper the EIA is, more trade the partners do" (Guillin, 2010).

As follows, a distinguishable trend can be observed: agriculture countries export agriculture goods; countries rich in natural resources, develop mining and export natural resources; industrial economies, do manufacturing and export manufacturing products, etc. This phenomenon designated the old business model where market specialized or concentrated in "clusters" to produce items while exploiting advantages by securing a comparative advantage, and maximizing their benefits (Bathelt et al., 2004). However, the new business model is thoroughly different, societies are increasingly sophisticated and demanded commodities are becoming more and more complex. Thereupon, countries needed to improve their products by gathering expertise, know-how and technology (Felipe et al., 2012). Nonetheless, knowledge transfer is very difficult as present-day requests call for intensified tacit knowledge that are only embedded in implicit learning, where in some cases, expertise would only be enforced physically (Haussmann, Hidalgo et al., 2014). For that reason, as skills and talents cannot always be transmitted, the flow of services, and the deepening of trade agreements have become a necessity. The latter will allow for technology transfer, knowledge relocation, know-how application and knowledge-intensive products' delivery. Last, it is crucial that nations enter negotiations, including written agreements on services (i.e. EIAs) (Guillin, 2010), we therefore hypothesize that:

H2: ECI is associated positively with EIAs

c. Customs Union (CUs)

Similar to Free Trade Agreements, the central positive effects of Customs Union are the increase in trade within members. The two types are similar in terms of tariffs and other trade barriers elimination on most or all trades (Dür, Baccini and Elsig, 2014). The key distinction between CUs and FTAs, however, involves their approach to non-treaty nations, this form necessitates the initiation of a common external tariff and an obligation to adopt identical commercial policies vis-à-vis third parties (Dür and Elsig, 2013). According to Krueger (1997), in his paper *free trade agreements versus customs unions,* he shows that CUs yield superior outcomes compared to FTAs*: "Therefore, all else equal, customs union arrangements are strictly Pareto-superior to free trade agreements"*. Moreover, one of the main arguments for a customs union over a simple free trade agreement is that it resolves the issue of trade deflection. This event occurs, whenever non-members move their products to a low tariff FTA country member and then ship it again to a high tariff FTA country member. This trade defection is bypassed if members form customs unions (Web Finance, 2019). However, today's challenge revolves around the realm of tacit knowledge and its distribution in comparison with codified knowledge that may roam the globe almost effortlessly (Bathelt et al., 2004). And as one of the main advantage of PTA is found in the ability it offers for trade parties to agree on specific obligations that go beyond WTO rules (Allee, 2017), CUs thereby establish selective rules that suits their own interests vis-à-vis external members and thus initiate a particular relationship marked by "an attached commitment" that has placed it in third position after FTAs and FTAs & EIAs in terms of adoption (despite custom unions' complexity for setting a common tariff rate). This engagement, would later guarantee knowledge transfer within members, as "strongest countries" in this pact would share their expertise and transfer their know-how within this "enclosed circle" (Krueger (1997) that consolidates members' competences, develops relational linkages to support the exchange of

complex uncodified information and tacit knowledge, and becomes self-sufficient, hereby, increasing economic complexity of corresponding accords (Sturgeon et al., 2008). As such, we hypothesize that:

H3: ECI is associated positively with CUs.

d. Partial Scope Agreements (PSAs)

PSA is an agreement like all others where parties attempt to strengthen the commercial and economic relation between them. However, this agreement is only partial in scope, it allows for reciprocal, or two-ways trade between a pair of nations and covers only a few number of products (Dür and Elsig, 2013). Expressed in a more conservative framework, one might put to the question, whether this type of arrangements would outperform the others' disadvantages such as the destruction of native cultures, decreased tax revenues, etc (Blevins et al., 2016).

Thus, countries whose exchange strategy rely primarily on partial agreements are limited to a selected number of products or sectors rather than an extensive openness and enlarged network ties (Nugroho, 2007), which we suppose, would exhibit weaker performance in terms of complexity and competition, as such, we hypothesize that:

H4: ECI is associated negatively with PSAs

e . Free Trade Agreement and Economic Integration Agreement (FTA & EIA)

A consequence of the rise in FTAs & EIAs is that international trade is increasingly dominated by the trade in goods but also trades in services (Grossman and Rossi-Hansberg, 2008). A free trade agreement and economic integration agreement is a result of a treaty that covers mutually goods and services (WTO, 2019). This type of arrangement will include the elimination of tariffs and other trade barriers on most/all goods plus services (WTO, 2011). Nations no longer exchange good that are produced entirely in the exporting country. Conversely, an increasing share of global trade today include exchange of parts and elements within the Global Value Chains (GVC), in other words, trade in services (Sturgeon et al., 2008).

As such, countries rely progressively on inputs imported to produce their exports noting that a value chain is not only a physical transformation process but also incorporates support activities that are generally in the service sectors (Porter et al., 2011). Accordingly, the creation of agreements covering goods and services conjointly became crucial. In this manner, the process of knowledge creation through interactive learning processes is multiplied, and economic complexity is performed conveniently. We therefore hypothesize that:

H5: ECI is associated positively with FTAs & EIAs

f. Economic Integration Agreements and Customs Unions (EIAs & CUs)

Once again, more and more combinations are being designed and countries are trying to decrease barriers to trade while focusing on specializing theories. Thus, it would be crucial to highlight that a country's capability to produce a specific item is illustrated by its Revealed Comparative Advantage (RCA). Recalling the literature on the Balassa's index of RCA: a country has Revealed Comparative Advantage in a product if it exports exceeds its fair share; thus, countries that possess an RCA in typical products, possess those capabilities (Felipe et al., 2012). Therefore, in terms of global value chain governance, "rising complexity combined with low codifiability and variable industry-level standards" (Sturgeon et al., 2008), will drive buyer-supplier linkages toward the formation of deeper trade agreements that are assumed to englobe increased knowledge, to build more capabilities, and to have large effects on trade flows (Dür, Baccini and Elsig, 2014).

We have showed earlier that the European Union is one of the most successful regional trade agreement that has reached five levels of economic integration starting with a free trade area (reduce/remove internal tariffs), moving to custom unions (common external tariffs), heading into a common market (free movement of goods, people, and capital), then reaching an economic union (common policies), and finally applying a political union for which previous privileges are all combined into an economic and political integration (WTO, 2011). The EU, is an agreement that has placed mainly all of its members into the top countries with highest ECI (refer to Appendix 6), following this logic: by merging different types of trade agreements, precisely, EIAs and CUs (that would allow free movement of goods and services) we move towards deeper degrees of economic integration, for which we anticipate a higher ECI. We thus hypothesize that:

H6: ECI is associated positively with EIAs & CUs

g. *Bilateral Agreements versus Multilateral Agreements*

Preferential Trade Agreements (PTAs) can be formed in a bilateral way, which means within two countries or between many nations, which would be classified as multilateral (or plurilateral) but also within one or diverse PTAs that already took place (WTO, 2011). Further, there exists an increasing number of several bilateral pacts that are being combined to a plurilateral agreement or to an existent regional bloc. According to (Couillard and Turkina, 2015), it seems that bilateral and multilateral arrangements have divert consequences on global trading: "The reality is that, unlike multilateral trade agreements, bilateral trade agreements are less efficient for removing barriers to trade and trade protection". Yet, Couillard and Turkina's (2015) study was limited to sector competitiveness. As this paper encloses an overall economic sector, in which clusters, specialization, and transfer of expertise are transmitted through increased work collaboration and enlarged tasks division within a global value chain, we speculate that multilateral pacts would yield greater benefits in terms of diversity and ubiquity, which means the economic complexity of a country. As such, we hypothesize that:

H7: Multilateral agreements have stronger effects on the economic complexity than bilateral ones.

5. METHODOLOGY AND ANALYSIS

1. Data Description

1.1 Dependent Variables: Economic Complexity Index

In this research, to determine competitiveness or economic performance of a country, we relied on one single dependent variable, namely, the economic complexity index (ECI) that is based on diversity and ubiquity of each country. "The Economic Complexity Index (ECI) and the Product Complexity Index (PCI) are, respectively, measures of the relative knowledge intensity of an economy or product.

ECI measures the knowledge intensity of an economy by considering the knowledge intensity of the products it exports. PCI measures the knowledge intensity of a product by considering the knowledge intensity of its exporters. "This circular argument is mathematically tractable and can be used to construct relative measures of the knowledge intensity of economies and products" (Simoes and Hidalgo, 2011).

In addition, ECI has been confirmed as a relevant economic measure by showing its ability to predict future economic growth, being strongly associated with it; which enables the forecasting of forthcoming events plus the understanding of income inequality global variations. (Haussmann, Hidalgo et al., 2014).

The data for this variable came from The Economic Complexity Observatory[1], which also offered the ECI Ranking for the year of 2017, including 129 countries. For the rest of our study, we only take into consideration nations with an ECI in that date, for a total of 125

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[1] https://atlas.media.mit.edu/en/rankings/country/eci/

countries, (4 missing values for the year of 2017) as our main objective is to predict the impact of PTAs activities on countries' Economic Complexity Index.

1.2 Independent Variables

The seven independent variables in this paper were the six different types of Preferential Trade Agreements, plus one sub-category, that have been identified in the PTAs' literature review: FTA, EIA, CU, PSA, FTA & EIA, CU & EIA and Bilateral/Plurilateral. For this study, we only take PTAs that are still in force today, derived straight from the WTO Regional Trade Agreement (RTA) Database[2] which is recognized as the official archive of all preferential trade agreements. That corpus is consisted of 472 agreements that have been signed between 1948 and 2019, and declared to the WTO. The 202 parties incorporate several types of agreements that can be combined in different ways (Example: EIA & CU; FTA & EIA). The major categories are: free trade agreements (FTA), Custom Unions (CU), Partial Scope Agreement (PSA), and Economic Integration Agreement (EIA). Of these accords 60% are in force, while 40% expect ratification. Sub-categories include bilateral and multilateral agreements, where every treaty falls under one of these two categories, if an arrangement involves two countries it is then classified as bilateral, if not, it is defined as plurilateral/multilateral.

It is important to note that 93% of these treaties are written in English, the remaining are Spanish except for one reported element in French. Another crucial aspect to highlight is the use of "preferential trade agreement (PTA)" as any reciprocal trade agreement within two or

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[2] http://rtais.wto.org/UI/PublicAllRTAList.aspx

more parties (Krueger, 1997). Also, the official WTO database for trade agreements is based on notification requirements, therefore, whenever, a treaty is modified, or acceded by a new member, we thereby count two PTAs, as each and every new arrangement includes new policies, or conditions to be agreed upon.

As such, our dependent variable in every distinct model is calculated by adding the total number of countries that have participated in that type of agreement up till 2017, in order to account for countries' preferences in engaging in different PTA's groups.

1.3 Control Variables

Factors other than our independent variables may affect economic performance and complexity. We thus controlled for the effects of several variables on a country's economic growth. In diverse papers, these controls variables played a major role on the competitiveness of a country and are covered to advance the correctness of our study. Refering to (Couillard and Turkina, 2015): "The advancement, size and growth of the domestic market contribute to the degree of competitiveness".

These characteristics are best described by the Human Development Index (HDI), GDP in current US$, and GDP *per capita* in current US$. (Please note that our study is based on the year of 2017)

The elementary driver of growth and development is the progressive build-up of a firm's capabilities (Felipe et al., 2012). Likewise, a country's ability to diversify is relying upon its knowledge or more specifically its various products creation, and for that, a mixture of know-

how is essential (Inoua, 2016). While implicit knowledge is hard to be calculated, Human

Development Index HDI[3] has been proved to be a summary of people's average

achievements (Hartmann et al., 2016), which in return highlights individual's capabilities in

assessing the development of a country. Our data for HDI was taken from the UNDP Reports.

As we have demonstrated earlier, economic complexity reveals the amount of knowledge that

is enclosed in the productive structure of an economy. As such, it is no accident that a strong

interrelation exists within our criterion of economic complexity (i.e. ECI) and the income per

capita that nations can develop: "On average, their income tends to reflect their embedded

knowledge" (Haussmann, Hidalgo et al., 2014). Besides, when identifying a country's

wealth, comparing its financial stand or trying to depict its future growth, traditional literature

generally adopts GDP as a leading aspect for estimation (Albeaik, Kaltenberg, Alsaleh, and

Hidalgo; 2017). As follows, *GDP[4] and GDP per capita[5]* are crucial variables for our

examination. Data have been retrieved from the World Bank Data Catalog.

Moreover, a nation's governance structure can encourage a society to become more

contributive to growth and development (Couillard and Turkina, 2015). Similarly,

"Governance is important to allow individuals and organizations to cooperate, share

knowledge and make more complex products, it should be reflected in the kind of industries

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[3] http://hdr.undp.org/en/data

[4] https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KI

[5] https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KI

that a country can support" (Haussmann, Hidalgo et al., 2014). Thus, governance structure plays an important role in this analysis.

Governance structure is defined by the degree of corruption in a country, by its government effectiveness, and by the political stability and absence of violence in that nation.

For that, we adopted the Corruption Perception Index[6] to measure the public-sector corruption determined by expert assessments and opinion surveys published by Transparency International and for government effectiveness, we used the World bank database. Along, the Government effectiveness index[7]: "captures perceptions of the quality of public services, the quality of the civil service, the degree of its independence from political pressures, and the quality of policy formulation and implementation" (World Bank, 2019). Finally, we chose the political stability and absence of violence index[8], using the same source, as it measures the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism (The global economy, 2019).

2. Analysis

2.1 Data Analysis

Our data consists of 125 annual observation for the year of 2017, which includes each country's Economic Complexity Index together with its corresponding ranking. We tried to combine all nations around the world, however missing data made it impossible. As such, our model was confined to 80 developing countries, 30 developed nations, 2 Least Developed

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[6] https://www.transparency.org/cpi2018

[7] http://info.worldbank.org/governance/wgi/index.aspx#home

[8] http://info.worldbank.org/governance/wgi/index.aspx#home

Countries (LDC), and 13 economies in transition using the United Nations' country classification[9] and the UNCTADSTAT's[10] (United Nations Conference on Trade and Development) development status groups and composition. It is important to clarify that transition economies are countries switching from "central planning" to "free market". This has been brought following the collapse of communism in the 1980s when countries of the former Soviet Nations as Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Albania, Bosnia and Herzegovina, Belarus, Macedonia, Russia, Serbia, and Ukraine seek to adopt market capitalism by abandoning central planning (International Development Research Center, 2019).

Included in our dataset, is the presence of two LDCs: Cambodia and Ethiopia. LDCs are defined by the United Nations as countries that exhibit the lowest indicators of socioeconomic development with the lowest Human Development Index (one of our control variables) ratings of all countries in the world (United Nations, 2014), yet, they are involved in PTAs' activities that we shall discuss and study further in this text.

The remaining countries fall within developing and developed classification.

Moreover, all nations displayed marked diversities in their agreements' pursuit for a total of 1,943 agreements, some are cross regional and others are not. These pacts, stem mainly from Europe (25%), Asia (24%); and Africa (23%), the rest derive, respectively, from South America; Central America; North America; Oceania; CIS & Georgia; and the Caribbean. Further, the majority of these arrangements are Bilateral (64%) while others are Plurilateral (36%).

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[9] https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

[10] https://unctadstat.unctad.org/EN/Classifications/DimCountries_DevelopmentStatus_Hierarchy.pdf

Our database will cover all agreements notified to the GATT/WTO that were in force in 2017 with their specific ECI.

Figure 7 presents summary statistics, describes correlations among variables, and reveals several interesting aspects that helped with the selection of appropriate variables to build our model. As a start, figure 7 shows that bilateral and plurilateral agreements are highly positively correlated with total agreements, respectively, reaching 94% and 89% of correlation; this result is logical as total agreements include the sum of all agreements whether bilateral or plurilateral. For that, these variables must be used separately where bilateral and plurilateral will be selected, instead of total agreements. Second, while checking for robustness we concluded that the Economic Complexity Index (ECI) yields better results than ECI ranking. As such, we will be using the ECI solely. Third, the table proves that HDI and GDP per capita are highly positively correlated which might cause multi-collinearity problems, hence, they will not be in united in the same model. Next, GDP and GDP *per capita*, our economic control variables have not shown any high positive or negative correlation, thus GDP and GDP *per capita*, are not related mutually. An expected result as these two variables are disconnected; for countries where the population isn't growing much, the difference between GDP *per capita* growth and total GDP growth is minimal, however, for countries with rapidly growing populations, as China, reporting GDP growth can be highly misleading (Kopf, 2018). Likewise, we checked GDP with HDI which worked well, however, GDP per capita and HDI, seem to be highly correlated (78%) and as a result could not be plugged together.

Regarding political control variables, government effectiveness and corruption perception index seem to work better with the data. Our results are very strong, as we have tried several control variables in different models in order to reach this format.

Finally, independent variables suggested high correlation within one another, as some of them are made of two singular types, for instance FTA is highly correlated with FTA & EIA (71%) similarly EIA is highly correlated with FTA&EIA (78%); for that reason, we decided to test each independent variable in a unique model while including all suitable factors.

Figure 7: Correlation Table

	ecindex	ecirank	fta	eia	cu	psa	ftaeia	cueia	totala~s	bilate~l	pluril~l	classi~n	hdi	gdp	gdpcap~a	corrup~x	politi~e	goveff~s
ecindex	1.0000																	
ecirank	-0.8812	1.0000																
fta	0.6057	-0.4655	1.0000															
eia	0.5794	-0.4179	0.8777	1.0000														
cu	0.2964	-0.1811	0.6067	0.7310	1.0000													
psa	-0.1607	0.0993	-0.3276	-0.3480	-0.3842	1.0000												
ftaeia	0.7112	-0.5731	0.7088	0.7787	0.5304	-0.2086	1.0000											
cueia	0.5408	-0.4158	0.7743	0.8769	0.7532	-0.2471	0.6437	1.0000										
totalagree~s	0.7215	-0.5940	0.8408	0.8544	0.6018	-0.1026	0.9144	0.7868	1.0000									
bilateral	0.7665	-0.6138	0.8425	0.8151	0.4997	-0.1601	0.9144	0.6856	0.9383	1.0000								
plurilateral	0.5532	-0.4159	0.8295	0.9401	0.7981	-0.2496	0.8037	0.9011	0.8924	0.7885	1.0000							
classifica~n	0.5724	-0.4335	0.6137	0.7014	0.5209	-0.1468	0.7079	0.5948	0.7095	0.6932	0.6724	1.0000						
hdi	0.8042	-0.7451	0.5522	0.5170	0.2266	-0.0942	0.6554	0.4672	0.6515	0.6898	0.4917	0.4988	1.0000					
gdp	0.2683	-0.2107	-0.0201	-0.0151	-0.0730	-0.0026	0.2401	-0.0164	0.1409	0.2141	-0.0243	0.1649	0.1929	1.0000				
gdpcapita	0.7322	-0.5731	0.5188	0.4910	0.2980	-0.1969	0.6184	0.4063	0.5697	0.6325	0.4245	0.5967	0.7775	0.2285	1.0000			
corruption~x	0.7396	-0.6039	0.5415	0.5461	0.3128	-0.1685	0.6675	0.4743	0.6305	0.6812	0.4964	0.6500	0.7688	0.1971	0.8780	1.0000		
politicals~e	0.5804	-0.4838	0.4351	0.5022	0.2286	-0.1437	0.6154	0.4399	0.5594	0.5853	0.4544	0.5522	0.7018	0.0637	0.7100	0.7896	1.0000	
goveffecti~s	0.7769	-0.6740	0.4912	0.4801	0.2199	-0.1016	0.6617	0.4305	0.6213	0.7036	0.4484	0.5453	0.8070	0.2083	0.7925	0.8792	0.7783	1.0000

2.2 Multiple Regression Analysis – Results

Using multiple regression analysis, we show that the economic complexity index is associated positively with different types of trade agreements. Results of hypothesis testing appear in tables 3,4,5,6,7,8 and 9.

Starting with table 3, the pattern of results show that FTA have an important significant effect on ECI, this is explained through consistent significance of the four models, even when different control variables were plugged. Overall significance of the model (Prob > F = 0.0000 < 0.01), is optimal in all cases, and adjusted R-squared varied within 63% and 73%. With this, the following result suggests that we can explain 73% of the ECI variance with the ensemble of our variables.

The economic complexity index derives information about a country's diversity that is related to the number of products a country produces or is associated with, which is also positively correlated with a country's productive knowledge, and the extent of its product complexity (Hausmann and Hilalgo, 2010). Put in a simplest way, countries vary notably with the way they diversify their exports, represented as diversity, while products alternate with the number of nations that export them, defined as product ubiquity.

As such, it would appear that FTAs offer exporting opportunities for countries, therefore enabling export diversification and product sophistication that would reciprocally increase the ECI.

However, there are no statistically significant evidence that developed countries would benefit more from these events compared to developing ones (classification variable), as the four models show insignificant results. There are nonetheless, sufficient and significant results to show that all controls: GDP, GDP *per capita,* HDI, government effectiveness, and the corruption perception index are contributing factors that could affect a country's economic complexity and therefore its economic performance or competitiveness.

Table 3: FTA Regression

	Model I	Model II	Model III	Model IV
FTA	0.05*** (0.12)	0.05*** (0.01)	0.03** (0.01)	0.03** (0.01)
Classification	0.01 (0.18)	0.07 (0.16)	0.18 (0.15)	0.17 (0.16)
GDP	6.77E-08** (2.54E-08)	5.92E-08** (2.34E-08)	5.94E-08** (2.18E-08)	5.77E-08** (2.25E-08)
GDP/ capita	0.000** (8.97e-06)	0.000** (6.92e-06)		
HDI			4.18*** (0.87)	5.24*** (0.82)
Government Effectiveness		0.02*** (0.00)	0.01** (0.00)	
Corruption Perception Index	0.02** (0.01)			0.14** (0.00)
N	125	125	125	125
Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.6348 63.48%	0.6916 69.16%	0.7316 73.16%	0.7141 71.41%

$*p < 0.05, **p < 0.01, ***p < 0.001$ (two-tailed)

Our findings in table 4 suggest that EIAs, or more precisely, trade in services, help in determining better or increased ECI. Trade in services are growing faster than trade in goods (Guillin, 2010); suitably, international arrangements have been progressively including these matters. Discussions for such bargaining are difficult in general, particularly when complicated topics as services are in play. However, this type of service alliance is set out in our data within intra-regional trades, more precisely, in the European Union pact. A total of twenty-five EIAs have been up to now, and they all belong to the EU (28) enlargement

members' agreement, with the only expectation of Norway. In addition (Guilli, 2010) argues that other trade agreements might increase trade in services, however to a different extent: "only Economic Integration Agreements (EIAs), which covers services only, make trade grow (by 32%), while none EIAs do not boost intra-trade".

Table 4: EIA Regression

	Model I	Model II	Model III	Model IV
EIA	0.54*** (0.15)	0.52** (0.17)	0.34** (0.13)	0.33** (0.13)
Classification	-0.1 (0.2)	-0.09 (0.12)	0.13 (0.17)	0.12 (0.18)
GDP	6.60E-08** (2.59E-08)	6.39E-08** (2.33E-08)	5.36E-08** (2.21E-08)	5.63E-08** (2.28E-08)
GDP/ capita	0.000** (9.07E-06)	8.28E-06** (4.17E-06)		
HDI			4.42*** (0.87)	5.47*** (0.82)
Government Effectiveness		0.02*** (0.00)	0.01*** (0.00)	
Corruption Perception Index	0.02** (0.01)			0.01*** (0.01)
N	125	125	125	125

Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.6233 62.33%	0.7395 73.95%	0.7260 72.60%	0.7087 70.87%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

Further, hypothesis 5 that has received strong support in our findings (table 5), confirms that whenever FTAs & EIAs are in force side by side, they are likely to rise the economic complexity of a country and boost its economic performance. The models used in this study are quite successful in explaining the variability in the dependent variable: ECI (reaching 73%).

To add, this combo is remarkably popular (#1 in type selection), and holds the highest position fulfilling almost 40% of total agreements. This event is not shocking as FTAs are ranked second in position constituting 37% of the bulk. Thus, when FTAs are merged with EIA, it goes without any doubt, that this package would offer thriving, cherished and satisfying results.

Table 5: FTA & EIA Regression

	Model I	Model II	Model III	Model IV
FTA & EIA	0.05*** (0.01)	0.04*** (0.01)	0.03** (0.01)	0.03** (0.01)
Classification	-0.1 (0.19)	0.02 (0.17)	0.18 (0.16)	0.12 (0.17)

GDP	3.07E-08 (2.48E-08)	2.87E-08 (2.34E-08)	3.35E-08 (2.17E-08)	3.53E-08 (2.21E-08)
GDP/ capita	0.000** (8.81E-06)	0.000** (6.96E-06)		
HDI			4.40*** (0.87)	5.12** (0.84)
Government Effectiveness		0.02*** (0.00)	0.12** (0.00)	
Corruption Perception Index	0.02** (0.01)			0.01* (0.01)
N	125	125	125	125
Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.6448 64.48%	0.6834 68.34%	0.7254 72.54%	0.7141 71.41%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

Moving to Custom Unions (table 6), the result of our analysis, indicate that there is no statistically significant evidence to support hypothesis (H3) regarding a positive relationship between custom unions and ECI. However, when combined with EIAs, this assortment suggests that EIAs & CUs could potentially increase diversity and ubiquity, two determinants of the ECI.

Our models' significance affirms the robustness of our results even when tested in different configurations.

Hence, countries actively participating in custom unions arrangements that are merged with negotiations including services seem to benefit to a greater extent than countries that do not. The initiation of a common external tariff vis-à-vis third parties appear to award participants with an intimate relationship leading to better economic performances. Additionally, this result is not surprising as CUs manifest their importance by being listed 3rd in countries selection, thus, when adding the benefits of a service agreement (EIAs) to CUs, results are boosted.

Measuring this variable on four different scales, verified again, that GDP, GDP *per capita*, HDI, corruption perception index and government effectiveness' persistence in affecting the ECI.

Table 6: CU Regression

	Model I	Model II	Model III	Model IV
CU	0.04 (0.06)	0.06 (0.06)	0.06 (0.05)	0.05 (0.05)
Classification	0.26 (0.2)	0.27 (0.18)	0.3** (0.16)	0.3* (0.17)

GDP	4.93E-08* (2.17E-08)	4.40E-08** (2.48E-08)	4.49E-08** (2.24E-08)	4.72E-08** (2.30E-08)
GDP/ capita	0.000** (9.55E-06)	0.000** (7.32E-06)		
HDI			4.92*** (0.86)	5.95*** (0.81)
Government Effectiveness		0.03*** (0.00)	0.01*** (0.00)	
Corruption Perception Index	0.03** (0.01)			0.15** (0.01)
N	125	125	125	125
Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.5828 58.28%	0.6514 65.14%	0.7133 71.33%	0.6961 69.61%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

Table 7: CU & EIA Regression

	Model I	Model II	Model III	Model IV
CU & EIA	0.22*** (0.06)	0.2*** (0.05)	0.14** (0.05)	0.14** (0.05)

Classification	0.001	0.06	0.19	0.16
	(0.19)	(0.17)	(0.15)	(0.17)
GDP	6.19E-08**	5.38E-08**	5.12E-08**	5.43E-08**
	(2.56E-08)	(2.36E-08)	(2.19E-08)	(2.25E-08)
GDP/ capita	0.000**	0.000**		
	(9.23E-06)	(7.01E-06)		
HDI			4.48***	5.47***
			(0.86)	(0.81)
Government Effectiveness		0.02***	0.01***	
		(0.00)	(0.00)	
Corruption Perception Index	0.02**			0.01**
	(0.01)			(0.01)
N	124	124	124	124
Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.6282	0.6845	0.7276	0.7113
	62.82%	68.45%	72.76%	71.13%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

Unfortunately, we were not able to support hypothesis 4, by showing that partial scope

agreements indicate a significant and negative relationship with ECI (table 8).

Table 8: PSA Regression

	Model I	Model II	Model III	Model IV
PSA	-0.02	-0.04	-0.05	-0.04

	(0.05)	(0.04)	(0.04)	(0.04)
Classification	0.31* (0.18)	0.35** (0.16)	0.38** (0.13)	0.36** (0.15)
GDP	4.67E-08* (2.67E-08)	4.00E-08 (2.44E-08)	4.11E-08* (2.20E-08)	4.42E-08* (2.26E-08)
GDP/ capita	0.000** (9.59E-06)	0.000** (7.41E-06)		
HDI			4.96*** (0.86)	5.99*** (0.81)
Government Effectiveness		0.03*** (0.00)	0.01*** (0.00)	
Corruption Perception Index	0.03** (0.01)			0.01* (0.01)
N	125	125	125	125
Prob > F	0.0000	0.0000	0.0000	0.0000
Adjusted R-squared	0.5821 58.21%	0.6502 65.02%	0.7142 71.42%	0.6971 69.71%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

Regarding control variables, no support was received regarding countries' classification (developing, developed, etc.). While on the other side, political indicators (CPI & Government effectiveness) together with economic indicators *(GDP, GDP per capita, and HDI)* were totally approved significantly.

Finally, table 9 proves that bilateral and multilateral trade agreements, both generate opportunities with reference to the ECI. Therefore, nations' decision on selecting to engage in agreements that include two or more members would yield identical consequences regarding ECI increase. While both choices are available, sometimes plurilateral pacts are hard to be formed, as things get more complicated every time the round gets bigger (Amadeo, 2019). Though, once negotiated, they are all-powerful, reaching a wider geographic area that grants a greater competitive advantage to signatories. To add, the coefficients associated with bilateral and plurilateral agreements are significant at 1% confidence with a p-value of 0.000 in both cases; also, the plurilateral coefficient display a tiny difference in result (coefficient 0.05) that is obviously disregarded.

Lastly, hypothesis (H7) is rejected, which means multilateral agreements do not yield greater benefits for Economic Complexity than bilateral agreements do.

Table 9: Bilateral v/s Plurilateral Regression

	BILATERAL	PLURILATERAL
Coefficient	0.06*** (0.01)	0.05*** (0.01)
Classification	-0.13 (0.17)	-1.2 (0.2)

GDP	3.29E-08 (2.31E-08)	6.57E-08** (2.56E-08)
GDP/ capita	0.000** (8.25E-06)	0.000** (9.01E-06)
HDI		
Government Effectiveness		
Corruption Perception Index	0.01 (0.01)	0.02** (0.01)
N	125	125
Prob > F	0.0000	0.0000
Adjusted R-squared	0.6880 68.80%	0.6297 62.97%

*p <0.05, **p<0.01, ***p<0.001 (two-tailed)

6. DISCUSSION AND CONCLUSION

We conducted this study with the objective of shedding light on how trading factors or country's engagement in trade agreements affect a nation's economic performance and competitiveness.

Unlike prior studies, which have focused solely on the role of economic factors as GDP or human capital and the crucial aspect they give when linked to an economy's development and growth; we argued that these factors are important in determining a country's economic improvement but are not sufficient in considering the complexity of a nation. Taking economic complexity and productive space dynamics into account allow us to reveal structural linkages between economic complexity and trade pacts. Our empirical evidence document a strong and robust interrelation between the ECI and trading agreements. Using multivariate regression analysis, we confirmed that this relationship is fierce even when controlling for measures of multiple trading alliances. Our results show that the effects of PTAs on the competitiveness of a nation vary according to agreements' type.

Correspondingly, hypothesis 1 and 5 received strong support, two leading arrangements: FTA and FTA & EIA that represent 77% of total agreements notified to the WTO, indicated that engaging in such accords is highly and positively associated with the economic complexity of a country. This result was predicted as FTAs allow for many opportunities and favorable circumstances such as increased economic growth, more dynamic business climate, lower government spending, foreign direct investment, expertise, technology transfer, to name but a few (Amadeo, 2019). These notions revolve around theories asserting that: "An economy's capacity to diversify is given by its technology" (Inoua, 2016), therefore directly related to a country's economic complexity, that is based on its level of product diversity and ubiquity.

Similarly, Economic Integration Agreement (EIA), which is the only type of agreement available when countries negotiate on services, is highly supported by our results, confirming its positive association with ECI. Consistent with our predictions, trade in services has been

on a substantial positive trend since the last decades, one of the reason behind is illustrated by (Guillin, 2010): "even if the RTAs has been in force since several years, if services are kept aside in the agreement, trading ties do not lead to increase trade in services, except if an agreement on services is signed later". Other authors as well, such as Baier & Bergstrand proved that: "a typical EIA increase two members' aggregate goods bilateral trade about 100 percent after 10 – 15 years" (Bergstrand, Larch and Yotov; 2013).

Next, we note that coefficients of PSAs and CUs are not significant throughout our analysis in having positive association with ECI. However, when merging CUs with EIAs, the theory holds opposite outcome and gets full support by our results. Connecting CUs & EIAs to ECI (hypothesis 6), was based on the premise that sharing common policies with third parties, through custom unions, would allow for increased confidence that would reciprocally achieve augmented trades within members, resulting in diversity and know-how accumulation, thus leading to the ECI's increase, especially when services (i.e. EIAs) are included.

To this end, more and more services are being included in agreements, and when combining both types of EIAs & CUs together to form one single alliance that covers mutually shared policies and services, this would undoubtedly yield the exact same booming outcome.

Lastly, previous studies (Couillard and Turkina, 2015) showed that multilateral arrangements yield superior benefits, while exploring the effects related to the dairy sector, a single sector. Yet, our study covers competitiveness of the whole economy in which this hypothesis did not find support. Multilateral agreements do not seem to have stronger effects on a country's economic complexity index, which is in reconciliation vis-à-vis our previous literature and

data showing that 64% of total agreements correspond to bilateral pacts and only 36% are equivalent to multilateral deals.

As for the level of development, world trade agreements' presence have continued to accelerate over time and have become even more broad. This continuing trend in PTAs' participation was predictable as more and more countries were approaching government policies that attempt to achieve development through free trades and unrestricted movement of labor and capital, an: "outward oriented development". The latter has resulted in robust financial improvement for these nations that in return has encouraged others who previously followed inward oriented policies or protectionist strategies to shift. As follows, developing countries have participated heavily to ongoing PTAs activities, and their contribution have progressed from constant rise in preferential agreements with developed nations to an accelerated motif within developing nations. Also, development of countries of the Global South has helped the integration of least developed countries (LDCs) through a South-South cooperation by exchanging resources, technology and knowledge within the regional collection and later into the exporting movement (Nagel, 2017). An event that has consequently supported the potentiality of developing countries to bargain when facing multilateral trading bargaining. As such, the more "deep" agreement were, the better effect they had on trades (WTO, 2011).

See Appendix A1, A2, A3, and A4 for further information on PTAs evolution.

To this end, our analysis have implications for policymakers, government, trade commissioners, politicians and other fields within a country's administration. International success, today, is a dynamic process resulting from continued development of products and

processes. These forces are the ones that guide firms (representing countries) to undertake in such activities and thus become central to international competition. The key dimensions or distinctive issues of how a company competes are related to its configuration, i.e. where in the world each activity in the value chain is performed, and to its coordination, meaning how activities are coordinated within one other. Thus, many linkages connect tasks, not only within their activities but also within their supplies channels that become crucial to a company's competitive advantage. To add, "Market presence in many countries and some export and import of components and end products are characteristic of most global industries. High levels of foreign investment or the mere presence of multinational firms are not reliable measure […]" (Porter, 1986). As such, understanding the characteristics of global strategies enable countries to call governments to promote the concentration of activities by providing subsidies or other forms of incentives, clearly pointing to government's decision on expanding their presence in trade agreements around the world. Domestic forces whether political, economic, social or related to other institutional laws may facilitate or hamper openness and improvements, measured through PTAs in our paper, that would consequently have an effect on a nation's performance.

The level of universal trade is necessary but insufficient by itself, due to its inability to capture the nature of these international linkages. For this reason, the approach adopted in this paper focused on gathering data on trading agreements' activeness and literature by supplementing it with economic complexity findings conductive to prove how increased openness and rise of trade agreements have helped nations gather knowledge, expertise and know-how. This in return, enabled the increase of their complexity delegated with an economic complexity index (ECI) comparable for each country and based on their level of product diversity and ubiquity. Therefore, the motivation to join world trade agreements,

intra-regional trades, or multilateral trades is vital to assist a nation's prosperity using access to a bigger portion of the world, an enormous universal network, better economic performance and increased competitiveness.

Finally, our results suggest that policymakers should be caution when selecting specific types of arrangements as they yield different outcomes. In this light, people in charge should align their national and international policies with the best infusing of trade negotiations.

A limitation of our study is that our results only include countries that hold an economic complexity index. Yet, our findings do not mean that productive structures or economic complexity solely determine a country's level of competitiveness or economic performance. On the contrary, there are obviously several variables that should be considered and studied thoroughly, however, our goal for this search was limited to world trade agreements precisely, compared with their effects on ECI. Of course, much more theoretical work needs to be done on the complex relationships between economic complexity, institutions, and government decision to adhere different arrangements. For instance, there is a need for more research on the importance of nations being/or not being members of WTO, being part of an RTA previously, etc. Finally, the whole notion of globalization being split within trades, foreign direct investments, or multinational enterprises require further classification and research.

More in-depth case studies are also required, to show for example a country that has developed in complexity but not in competence or vice versa. Despite the limitations, using linear regression and concrete data, we were able to capture significant information about nations' path of economic development that goes beyond aggregated factors like GDP or

HDI. In sum, our findings strongly suggest that countries entering progressively world trade agreements tend to have significantly higher economic complexity index and thus better performance.

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APPENDIX A1

The different types of agreements through years (evolution) Using Point graphs

Starting around 1950 and through the years, Free Trade Agreements were the most popular categories. Beginning 2000, a merge between Free Trade Agreement & Economic Integration Agreement was becoming preeminent. Economic Integration additionally includes the reduction or elimination of trade barriers for the coordination of monetary and fiscal policies. However, when unaccompanied, Economic Integration Agreement was not attractive with only two activities around the year of 2000. Yet when mixed with Customs Unions, this accord lead to a more active performance from 1960 till 2000. As for Partial Scope Agreement together with Customs unions, both were mobile and regularly functioning in general.

(Please note PTA in this article, refers to any reciprocal trade agreements between two or more partners.)
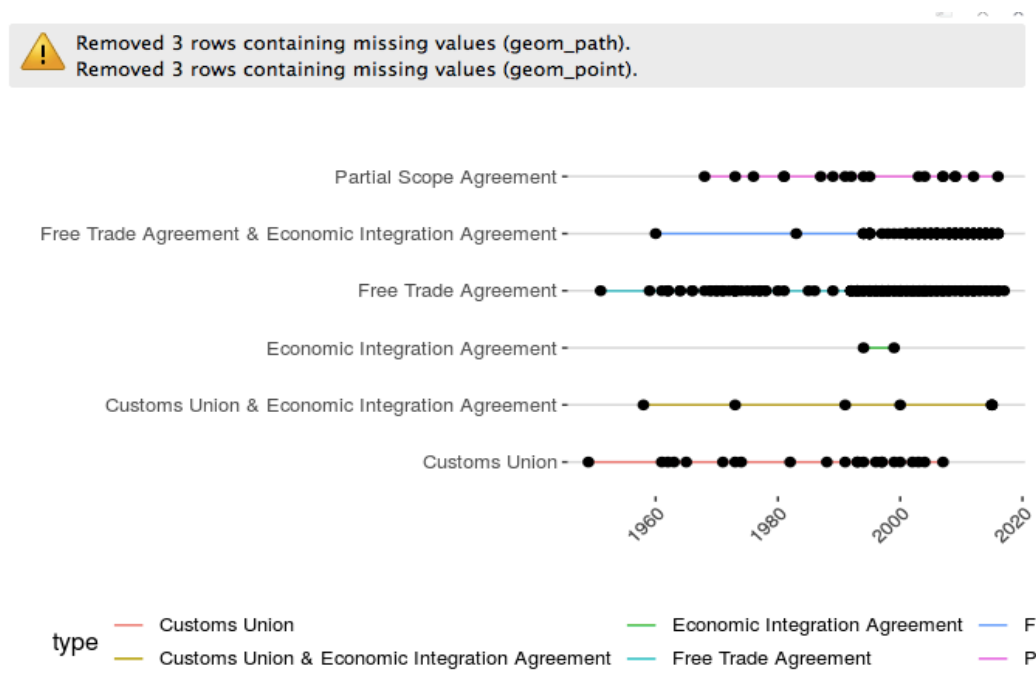
APPENDIX A2

<u>The different types of agreements through years (evolution)</u>
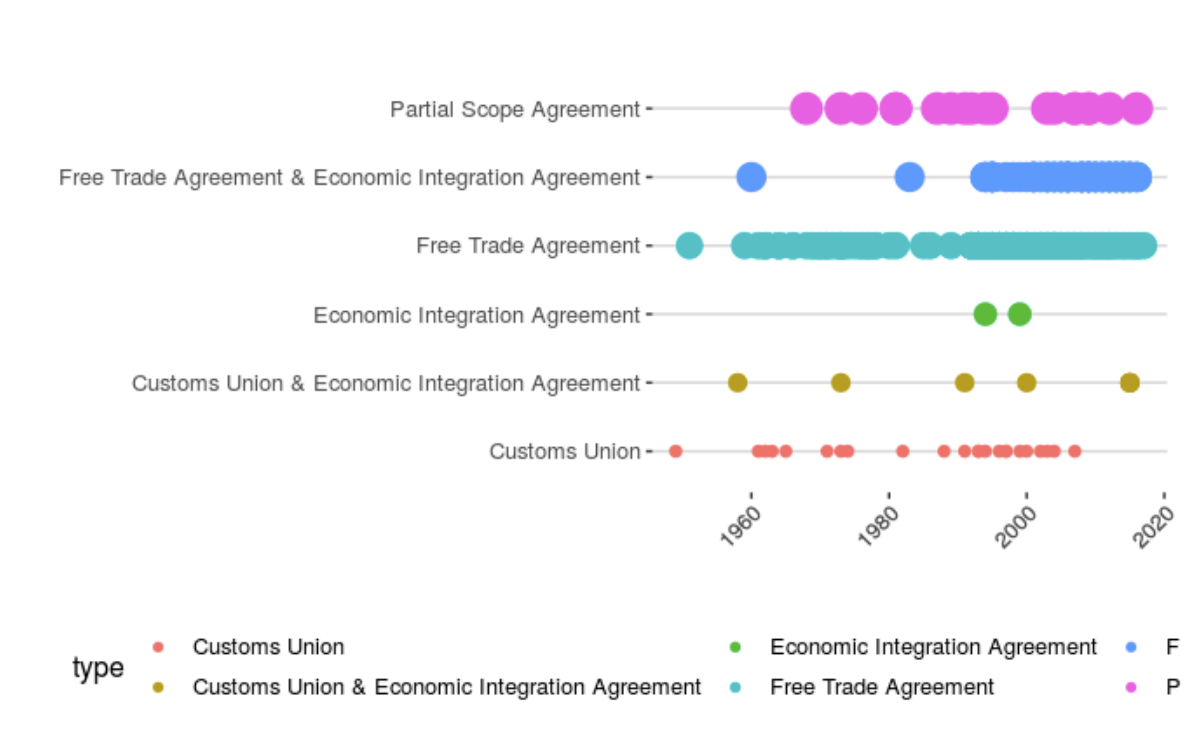
APPENDIX A3

Number of words per type of PTA

As a first step, it was essential to look at treaty length whether by type or through years, this progression or change in agreements would allow further distinction leading to the understanding of content's designs.

To begin, Free Trade Agreements are wordier than any other treaty, hence, whenever combined with any other type as Economic Integration Agreement it would clearly constitute the most extended accord. On the other side, partial scope agreement together with customs union, were on average moderate and stagnating in increase. Whereas others, as mentioned earlier FTA plus economic integration agreement or FTA on their own, were not only the most lengthy but they were constantly increasing over the years. Finally, Partial scope agreement were represented with the least rambling contracts.
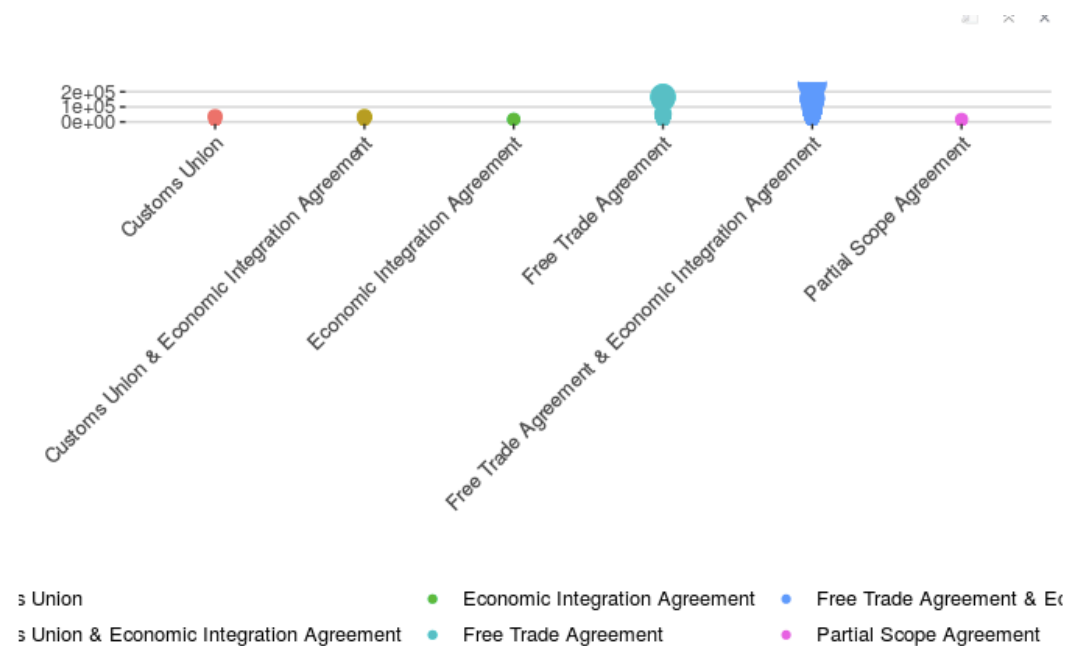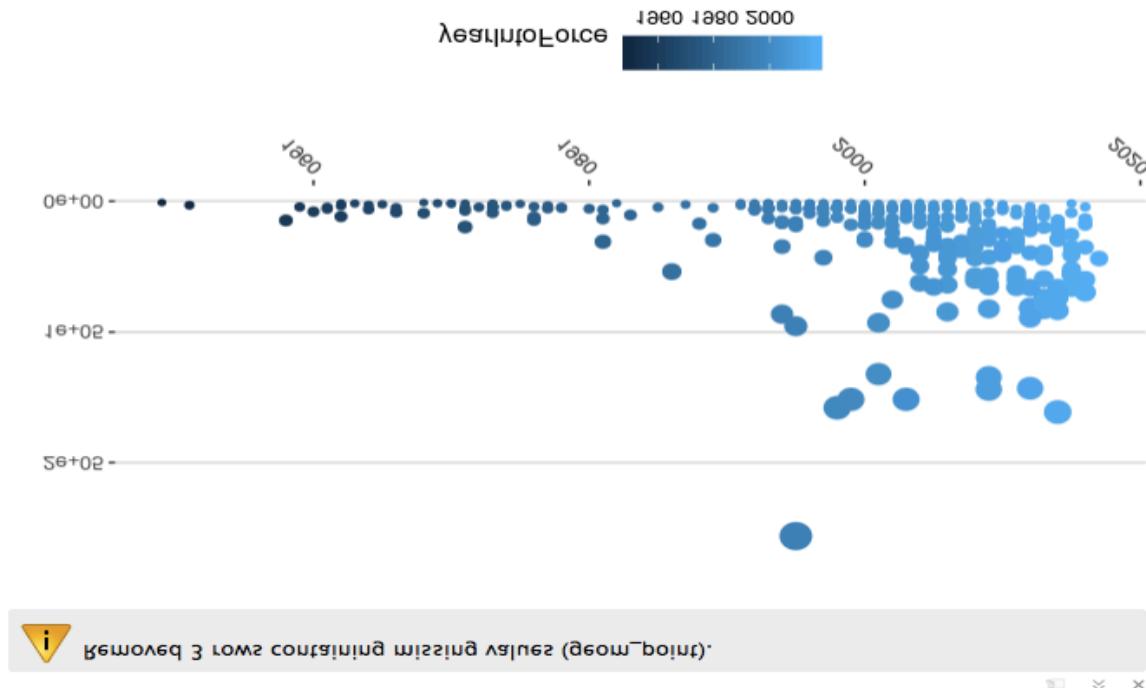
APPENDIX A4

<u>Number of words through the years</u>

It was clearly noticeable that treaty length measured through word counts has been increasing by more than tenfold through the years. When contrasting length, around 65 years is elapsed differentiating each portion from another. Starting with the bilateral free trade & economic integration agreement: Colombia-Mexico that was put into force in 1955 but signed in 1994, a total of 256,204 words are reported making it the most lengthy one. The latter is written in Spanish and encompass South & North America, thus a Bilateral one. On the other extreme, the Economic & Monetary Community of Central Africa (CEMAC) that includes the Cameroon, the Central African Republic, the Congo, the Equatorial Guinea, and the Gabon represents the shortest customs unions agreements put into force in 1999, written in French, plurilatetral, and not cross regional with only 697 words.

This increase in length was due mainly by virtue of longer trade agreements specifically the wordier Free Trade Agreements that began to expand beginning early 2000s.

The importance of analyzing agreement's length is that the latter could reveal few treaty contents. However, although words computation does provide us with beneficial information regarding design deviations, they unfortunately do not capture any diversity in all PTAs.

APPENDIX A5

The following countries are included in our analysis:

A- Albania, Algeria, Angola, Argentina, Australia, Austria, Azerbaijan

B- Bangladesh, Belarus, Belgium (Missing ECI for 2017), Bolivia, Bosnia and Herzegovina,
Botswana (Missing ECI for 2017), Brazil, Bulgaria

C- Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire,
Croatia, Cuba, Czech Republic

D- Denmark, Dominican Republic

E- Ecuador, Egypt, El-Salvador, Estonia, Ethiopia

F- Finland, France

G- Gabon, Georgia, Germany, Ghana, Greece, Guatemala, Guinea

H- Honduras, Hong Kong, Hungary

I- India, Indonesia, Iran, Ireland, Israel, Italy

J- Jamaica, Japan, Jordan

K- Kazakhstan, Kenya, Kuwait, Kyrgyzstan

L- Laos, Latvia, Lebanon, Liberia, Libya, Lithuania

M- Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique

N- Namibia (missing ECI Rank for 2017), Netherlands, New Zealand, Nicaragua, Nigeria, Norway

O- Oman

P- Pakistan, Panama, Papa New Guinea, Paraguay, Peru, Philippines, Poland, Portugal

Q- Qatar

R- Republic of the Congo, Romania, Russia

S- Saudi Arabia, Senegal, Serbia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria

T- Tajikistan, Tanzania, Thailand, Togo (missing ECI Rank for 2017), Trinidad &Tobago, Tunisia, Turkey, Turkmenistan

U- Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan

V- Venezuela, Vietnam

Y- Yemen

Z- Zambia, Zimbabwe

APPENDIX A6

Economic Complexity Index Ranking – 2017

Retrieved from https://atlas.media.mit.edu/en/rankings/country/eci/

1-	Japan	56-	Poland
2-	Switzerland	57-	Canada
3-	Germany	58-	Malaysia
4-	Singapore	59-	Estonia
5-	Sweden	60-	Russia
6-	South Korea	61-	Spain
7-	United States	62-	Saudi Arabia
8-	Finland	63-	Belarus
9-	Czech Republic	64-	Romania
10-	Austria	65-	Thailand
11-	United Kingdom	66-	China
12-	Slovenia	67-	Lithuania
13-	Ireland	68-	Latvia
14-	France	69-	Croatia
15-	Hungary	70-	Brazil
16-	Slovakia	71-	Hong Kong
17-	Israel	72-	Ukraine
18-	Netherlands	73-	Serbia
19-	Denmark	74-	Philippines
20-	Italy	75-	Panama
21-	Mexico	76-	Kuwait

22- Norway

23- Bosnia And Herzegovina

24- India

25- Bulgaria

26- South Africa

27- Portugal

28- Costa Rica

29- Argentina

30- Uruguay

31- Turkey

32- Colombia

33- United Arab Emirates

34- Greece

35- Zambia

36- Senegal

37- Mauritius

38- Peru

39- Guatemala

40- Vietnam

41- Azerbaijan

42- Venezuela

43- Paraguay

44- Tajikistan

45- Cote D'Ivoire

46- Ghana

77- Kazakhstan

78- Australia

79- Lebanon

80- Chile

81- Trinidad and Tobago

82- Georgia

83- Oman

84- Jordan

85- Iran

86- Jamaica

87- Kyrgyzstan

88- Tunisia

89- Macedonia

90- Indonesia

91- Egypt

92- El Salvador

93- Dominican Republic

94- Cuba

95- Moldova

96- Uganda

97- Turkmenistan

98- Gabon

99- Mozambique

100-   Laos

47- Angola

48- Nicaragua

49- Cambodia

50- Sudan

51- Madagascar

52- Guinea

53- Bangladesh

54- Nigeria

55- Papa New Guinea

101-   Ethiopia