

# Preferential Trade Agreements and Global Value Chains

Theory, Evidence, and Open Questions

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## Abstract

Preferential trade agreements today are more numerous and deeper than they were a quarter century ago. Do deep agreements promote countries' integration into global value chains? What are the economic mechanisms? How do countries choose their trade agreement partners? Would the undoing of deep agreements disrupt global value

chains? What is the outlook for trade agreements and global value chains going forward? This paper reviews the small but growing literature on the role of deep agreements as the institutional underpinnings of global value chains. It discusses the available evidence and theoretical arguments, providing directions for future research in this area.

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**Preferential Trade Agreements and Global Value Chains:  
Theory, Evidence, and Open Questions<sup>1</sup>**

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## 1. Introduction

Two phenomena have characterized the trade and trade policy landscape since the early 1990s. On the trade side, the rise of Global Value Chains (GVCs), i.e., the de-nationalization of production, has changed the nature of international trade. For instance, trade in parts and components increased by close to six times between 1990 and 2015 (more than other forms of trade, which increased by a factor of 4.5). On the policy side, Preferential Trade Agreements (PTAs) are increasing in number and deepening in content.<sup>3</sup> The number of PTAs surged from 50 in 1990 to close to 280 in 2015. New data collected by the World Bank document that these agreements are also “deepening” in the sense that they cover an expanding set of policy areas well beyond the traditional focus of PTAs, such as investment and competition policy.

The aim of this paper is to analyze the relationship between preferential trade agreements, particularly “deep” PTAs, and global value chains. Specifically, the goal is to answer seven policy-relevant questions:

- i) How have PTAs evolved over time?
- ii) Why do countries sign PTAs in a world with global value chains?
- iii) Do PTAs increase GVC integration?
- iv) Would the undoing of PTAs affect GVCs?
- v) How does the content of PTAs impact GVC trade?
- vi) How do GVCs affect the choice of PTA partners?
- vii) What is the outlook of the GVC-PTA relationship going forward?

This paper contributes to the large literature on preferential trade agreements (e.g. Limao, 2016) in different ways. First, based on new World Bank data, I document how PTAs have deepened over time and how this evolution is associated to the rise of GVCs. Second, I review the theoretical literature on the rationale for the GVC-PTA relationship and outline several avenues for future research. Third, I discuss recent empirical research suggesting that deep agreements boost GVC integration, and showing how this impact differs across country groups. Finally, I present a simple framework to help us think about the GVC-PTA relationship going forward.

While more work in this area is needed, several findings emerge from this review. New data on the content of trade agreements and on participation in global value chains point to a strong positive correlation, with deeper agreements associated to more intense GVC relationships. Economic theory identifies several reasons for this relationship, ranging from the need to internalize cross-border policy spillovers to the benefits of stronger commitments in policies that affect GVC participation. Econometric analysis confirms that deep PTAs boost participation in global value chains, suggesting that trade agreements can be an effective tool for policy makers to anchor national producers to global and regional production processes. Going forward, the

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<sup>3</sup> In this paper, the term “preferential trade agreements” will be used rather than the term “regional trade agreements (RTAs)” since some of these agreements are not necessarily between countries within the same region or in regional proximity.

future of the GVC-PTA relationship will crucially depend on continuing trust in the willingness of other partners to preserve an open trading system.

The rest of the paper is organized as follows: Section 2 documents the evolution of preferential trade agreements. Section 3 focuses on GVCs and the rationale for (deep) PTAs. Section 4 studies the impact of trade agreements on GVCs. Section 5 focuses on how the exit of the UK from the EU (Brexit) may impact UK-EU GVCs. Section 6 investigates how the content of PTAs affects GVCs. Section 7 addresses the question of the choice of PTA partners in a GVC context. Section 8 speculates on the future of PTAs and GVCs. Concluding remarks follow.

## **2. Evolution of Preferential Trade Agreements<sup>4</sup>**

The number of preferential trade agreements has increased dramatically in the last quarter century. Fifty trade agreements were in force and notified to the WTO in 1990. The number was 279 at the end of 2015. This dramatic change has spurred a large debate among researchers and policy makers on the rationale for preferential arrangements, their impact on trade flows, growth and welfare of member and non-member countries, and their relationship with the broader system of global trade governance. A large body of literature has been devoted to investigate these and other issues.<sup>5</sup> In this section, I present new evidence on the evolution of PTAs as a basis for a discussion on the relationship between trade agreements and global value chains.

An often overlooked factor in the literature on trade agreements is that, alongside their increasing number, the content of PTAs has changed over time. While before the 1990s trade arrangements mostly involved tariff reductions, more recent PTAs include a set of provisions covering policy areas that go well beyond that. Specifically, two recent studies (Horn, Mavroidis and Sapir, 2010; WTO, 2011) document how several trade agreements cover regulatory issues such as services, intellectual property rights protection, investment, competition policy and others. Building on the methodology developed in these studies, Hofmann, Osnago and Ruta (2017) collected information for all preferential trade agreements in force and notified to the WTO in 2015. Their new database contains information on the inclusion and legal enforceability of 52 policy areas in 279 PTAs among 189 countries.<sup>6</sup>

Some novel stylized facts emerge from an analysis of the new data on PTAs. First, the database can inform on the changing content of PTAs. Figure 1 reports the evolution in the cumulative number of preferential agreements over time (the solid line) and the number of policy areas that are covered by newly signed agreements in each year (the shades of color in the histograms). As

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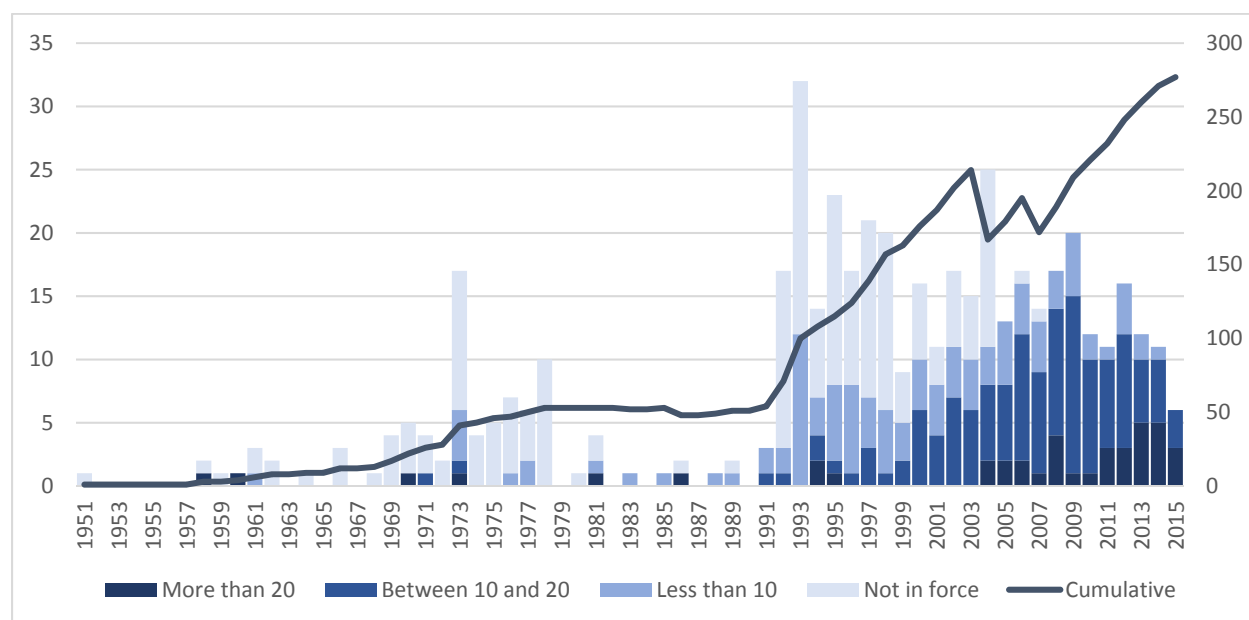
<sup>4</sup> This section draws on Hofmann, Osnago and Ruta (2017).

<sup>5</sup> See Freund and Ornelas (2010), WTO (2011) and Limao (2016) for recent surveys of the literature on preferential trade agreements.

<sup>6</sup> This database offers the most comprehensive and up-to-date data available in terms of the number of trade agreements, countries, and policy areas covered. The database is freely available on the World Bank website at <http://data.worldbank.org/data-catalog/deep-trade-agreements>.

the figure shows, a growing number of trade agreements covers a large set of policy areas (more than 20) the majority of newly signed PTAs covers between 10 and 20 policy areas; and it is only a minority of PTAs that focus on few issues (less than 10 policy areas).

Figure 1: The number and content of PTAs



Second, the new database allows to look in detail at the content of trade agreements. In addition to tariff reductions, more than half of the PTAs in the database include legally enforceable regulations on some policy areas that fall under the current mandate of the WTO (Figure 2). These provisions, referred to as “WTO plus” or “WTO+” in the literature, include areas such as customs regulations, export taxes, anti-dumping, countervailing measures, technical barriers to trade (TBT), sanitary and phytosanitary (SPS) standards. Provisions outside the WTO mandate (usually called “WTO extra” or “WTO-X”) include a wide-ranging set of policy areas from investment to environmental laws, to nuclear safety. The extent to which these provisions are included in PTAs and whether they are legally enforceable or not varies widely by policy area (Figure 3).

PTA provisions may also be disaggregated in different ways depending on the specific question under investigation. Following Hofmann et al. (2016), I divide PTA provisions into “core” versus “non-core”. Core provisions are the ones that the literature identifies as more meaningful from an economic point of view (e.g. Baldwin, 2008; Damuri, 2012) and include the set of WTO+ provisions and four WTO-X (competition policy, investment, movement of capital and intellectual property rights protection). As the figures show, along with WTO + provisions, the four core WTO-X policy areas are the provisions that appear more frequently in PTAs. Almost 90 percent of

agreements include at least one of the "core" WTO-X provisions and one-third of PTAs include all "core" WTO-X provisions.

Figure 2: WTO “plus” policy areas in PTAs

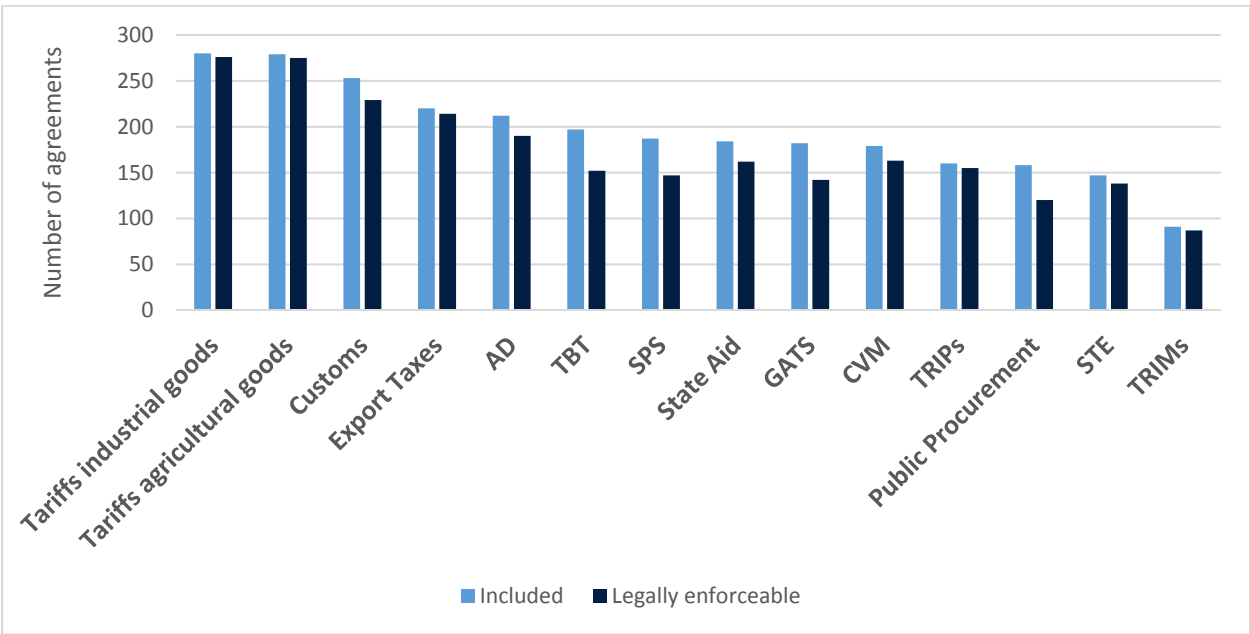
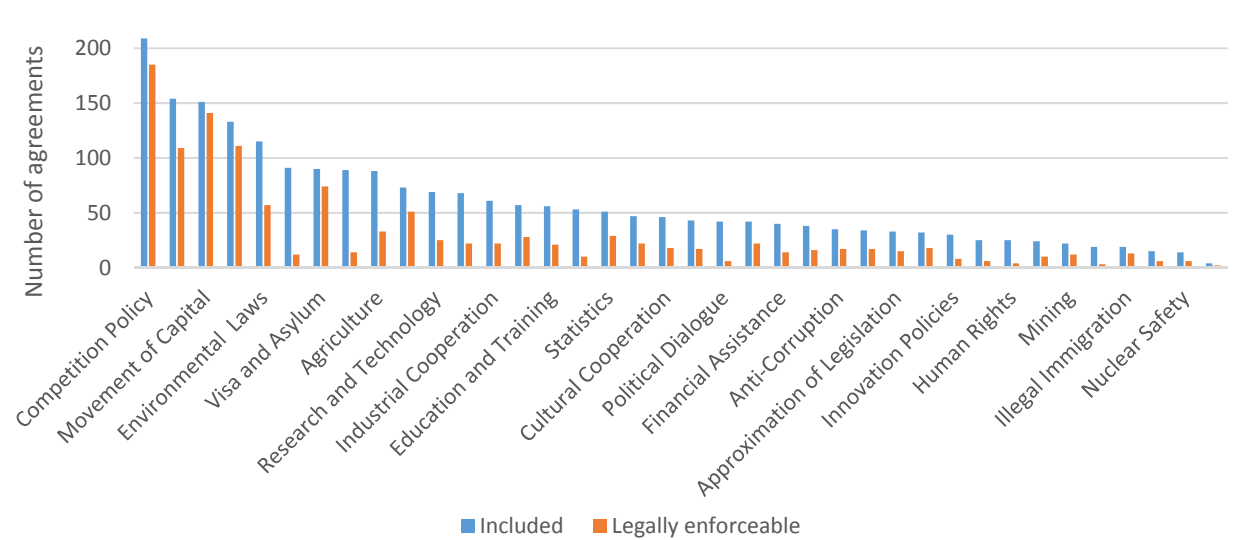


Figure 3: WTO “extra” policy areas in PTAs



Third, the data can inform on the changing depth of preferential trade agreements. Hofmann et al. (2017) construct synthetic indexes of “horizontal” depth, which measure the coverage of policy areas in PTAs. The first index of depth, referred to as “total depth”, is the simple count of (legally enforceable) provisions included in a PTA. Total depth increased from an average of around 8 in the 1990s to more than 17 in the last 5 years. An index of “core depth” can be constructed in a similar way by counting how many core provisions are included and legally enforceable in a PTA. Core depth increased from around 7 in the 1990s to almost 14 in the period 2010-2015. Finally, Principal Component Analysis (PCA) can be used to obtain a third index of depth, referred to as “PCA depth”, that accounts for most of the variability in the data. PCA depth increased from around 1 in the 1990s to 2.8 in the 2010-2015 period.

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

### **3. GVCs and the Rationale for Trade Agreements**

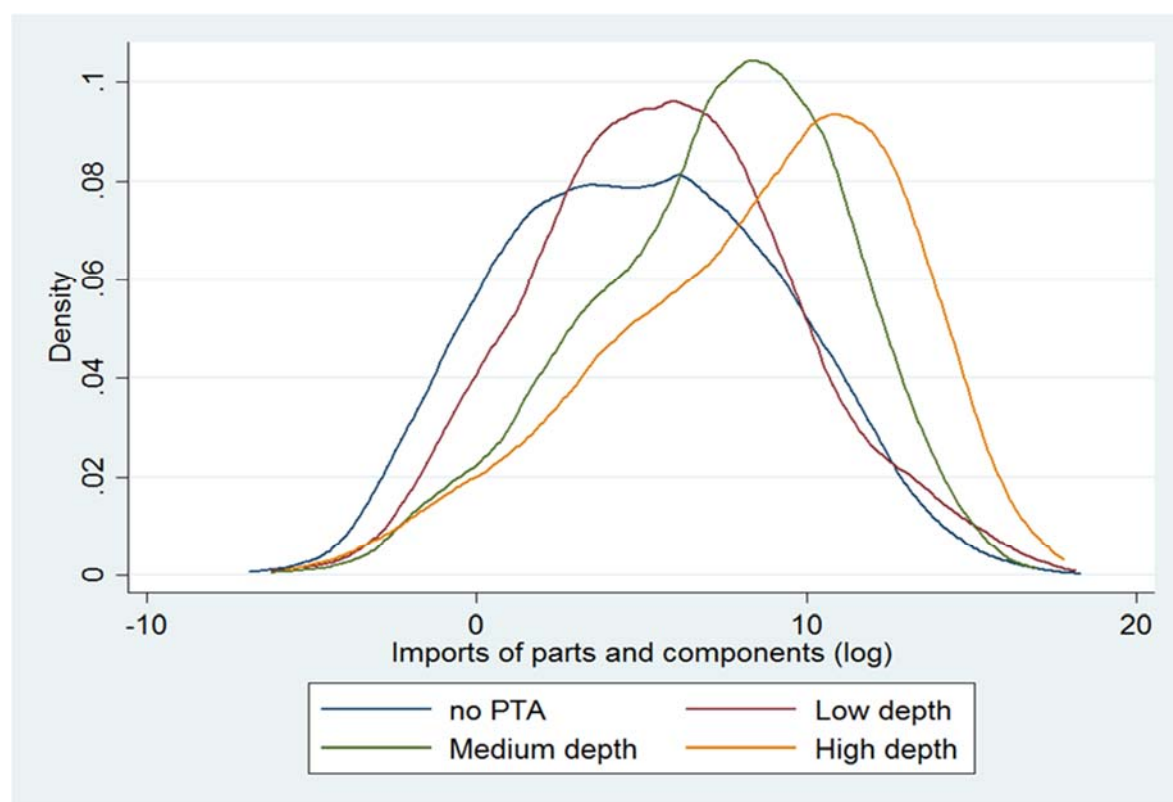
In this section, I look at the rationale for trade agreements, particularly “deep” agreements, in a world with global value chains. There is a large literature that studies the motives for trade policy cooperation and the design of trade agreements in a traditional setting where production is not fragmented internationally.<sup>7</sup> The focus of this literature is generally on cooperation on tariffs, consistently with the idea that the main problem that trade agreements solve is to internalize the terms-of-trade externality created by unilateral tariffs. But as Figure 4 shows, there is a positive correlation between GVC trade (measured as trade in parts and components) and the “depth” of trade agreements (measured by the number of policy areas covered by the agreements). This relationship indicates that the rationale for trade agreements in the context of global value chains may be more complex than in settings where production is not fragmented internationally.

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<sup>7</sup> See Maggi (2014), Bagwell, Bown and Staiger (2015), Bagwell and Staiger (2016) and Grossman (2016) for recent reviews.



Figure 4: Depth of PTAs and GVC trade



Lawrence (1996) introduced the notion of “shallow” and “deep” trade agreements. Shallow agreements are defined as those PTAs that focus on tariffs and other border measures that directly affect market access. Economic theory and evidence suggests a relationship between cross-border production and shallow PTAs. For instance, Blanchard and Matschke (2014) estimate that a 10% increase in U.S. foreign affiliate exports to the U.S. is associated with a 4 percentage points increase in the rate of preferential duty-free access. Intuitively, firms that produce offshore are more likely to lobby for lower tariffs on the products re-imported in the U.S. market. Similarly, domestic firms may choose to locate production stages in another PTA member under the expectation that tariffs on re-imported goods will be lower.

Deep agreements are those PTAs that go beyond traditional market access issues and include disciplines such as investment, competition policy or the harmonization of product regulations. The new empirical evidence on the relationship between PTA depth and GVC trade is the core of the next sections. Here, I discuss this relationship from a theoretical point of view (Antras and Staiger, 2012; Baldwin, 2008; WTO, 2011; Ederington and Ruta, 2016). A simple way to explain the correlation in Figure 4 is that certain behind the border policies need to be disciplined in trade agreements for GVCs to operate efficiently. First, the unbundling of stages of production across

borders creates new forms of cross-border policy spillovers beyond the traditional terms-of-trade externality. Second, governments may face credibility problems with respect to behind the border measures in the context of GVCs. Third, the costs created by coordination externalities (e.g. the costs of heterogeneous regulations) may be higher in the presence of cross border production. These spillovers and credibility concerns generate a demand for deeper forms of integration.

Despite the rich set of arguments that are present in the literature, many aspects of the relationship between deep PTAs and GVCs have not been incorporated in formal models. First and foremost, the fundamental question of the role that deep agreements play in the presence of GVCs has not been rigorously investigated. For instance, Antras and Staiger (2012) show that behind the border policies create cross-border spillovers when production is internationally fragmented. While they indicate that deep provisions in PTAs may allow governments to internalize these externalities, the model does not provide a formal treatment of this point. Similarly, the commitment rationale for deep agreements has only been formalized for specific provisions (e.g. domestic subsidies in Brou and Ruta, 2013), and this has not been done in a GVC context. Finally, papers that study the harmonization of standards and other forms of regulatory cooperation (e.g. Costinot, 2008) generally rely on traditional trade models that assume that production is purely national.

Several other interesting questions are open and would constitute important avenues for future research. A first set of questions relates to the content of deep agreements. A large trade literature has recently investigated the role of institutions in shaping the international organization of production (Antras, 2015). Osnago et al. (2015) find evidence that the content of deep PTAs affects FDI decisions, suggesting that the role of specific provisions in shaping GVCs may be relevant. But more work is needed to understand the specific channels. A second area relates to the role of preferential as opposed to multilateral deep integration. Why is deep integration generally taking place in PTAs? How are PTA partners selected in a GVC context? I will elaborate on these questions in Section 7.

#### **4. Do Deep Agreements Promote GVCs?<sup>8</sup>**

The relationship between GVCs and PTAs runs in both directions. An important question from a policy perspective is to which extent trade agreements, and particularly deep PTAs, can boost GVC integration. Osnago, Rocha and Ruta (2016) use a gravity model to empirically investigate this question. The analysis exploits the new World Bank data on the content of PTAs described in Section 2. Bilateral GVC integration is measured in two ways: trade in parts and components and value-added trade. Trade in parts and components has the advantage of being available for a larger set of countries and years covered by the new data set on PTAs. Value-added trade is a

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<sup>8</sup> This section is based on Osnago, Rocha and Ruta (2016).

more precise measure of GVC involvement, but it is limited to a small sample of countries (41) and time coverage is limited to 1995-2011.<sup>9</sup>

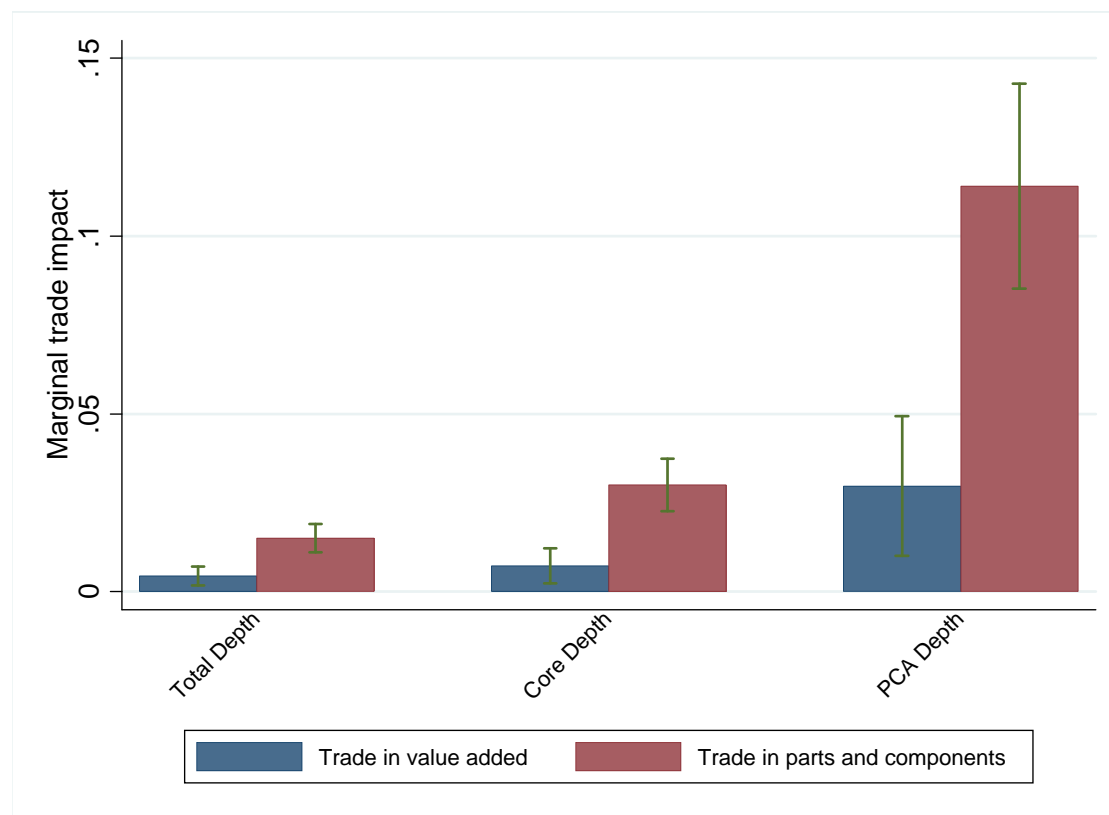
The empirical approach is based on the standard augmented gravity, which has been widely used to assess the impact of PTAs on trade flows (for a seminal paper, see Baier and Bergstrand, 2007). Differently from the standard approach, which uses a “dummy” to identify the presence of a trade agreement between a country pair, Osnago, Rocha and Ruta (2016) use the three measures of the “depth” of PTAs discussed in Section 2 (“total depth”, “core depth” and “PCA depth”). As standard in the modern gravity literature, the regressions include a set of fixed effects and controls for various determinants of bilateral trade.

Signing deep agreements has a large and positive impact on GVC trade. Figure 5 offers a summary of the regression results found in Osnago, Rocha and Ruta (2016). Specifically, the figure reports the estimated coefficients of the impact of PTA depth on GVC trade. The first histogram reports the coefficient estimated using the measure of trade in value added, while the second histogram reports the estimated coefficients for trade in parts and components. For completeness, I report the data for each of the three measures of depth. The analysis shows that adding a provision to a PTA increases bilateral trade in parts and components by 1.5 percent and re-exported value added by 0.4 percent. This means that signing the deepest PTA in the sample doubles trade in parts and components and increases re-exported value added by about 22 percent.

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<sup>9</sup> Data on trade in parts and components come from COMTRADE, while the data on trade in value added are based on the decomposition by Wang et al. (2016) and come from WIOD.

Figure 5: The impact of deep PTAs on GVC trade



The analysis of the impact of PTAs on GVC trade presents two difficult econometric challenges. The first is that, as first noted in Johnson and Noguera (2014) and Noguera (2012), value added trade depends not only on bilateral trade costs but also on trade costs with third countries. The second challenge is the endogeneity of GVC trade and preferential trade agreements. The study by Osnago, Rocha and Ruta (2016) attempts to address both problems.

First, in order to take into consideration the indirect effects that preferential trade agreements by third countries may have on GVC trade of other countries, it is necessary to modify the gravity equation and weigh the depth variable of interest with weights that take into account the international input-output structure. Osnago, Rocha and Ruta (2016) follow the methodology proposed by Noguera (2012) and find that accounting for the depth of third-country agreements increases the impact of PTAs on global value chains.

The second empirical concern is of endogeneity. Deep PTAs may stimulate the creation of GVCs by providing common disciplines that allow to internalize cross-border policy spillovers and address credibility problems. But countries already involved in GVCs may be more likely to sign deep PTAs because cross-border production creates a demand for deep provisions. The fixed-effect approach partially controls for this reverse causality as it compares country-pairs before and after a PTA is signed. However, there may be other time-varying country-pair characteristics

that may not be controlled for. Osnago, Rocha and Ruta (2016) adopt an instrumental variable (IV) approach to address this type of endogeneity using as an instrument for the depth of the PTA between country  $i$  and country  $j$  the (weighted) average depth of all the agreements signed by  $i$  and  $j$  with any other country excluding the agreement(s) they have in common. Results of the IV analysis confirm the relevance of deep agreements in boosting GVC trade.

An alternative approach that allows to determine the importance of deep PTAs for GVCs is to look at the effect of depth on different sectors. The effect of deep PTAs should be stronger in sectors that are more integrated in GVCs. In order to test this, Osnago, Rocha and Ruta (2016) exploit the decomposition of gross exports into value added components available for 13 manufacturing sectors in WIOD for the period 1995-2011. They augment a sector-level gravity regression with an interaction term between depth and an index of vertical specialization. The coefficient of the interaction term is consistently positive and significant across specifications and using different variables of depth and provisions. The results suggest that deep PTAs have a larger impact on GVC intensive sectors.

## **5. Undoing Trade Agreements: Brexit and GVCs<sup>10</sup>**

The previous section looked at the impact of PTAs in boosting GVCs trade. In this section, I ask the opposite question -i.e. whether the undoing of a PTA would negatively affect global value chains. As an application, I focus on recent work that attempts to assess the trade impact of Brexit, the UK's exit from the European Union. Specifically, Mulabdic, Osnago and Ruta (2017) study the effect that EU membership had on trade of the UK, most notably with its European partners, and then use this information to assess the future of UK-EU trade under different scenarios.

The EU has been a precursor of deep integration. The World Bank data on the content of trade agreements indicate that the EU is the deepest PTA among the 279 currently in force. The relationship between the UK and the rest of the EU members before Brexit will actually happen is regulated by the European Community (EC) Treaty and the following enlargement agreements which cover 44 policy areas ranging from standards to movements of capital, to labor mobility. The EU is also the region that has the largest share of intra-regional trade. The UK economy is part of this intense network of trade relations. First, the EU is the most important trade partner of the UK accounting for 52 percent of UK's exports of goods and services. Second, the UK is closely integrated in regional value chains. For instance, the share of intermediates value added in total domestic value added in UK exports (the majority of which goes to the EU) is close to 70 percent.

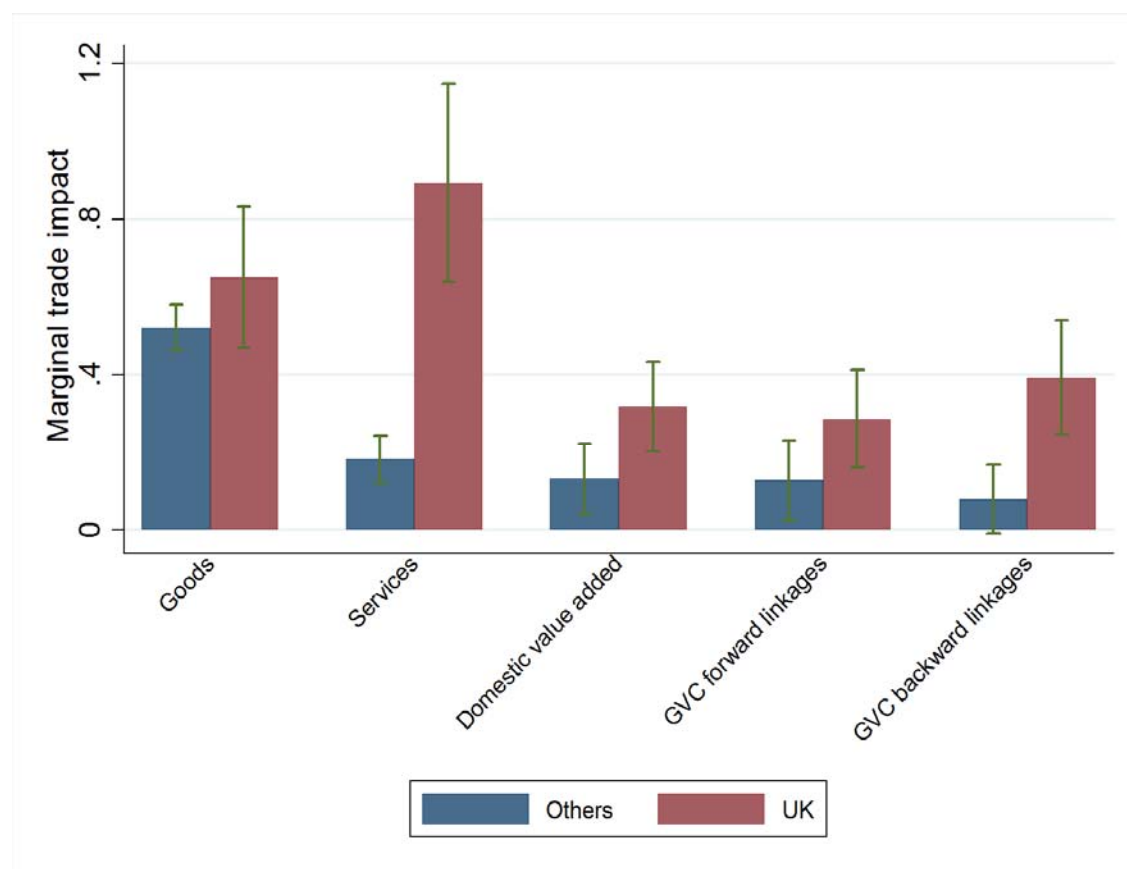
Mulabdic, Osnago and Ruta (2017) investigate the extent to which the depth of the EU and its trade agreements with third countries contributed to boost UK trade using a gravity equation

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<sup>10</sup> This section is based on Mulabdic, Osnago and Ruta (2017).

augmented with a measure of depth as discussed in Section 4. By interacting the depth of PTAs with dummies identifying the UK, they can quantify the effect of the depth of trade agreements on UK imports and exports of goods, services and value added. Deep trade agreements are found to increase goods and services trade by 42 percent on average. The depth of UK's trade agreements strongly increased trade in services: as a result of its EU membership and its participation in deep PTAs signed by the EU with third countries, UK services trade more than doubled. Deep PTAs also increased domestic value added in gross exports of the UK. This effect is mainly driven by the UK's stronger GVC relationship with its EU partners: UK's intermediates value added in gross exports (forward linkages) increased by 31 percent thanks to deep PTAs. In addition, foreign value added in UK exports (backward linkages) was boosted by EU membership by 37 percent. Figure 6 provides an overview of the trade effects of EU membership on UK trade.

Figure 6: The impact of EU membership on UK trade



Mulabdic, Osnago and Ruta (2017) then use the estimate from the gravity regressions to analyze the impact that changes in the UK-EU trade agreement can have on UK-EU trade relations going forward. This is a difficult task, as the only certainty on the future institutional setting is its

uncertainty. They address this problem by considering three distinct scenarios, with decreasing depth of the future agreement between the UK and the rest of the EU. The first scenario assumes that the PTA between the UK and the EU will be as deep as the agreement the EU has with Norway (called, “soft” Brexit). In the second scenario, the UK and the EU will sign a PTA as deep as the average PTA the EU currently has with third countries (referred to as “hard” Brexit). Finally, the third scenario (“very hard” Brexit) has no agreement.

This analysis indicates that UK-EU trade declines under all scenarios and that this drop is sharper the lower the depth of the future arrangement relative to the depth of the EU agreement. In terms of value added trade, the decline ranges from 6 percent of the “Norway” scenario to 28 percent of no agreement. In all scenarios, the largest declines are for UK services and GVC trade with the rest of the EU. Summary results are reported in Table 1. These predictions should be seen as average effects. As it takes time for trade flows to respond to changes in trade costs, the expectation is that the impact in the short-run to be smaller than in the longer term. Another caveat is that the analysis assumes that the processes of integration and disintegration are symmetric. In practice, this may not be the case: once GVC linkages are formed, they may be more resilient to changes in trade policy than the analysis predicts.

Table 1: Changes in UK’s bilateral trade with the EU under different scenarios

	"Norway" scenario	"average PTA" scenario	"no-agreement" scenario
Goods	-12%	-38%	-50%
Services	-16%	-48%	-62%
Domestic Value Added	-6%	-20%	-28%
GVC forward linkages	-5%	-18%	-26%
GVC backward linkages	-7%	-25%	-34%

*Notes:* Depth decreases from 44 to 36 in the “Norway” scenario, to 14 in the “average PTA”, and to 0 in the “no-agreement” scenario.

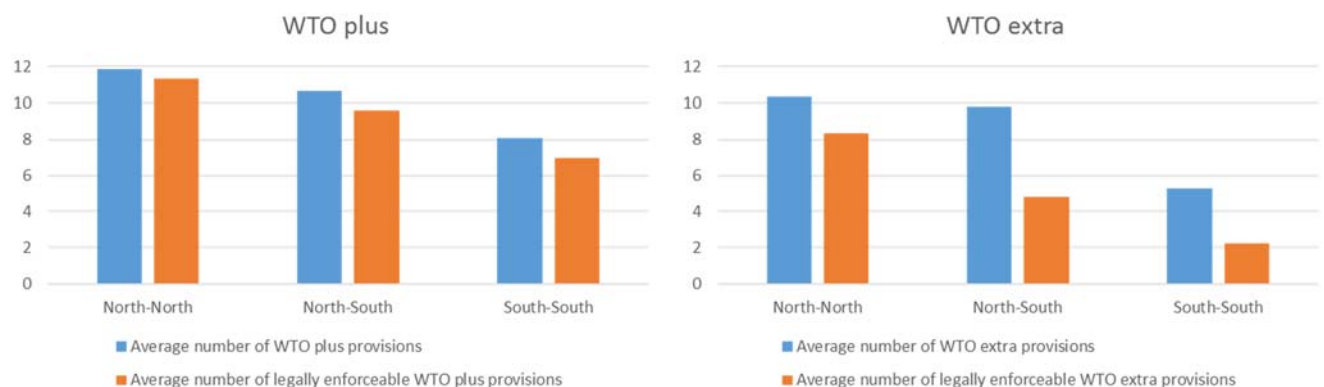
Source: Mulabdic et al. (2017)

## 6. GVCs and the Content of PTAs<sup>11</sup>

In this section, I dig deeper into the relationship between deep PTAs and GVCs and explore empirically potential heterogeneity in the effects of deep PTAs. Specifically, following Osnago, Rocha and Ruta (2016), I consider two dimensions of heterogeneity: i) splitting the provisions into different categories (WTO plus and extra); and ii) dividing PTAs by the level of development of country-pairs (North-North, North-South and South-South). These extensions allow to investigate what type of provisions drive the relationship between deep agreements and GVCs among different sets of countries.

The reason for signing trade agreements could be different depending on the countries involved and on the level of liberalization already achieved. As discussed in Section 2, the World Bank data show that North-North PTAs and North-South PTAs tend to have similar depth and South-South PTAs are on average shallower. In addition, the prevalence of WTO plus and WTO extra provisions varies according to the level of development of the signatories of the agreement. As Figure 7 shows, PTAs that are North-North and North-South tend to have more WTO extra provisions, although in the case of the latter they are less likely to be legally enforceable. South-South agreements tend to focus on WTO plus issues, which are the more traditional trade policy areas.

Figure 7: The content of PTAs across income groups



There is no formal theory to guide the analysis of differential effects of deep PTAs across countries' level of development, but a plausible argument is that deep PTAs matter for advanced and developing economies for different reasons. As trade among developed countries is already largely liberalized and domestic institutions are robust, North-North deep agreements mostly aim at internalizing cross-border policy spillovers. Deep agreements have additional roles for developing countries, as trade generally faces higher barriers and domestic institutions are

<sup>11</sup> This section is based on Osnago, Rocha and Ruta (2016).



weaker relative to advanced economies. North-South deep trade agreements offer an anchor to boost GVC participation of developing countries by providing a commitment device to border and behind the border policies. Since tariffs between developing countries are often still high, South-South PTAs affect GVC participation mostly through traditional trade liberalization.

To investigate the effect of the content of PTAs depending on the level of development of the countries involved, Osnago, Rocha and Ruta (2016) run three regressions on different groups of countries: North-North, North-South, South-South. To allow for a broader sample of countries, data in trade and parts and components are used in these regressions to measure the extent of GVC integration among country pairs. In each of these regressions the key explanatory variable is no longer the depth (i.e. the number of provisions covered by the agreement) but the number of WTO plus and WTO extra provisions in a PTA.

The regression analysis shows that the content of PTAs matters for GVC integration, and the impact varies by income groups. Provisions outside the current WTO mandate (e.g. investment, competition policy) drive the effects of North-South trade in parts and components. The impact of an additional WTO extra provision in a North-South PTA increases GVC integration by 4.3 percent. Provisions under the current WTO mandate (tariff reduction, etc.) drive the effect of deep PTAs on South-South trade in parts and components. Each additional WTO plus provision boosts South-South GVC integration by 8.3 percent.

## **7. GVCs and the Choice of PTA Partners**

This section studies countries' choice of PTA partners. We can look at this question from a normative and from a positive perspective. From the first point of view the issue is whether the international fragmentation of production changes the merits of regionalism relative to multilateralism. From a positive perspective, instead the question is whether the presence of GVCs (or the possibility to anchor a country to them) changes the way countries select their trading partners. I briefly look at both issues from a theoretical perspective and then discuss an application of this question to China.

The debate on the merits of regionalism versus multilateralism dates back at least to Viner (1950). In traditional models, where production is entirely national and tariffs are the sole instrument of trade policy, PTAs are sub-optimal to a multilateral agreement from a global welfare perspective. Preferential arrangements may still be efficient from the perspective of an individual country both for economic and non-economic reasons. First, countries may benefit from a PTA to the expense of other countries not included in the agreement. This would be the case where exports from members displace exports from non-members. Second, countries may have non-economic reasons to sign trade agreements, as PTAs can strengthen security ties or work as a building block for political integration. As these arguments are non-economic in nature or beggar-thy-neighbor, PTAs are an inefficient substitute for multilateral trade liberalization from an economic point of view.

This logic is altered in the presence of global value chains. As discussed in Section 2, GVCs create new rationales for PTAs, as the unbundling of stages of production across borders creates new forms of international policy spillovers and time-consistency problems. This in turn generates a demand for deeper forms of integration. Differently from traditional agreements that focus on tariffs, for deep agreements involving behind-the-border policies a tradeoff arises between economies of scale and heterogeneity of preferences.<sup>12</sup> This tradeoff is well known from the public economics literature that deals with fiscal federalism (Oates, 1999). While non-economic arguments and new beggar-thy-neighbor gains (e.g. “rule of law” externality) may still drive the decisions to form PTAs, smaller groups can be efficient from an economic point of view as they efficiently trade off the costs and benefits of deep integration. As argued in WTO (2011), deep PTAs may complement rather than substitute the multilateral trading system as they allow to coordinate or harmonize policies that could not be coordinated or harmonized at the global level.

From a positive perspective, the literature on (shallow) PTAs struggled with the notion of the ideal partner (Schiff and Winters, 2003). Two main sets of economic characteristics are found to increase the benefits of forming a PTA with a certain partner. The first is trade intensity, which suggests that the two countries are “natural” trade partners. Characteristics such as geographical proximity that increase the trade intensity among partners make it more convenient to reduce bilateral tariffs. The second set of characteristics has to do with comparative advantage. Complementarities in production and/or consumption increase the benefit of forming a PTA.

Are these characteristics the relevant ones in the context of GVCs? The answer is not obvious and the literature is not yet developed on this point. Some characteristics still matter. For instance, proximity may be important to select PTA partners because face-to-face communication is relevant to manage supply chains. Similarly, comparative advantage can be defined at the task level: complementarities, say between different stages of production, may still guide the choice of PTA partners. However, other characteristics would appear to matter. One example is cross-country differences in policy preferences. If GVCs require deep agreements for their smooth functioning, then ideal PTA partners should not have policy preferences that are too different as this would increase the cost of coordinating and harmonizing policies.

I close this section with a focus on the experience of China in choosing PTA partners based on the recent work by Cheng et al. (2016). In order to characterize the PTAs from the point of view of GVCs, Cheng et al. (2016) borrow the concept of the “smiling curve”, with the horizontal axis representing a continuum of tasks or stages of GVC from upstream to downstream covering research & development (R&D), intermediates, assembling and processing, marketing and after-sale services, and with the vertical axis depicting the value-added generated from various tasks or stages. Based on this notion, Cheng et al. (2016) define “vertical” PTAs as the agreements

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<sup>12</sup> A similar rationale is discussed in Maggi (2014). Specifically, bargaining frictions may be higher for negotiations that involve many countries and complex issues. For this reason, deep provisions may be more efficiently negotiated in a PTA or, alternatively, in an agreement involving a subset of members within the WTO, such as a plurilateral or critical-mass agreements.

formed as the result of the vertical division of labor along the supply chain, with member economies locating at different GVC positions. In other words, vertical PTAs are the agreements that are driven by comparative advantage at the task level.

Currently, China has concluded and is implementing 13 PTAs involving 21 individual economies.<sup>13</sup> There are other 11 bilateral and regional PTAs under negotiation or being proposed, and the sixteen-member Regional Comprehensive Economic Partnership (RCEP). With this framework in mind, Cheng et al. (2016) ask the question if China's PTAs exploit complementarities in production along the supply chain. Based on the work of Wang et al. (2016), Cheng et al. (2016) quantify China's GVC linkage with its PTA and non-PTA partners. Their results indicate that GVC complementarities play an important role in the choice of PTA partners for China.

## **8. The Future of GVCs and Deep Agreements**

In this section, I turn to the question of the future of GVCs and deep agreements. The past 25 years have been a period of deepening trade agreements and growing intensity of global value chains. Should we expect this trend to continue in the next quarter century? In light on the growing backlash to globalization in advanced economies, this is no longer a rhetoric question. On the one hand, there are reasons for optimism, as GVCs and PTAs reinforce each other and make it less likely to slip backwards. On the other hand, the future of this relationship should not be taken for granted as cross-border production decisions depend on the expectations of trading partners' future trade policies. Negative expectations could result in a reversal of the current trends towards GVC expansion and deeper integration. The rest of this section elaborates on these points.

I look first at the reasons for optimism. Some observers have argued that the current globalization backlash has similarities to the backlash of the early 20<sup>th</sup> century and that this may lead to a Prisoner Dilemma situation where countries escalate protectionism as in the 1930s. This pessimistic view of the future of trade relations does not acknowledge that the production structure and trade policy landscape of today are very different from the one of the early 20<sup>th</sup> century.

As the evidence discussed in this paper shows, trade agreements have stimulated the creation of GVCs. The reason is that trade agreements allow to internalize cross-border policy externalities, lower trade costs and provide deeper common disciplines that facilitate the operation of economic activities that span multiple borders. In turn, GVCs have changed the political economy of trade policy, discouraging protectionism and creating a demand for deep integration. Recent evidence shows that governments set lower tariffs the higher the domestic content of foreign-

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<sup>13</sup> The PTAs are with Australia; Chile; Costa Rica; Hong Kong SAR, China; Iceland; Macao SAR, China; New Zealand; Pakistan; Peru; Singapore; the Republic of Korea; Switzerland; and the 10-member Association of Southeast Asian Nations (ASEAN) (Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam).

produced final goods (Blanchard et al. 2016) and that countries sign deeper agreements the higher the GVC trade with partners (Orefice and Rocha, 2014). This two-way relationship between GVCs and PTAs supports the view that trade disintegration (protectionism, undoing of trade agreements) is unlikely.

Despite these dramatic changes, however, the future of the GVC-PTA relationship should not be taken for granted. GVCs are the result of firms' investment / sourcing decisions that are endogenous as they depend on expectations of future trade policies. If firms expect a change in the course of future trade policy, they will take this into account in their decisions possibly leading them to re-nationalize (part of) their production processes. In this context, expectations can lead to multiple equilibria and give rise to coordination failures. More than the well-known Prisoner Dilemma, the current situation may be described by a Trust Dilemma (or a coordination game) where what is rational to choose depends on the beliefs of what others will do.

The simple game reproduced in Table 2 below provides an illustration of the Trust Dilemma that may characterize the GVC-PTA relationship -I will refer to it as the Trust Dilemma of Deep Integration. Consider two players: Home and Foreign. And assume that each one of them has two strategies. They can opt for deep agreements and GVCs or choose national production and no trade agreement. Each player chooses an action without knowing the choice of the other. If a player chooses to maintain an international production process and a deep agreement, it needs the cooperation of the partner to succeed. Choosing national production and no trade agreement, on the other hand, requires no cooperation with the other player but also leads to lower welfare. The payoffs in Table 2 capture this situation.

Table 2: The Trust Dilemma of Deep Integration

Home, Foreign	GVC / Deep agreements	National production / No agreement
GVC / Deep agreements	2, 2	0, 1
National production / No agreement	1, 0	1,1

The Trust Dilemma of deep integration has two pure strategy Nash equilibria. The first equilibrium is the upper-left corner where Home and Foreign cooperate; the second equilibrium is the lower-right corner where the two players defect and choose not to cooperate. As global welfare is inferior in the latter, this equilibrium can be described as a coordination failure. Importantly, this equilibrium can be the result of a self-fulfilling prophecy in the sense that it can be triggered by the belief that the other player will not choose to cooperate.

While only an example, this game illustrates why continuing trust in the willingness of others to cooperate is essential to the future of the GVC-PTA relationship. In the past 25 years, governments signed deep agreements and firms fragmented production internationally. These decisions reinforced each other and sustained a cooperative equilibrium (the upper-left corner). In the next 25 years, changing expectations on the course of policy could lead to a reversal and result in an inferior equilibrium where production processes are progressively renationalized and trade agreements undone (the lower-right corner). This coordination failure can be avoided as long as firms' expectations of future trade policy will not induce them to opt for national production to which policy makers would respond offering protection and undoing trade agreements.

## **9. Conclusions**

New World Bank data on the content of trade agreements show that PTAs are becoming deeper. This paper reviewed the recent literature on the relationship between the deepening of PTAs and GVC integration. The key points that emerge from this analysis can be summarized as follows:

First, economic theory indicates that PTAs and GVC integration are related, as the smooth functioning of cross border production activities calls for the regulation of a number of behind-the-border policy areas. Importantly, the theory also points out that, in a GVC context, PTAs and the multilateral trade system generally complement each other as some policy areas can be more efficiently regulated within smaller groups of like-minded countries. There are, however, many important questions on the relationship between PTAs and GVCs that remain open. One such question is on the content (or, equivalently, the efficient design) of deep PTAs; yet another is on the optimal choice of PTA partners. These are questions that the literature has investigated in models of shallow agreements and national production, but not for deep agreements and GVCs.

Second, thanks to the new data on the content of PTAs and on measurement of GVC integration, some progress has been made to illuminate the extent of the GVC-PTA relationship. First, recent evidence shows that the depth of PTAs boosts GVC integration and that undoing this depth, as in the case of Brexit, is likely to hurt GVCs. Second, the content of PTAs also matters: WTO extra provisions are key drivers of GVCs for North-South PTAs, while WTO plus provisions are important for South-South GVC integration. Third, an analysis of China's trade agreements indicates that the choice of the "right" PTA partners is affected by the GVC position of a country, stressing the importance of comparative advantage at the task level among other factors.

In closing this paper, I turned to the question of the future of GVCs and deep agreements. I argued that there are reasons for optimism and reasons for concern. In the past 25 years, governments signed deep PTAs and firms fragmented production. These decisions reinforced each other and sustained a cooperative equilibrium. In the next 25 years, changing expectations on the course of policy could lead to a reversal and result in an inferior equilibrium where production is progressively renationalized and trade agreements undone. Continuing trust in the willingness of

others to cooperate to preserve an open system is essential to the future of the PTA-GVC relationship.

## References

- Antràs, Pol. 2015. *Global Production: Firms, Contracts, and Trade Structure*. Princeton, NJ: Princeton University Press.
- Antràs, Pol, and Robert Staiger. 2012. "Offshoring and the Role of Trade Agreements." *American Economic Review* 102 (7): 3140–83.
- Bagwell, Kyle, Chad P. Bown, and Robert W. Staiger. 2015. "Is the WTO Passé?" National Bureau of Economic Research (NBER) Working Paper No. 21303, NBER, Cambridge, MA.
- Bagwell, Kyle, and Robert W. Staiger. 2016. "The Design of Trade Agreements." In *Handbook of Commercial Policy*, Vol. 1A, edited by K. Bagwell and R. Staiger, 435–529. Amsterdam: North Holland.
- Baier S. L., and J. H. Bergstrand. 2007. "Do Free Trade Agreements Actually Increase Members' International Trade?" *Journal of International Economics* 71 (1): 72–95.
- Baldwin, Richard. 2008. "Big-Think Regionalism: A Critical Survey." NBER Working Paper No. 14056, NBER, Cambridge, MA.
- Blanchard, Emily, Chad Bown, and Robert Johnson. 2016. "Global Supply Chains and Trade Policy." NBER Working Paper No. 21883, NBER, Cambridge, MA.
- Blanchard, Emily, and Xenia Matschke. 2015. "U.S. Multinationals and Preferential Market Access." *The Review of Economics and Statistics* 97 (4): 839–54.
- Brou, Daniel, and Michele Ruta. 2013. "A Commitment Theory of Subsidy Agreements." *The B.E. Journal of Economic Analysis & Policy* 13 (1): 239–70.
- Cheng, D., X. Wang, Z. Xiao, and W. Yao. 2016. "How Does the Selection of FTA Partner(s) Matter in the Context of GVCs? The Experience of China." Working Paper, Fudan University, Shanghai.
- Costinot, Arnaud. 2008. "A Comparative Institutional Analysis of Agreements on Product Standards." *Journal of International Economics* 75 (1): 197–213.
- Damuri, Y. R. 2012. "21st Century Regionalism and Production Sharing Practice." Center for Trade and Economic Integration (CTEI) Working Paper No. 2012-4, CTEI, Geneva.
- EC (European Commission). *World Input-Output Database (WIOD)*. Brussels: EC. Available at: <http://www.wiod.org/home>.
- Ederington, Josh, and Michele Ruta. 2016. "Non-Tariff Measures and the World Trading System." In *Handbook of Commercial Policy*, Vol. 1B, edited by K. Bagwell and R. Staiger. Amsterdam: North Holland.
- Freund, C., and E. Ornelas. 2010. "Regional Trade Agreements." *Annual Review of Economics* 2 (1): 139–66.

- Grossman, G. 2016. "The Purpose of Trade Agreements." In *Handbook of Commercial Policy*, Vol. 1A, edited by K. Bagwell and R. Staiger, 379–434. Amsterdam: North Holland.
- Hofmann, Claudia, Alberto Osnago, and Michele Ruta. 2017. "Horizontal Depth: A New Database on the Content of Deep Agreements." Policy Research Working Paper No. 7981, World Bank, Washington, DC.
- Horn, H., P. C. Mavroidis, and A. Sapir. 2010. "Beyond the WTO? An Anatomy of EU and US Preferential Trade Agreements." *The World Economy* 33 (11): 1565–88.
- Johnson, Robert, and Guillermo Noguera. 2014. "A Portrait of Trade in Value Added over Four Decades." Working Paper, Dartmouth College, Hanover, NH.
- Lawrence, Robert Z. 1996. *Regionalism, Multilateralism, and Deeper Integration*. Washington, DC: Brookings Institution.
- Lima, N. 2016. "Preferential Trade Agreements." In *Handbook of Commercial Policy*, Vol. 1B, edited by K. Bagwell and R. Staiger, 279–367. Amsterdam: North Holland.
- Maggi, Giovanni. 2014. "International Trade Agreements." In *Handbook of International Economics*, edited by Gita Gopinath, Elhanan Helpman, and Kenneth Rogoff, 317–90. Amsterdam: Elsevier.
- Mulabdic, A., A. Osnago, and M. Ruta. 2017. "Deep Integration and UK-EU Trade Relations." Policy Research Working Paper No. 7947, World Bank, Washington, DC.
- Noguera, G. 2012. "Trade Costs and Gravity for Gross and Value Added Trade." Working Paper, University of Warwick, Coventry, UK.
- Oates, Wallace E. 1999. "An Essay on Fiscal Federalism." *Journal of Economic Literature* 37 (3): 1120–49.
- Orefice, G., and R. Rocha. 2014. "Deep Integration and Production Networks: An Empirical Analysis." *The World Economy* 37 (1): 106–36.
- Osnago, Alberto, Nadia Rocha, and Michele Ruta. 2015. "Deep Trade Agreements and Vertical FDI: The Devil is in the Details." Policy Research Working Paper No. 7464, World Bank, Washington, DC.
- . 2016. "Deep Trade Agreements and Global Value Chains." Working Paper, World Bank, Washington, DC.
- Schiff, Maurice, and L. Alan Winters. 2003. *Regional Integration and Development*. Washington, DC: World Bank.
- UN (United Nations). UN Commodity Trade Statistics Database (Comtrade). New York: UN. Available at: <https://comtrade.un.org/>.



Viner, Jacob. 1950. The Customs Union Issue. New York: Carnegie Endowment for International Peace.

Wang, Zhi, Shang Jin Wei, and Kunfu Zhu. 2016. "Quantifying International Production Sharing at the Bilateral and Sector Levels." Working Paper, Columbia University, New York.

WTO (World Trade Organization). 2011. World Trade Report 2011—The WTO and preferential trade agreements: From co-existence to coherence. Geneva: WTO.