CHAPTER 8

Preferential trade agreements and global value chains: Theory, evidence, and open questions

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Two phenomena have characterized the trade and trade policy landscape since the early 1990s. The rise of global value chains (GVCs)—the denationalization of production—has changed international trade, with trade in parts and components increasing almost six times between 1990 and 2015, faster than the 4.5 times for other forms of trade. On the policy side, preferential trade agreements are increasing in number and deepening in content.[1] Their number surged from 50 in 1990 to close to 280 in 2015. These agreements are also deepening, in the sense that they cover an expanding set of policy areas, such as investment and competition policy, that go well beyond the traditional focus of preferential trade agreements, such as tariffs.

This chapter analyzes the relationship between preferential trade agreements, particularly "deep" preferential trade agreements, and GVCs. The goal is to answer six policy-relevant questions:

- How have preferential trade agreements evolved?
- In a world with GVCs, why do countries sign preferential trade agreements?
- Do preferential trade agreements increase GVC integration?
- How does the content of preferential trade agreements affect GVC trade?
- How do GVCs affect the choice of preferential trade agreement partners?
- What is the outlook of the relationship between preferential trade agreements and GVCs going forward?

This chapter contributes to the large literature on preferential trade agreements (such as Limao 2016) in several ways. First, based on new World Bank data, it documents how preferential trade agreements have deepened over time and how this evolution is associated with the rise of GVCs. Second, it reviews the theoretical literature on the rationale for the relationship between preferential trade agreements and GVCs and outlines avenues for future research. Third, it discusses empirical research suggesting that deep agreements boost GVC integration and showing how this impact differs across country groups. Finally, it presents a simple framework for thinking about the relationship between preferential trade agreements and GVCs going forward.

While more work is needed, several findings emerge from this review. New data on the content of trade agreements and on participation in GVCs point to a strong positive correlation, with deeper agreements associated with more intense GVC relationships. Economic theory identifies several explanations 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 preferential trade agreements boost participation in GVCs, suggesting that trade agreements can be an effective tool for policymakers to anchor national producers to global and

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regional production processes. Going forward, the future of the relationship between preferential trade agreements and GVCs will depend on continuing trust in the willingness of other partners to preserve an open trading system.

Evolution of preferential trade agreements

New evidence on the evolution of preferential trade agreements offers a basis for discussing the relationship between trade agreements and GVCs. The number of preferential trade agreements has increased dramatically in the last quarter century, from 50 trade agreements in force and notified to the World Trade Organization (WTO) in 1990 to 279 at the end of 2015.[2] This dramatic change has spurred debate among researchers[3] and policymakers on the rationale for preferential arrangements; their impact on the trade flows, growth, and welfare of member and nonmember countries; and their relationship with the broader system of global trade governance.

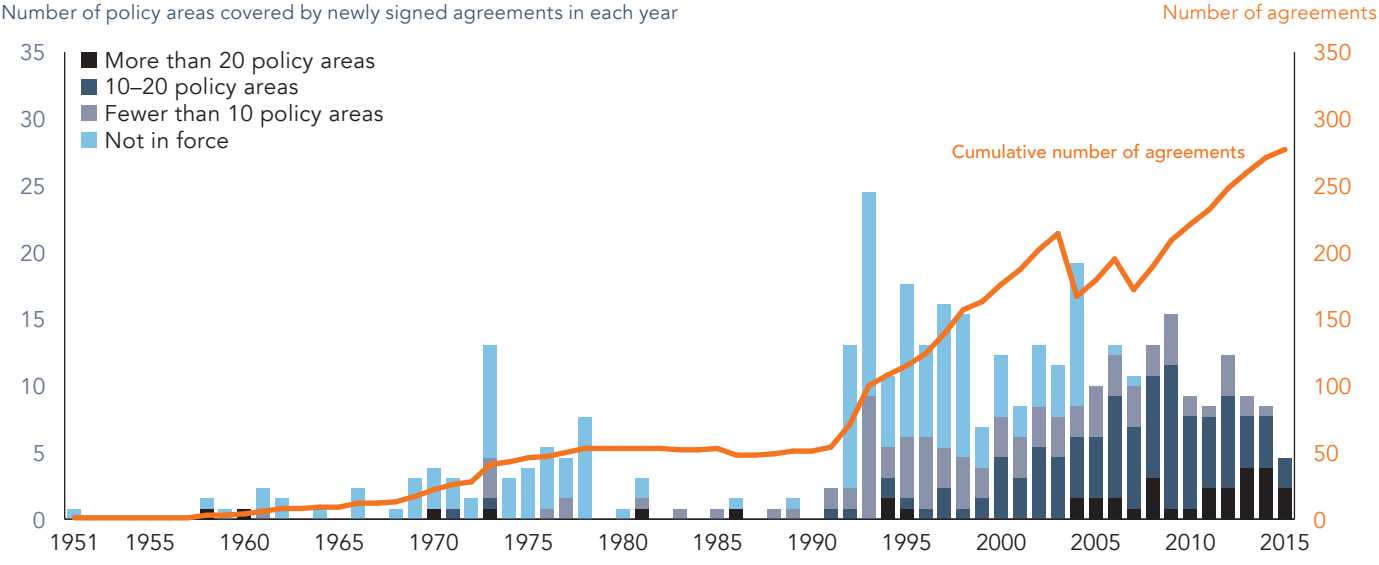
Often overlooked in the literature on trade agreements is that their content—as well as their number—has changed over time. Before the 1990s, trade arrangements involved mostly tariff reductions, but more recent preferential trade agreements include other policy provisions as well. Two recent studies document how several trade agreements cover regulatory areas such as services, investment, competition policy, intellectual property rights protection, and others (Horn, Mavroidis, and Sapir 2010; WTO 2011). Building on the methodology in these studies, Hofmann, Osnago, and Ruta (2017) collected information on 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 preferential trade agreements among 189 countries.[4]

The database documents the changing content of preferential trade agreements. A growing number of trade agreements cover more than 20 policy areas, a majority of newly signed preferential trade agreements cover 10–20 policy areas, and a minority focus on fewer than 10 policy areas (figure 8.1).

The new database also allows looking in detail at the content of trade agreements. In addition to tariff reductions, more than half the preferential trade agreements in the database include legally enforceable regulations on some policy areas that fall under the current mandate of the WTO (figure 8.2). These provisions, referred to as "WTO-plus" or "WTO+" in the literature, include customs regulations, export taxes, antidumping measures, countervailing duty measures, technical barriers to trade, and sanitary and phytosanitary 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 and nuclear safety. The inclusion of these provisions in preferential trade agreements and their legal enforceability varies widely by policy area (figure 8.3).

Preferential trade agreement provisions can also be disaggregated in different ways depending on the question under investigation. Following Hofmann, Onsnago, and Ruta (2017), preferential trade agreement provisions are divided here into core and noncore. Core provisions are identified in the literature as economically more meaningful (Baldwin 2008; Damuri 2012) and include the set of WTO-plus provisions and four WTO-extra provisions (competition policy, investment, movement of capital, and intellectual property rights protection) that appear frequently in preferential trade agreements. Almost 90% of agreements include at least one of the core WTO-extra provisions, and one third of preferential trade agreements include all core WTO-extra provisions (see figures 8.2 and 8.3).

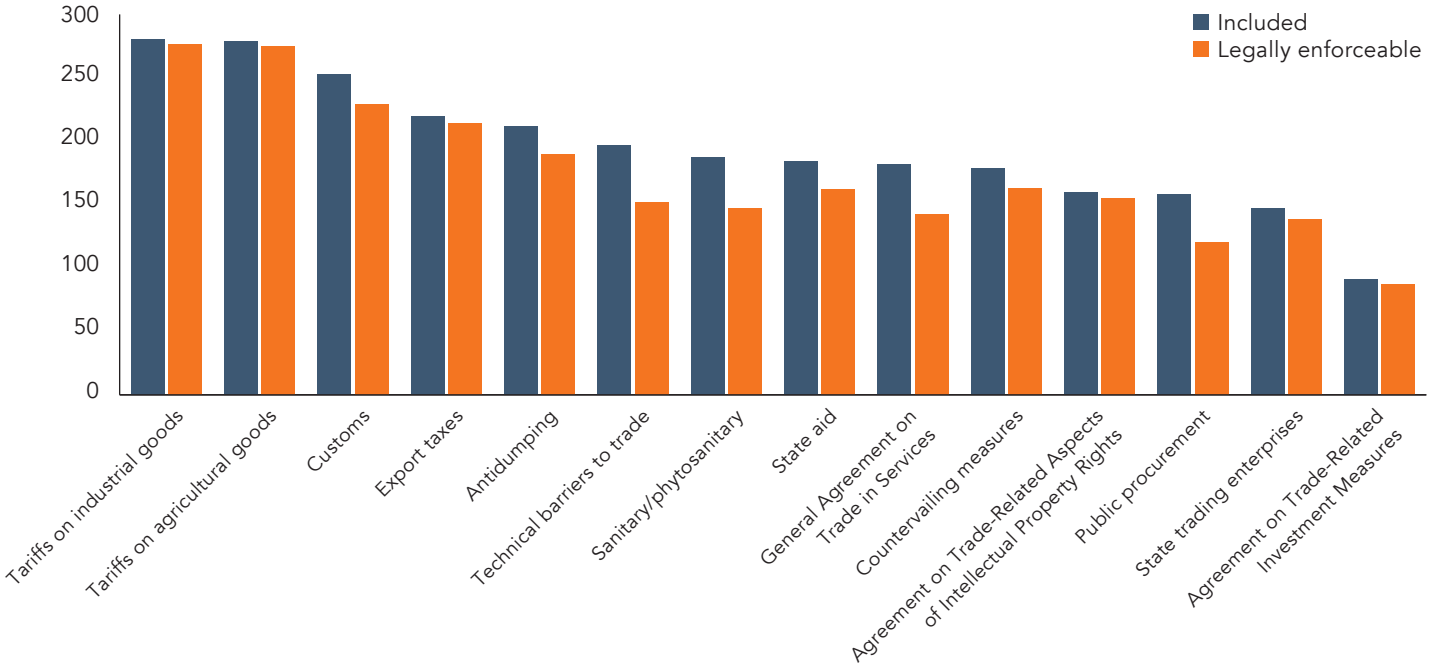
FIGURE 8.1 The number and content of preferential trade agreements, 1951–2015



Source: World Bank Content of Deep Trade Agreements Database (http://data.worldbank.org/data-catalog/deep-trade-agreements).

FIGURE 8.2 "WTO-plus" policy areas in preferential trade agreements, 2015

Number of agreements

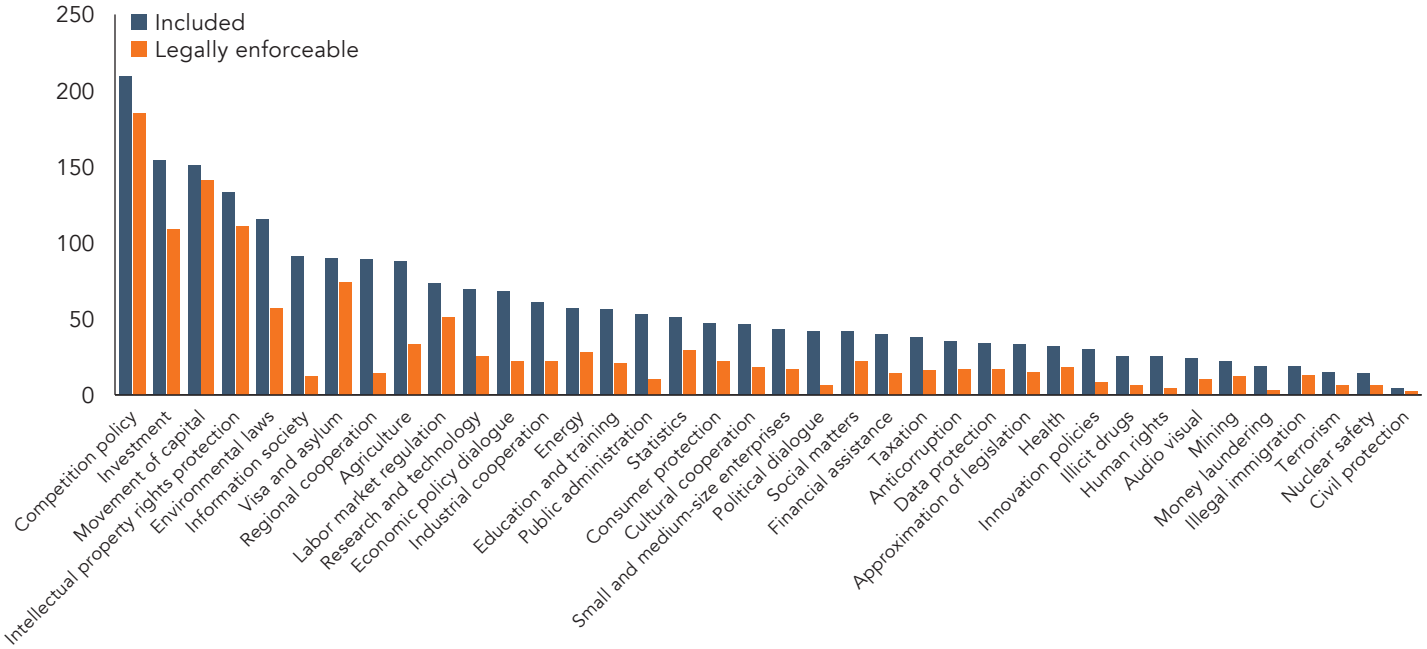


Source: World Bank Content of Deep Trade Agreements Database (http://data.worldbank.org/data-catalog/deep-trade-agreements).

Note: WTO-plus refers to legally enforceable regulations on some policy areas in preferential trade agreements that fall under the current mandate of the World Trade Organization.

FIGURE 8.3 "WTO-extra" policy areas in preferential trade agreements, 2015

Number of agreements



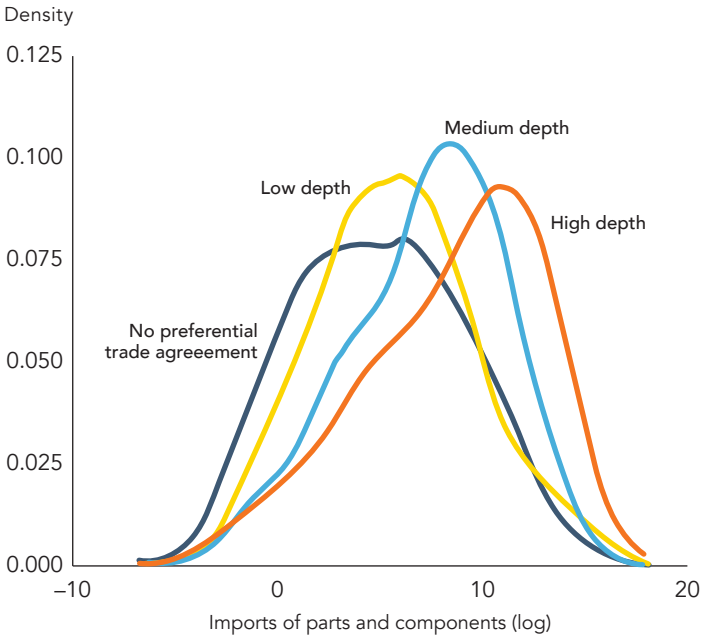
Source: World Bank Content of Deep Trade Agreements Database (http://data.worldbank.org/data-catalog/deep-trade-agreements).

Note: WTO-extra refers to provisions on some policy areas in preferential trade agreements that fall outside the current mandate of the World Trade Organization.

The new data also reveal the changing depth of preferential trade agreements. Hofmann, Osnago, and Ruta (2017) constructed synthetic indexes of depth, which measure the coverage of policy areas in preferential trade agreements. The first index of depth, referred to as "total depth," is the simple count of (legally enforceable) provisions in a preferential trade agreement. Total depth increased from an average of around 8 provisions in the 1990s to more than 17 in 2010–15. An index of "core depth" can be constructed by counting how many core provisions are included and legally enforceable in a preferential trade agreement. Core depth increased from around 7 provisions in the 1990s to almost 14 in 2010–15. Principal component analysis can produce a third index of depth that accounts for most of the variability in the data. Principal component analysis depth increased from around 1 in the 1990s to 2.8 in 2010–15.

The wide country coverage of the new data allows for analysis of the heterogeneity of deep preferential trade agreements across regions and incomes. Europe has the highest number of signed preferential trade agreements, and these preferential trade agreements are the deepest mainly because of the European Community Treaty and the subsequent EU enlargements. The average total depth of EU agreements is 25 provisions. Deep preferential trade agreements are also common for members of the European Free Trade Association (average of 23 policy provisions), Japan (21), and the Republic of Korea (20). Preferential trade agreements signed between developed and developing countries (North–South preferential trade agreements) include on average almost as many provisions (20) as North–North preferential trade agreements (22). But legal enforceability is generally weaker in North–South preferential trade agreements than in North–North agreements. And South–South preferential trade agreements, with an average total depth of 13 provisions, tend to be shallower than other preferential trade agreements.

FIGURE 8.4 Relationship between depth of preferential trade agreements and global value chain trade



Source: Hoffman, Osnago, and Ruta 2017.

Note: Depth of preferential trade agreements is measured by a density index for number of policy areas covered, where 0 means. Global value chains are measured by the log of imports of parts and components.

Global value chains and the rationale for trade agreements

What is the rationale for trade agreements, particularly deep agreements, in a world with GVCs? An extensive literature has examined the motives for trade policy cooperation and the design of trade agreements in a traditional setting, where production is entirely national and not fragmented internationally.[5] The focus generally is on cooperation on tariffs, consistent with the idea that the main problem that trade agreements solve is to internalize the terms-of-trade externality created by unilateral tariffs. But 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; figure 8.4). This relationship indicates that the rationale for trade agreements may be more complex in the context of GVCs than in settings where production is not fragmented internationally.

Lawrence (1996) first introduced the notion of "shallow" and "deep" trade agreements. Shallow agreements focus on tariffs and other border measures that directly affect market access. Economic theory and evidence suggest a relationship between cross-border production and shallow preferential trade agreements. For instance, Blanchard and Matschke (2015) estimated that a 10% increase in U.S. foreign affiliate exports to the United States is associated with a 4 percentage point increase in the rate of preferential duty-free access. Intuitively, firms that offshore production are more likely to lobby for lower tariffs on products re-imported into the U.S. market. Similarly, domestic firms may choose to locate production stages in another preferential trade agreement member under the expectation that tariffs on re-imported goods will be lower.

Deep agreements go beyond traditional market access issues and include disciplines such as investment, competition policy, and harmonization of product regulations. The new empirical evidence on the relationship between preferential trade agreement depth and GVC trade is the core of the next sections. Here, this relationship is discussed from a theoretical point of view (Antràs and Staiger 2012; Baldwin 2008; WTO 2011; Ederington and Ruta 2016).

A simple way to explain the correlation between GVC trade and depth of preferential trade agreements 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 for behind-the-border measures in the context of GVCs. And third, the costs created by coordination externalities (such as heterogeneous regulations) may be higher in the presence of cross-border production. These spillovers and credibility concerns generate demand for deeper forms of integration.

Despite the rich set of arguments in the literature, many aspects of the relationship between deep preferential trade agreements and GVCs have not been incorporated in formal models. Foremost is the fundamental question of the role that deep agreements play in the presence of GVCs. For instance, Antràs 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 preferential trade agreements may allow governments to internalize these externalities, their model does not provide a formal treatment of this point. Similarly, the commitment rationale for deep agreements has been formalized only for specific provisions (such as domestic subsidies in Brou and Ruta 2013), and this has not been done in a GVC context. Finally, studies of the harmonization of standards and other forms of regulatory cooperation (such as Costinot 2008) generally rely on traditional trade models that assume that production is purely domestic.

Several other interesting questions are also still open. One 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 (Antràs 2015). Osnago, Rocha, and Ruta (2015) find evidence that the content of deep preferential trade agreements affects decisions on foreign direct investment, 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 preferential trade agreements? How are preferential trade agreement partners selected in a GVC context? (These questions are returned to below.)

Do deep agreements promote global value chains?

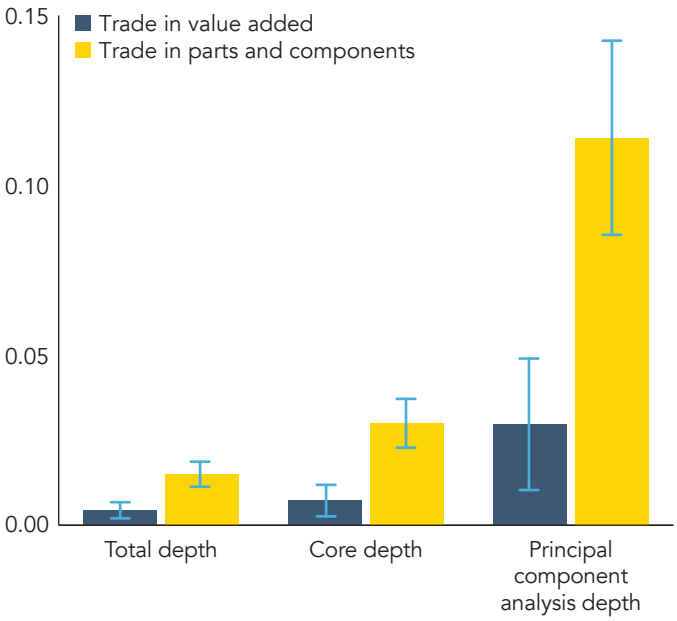
The relationship between GVCs and preferential trade agreements runs in both directions.[6] An important policy question concerns how much trade agreements, particularly deep preferential trade agreements, can boost GVC integration. Osnago, Rocha, and Ruta (2016) used a gravity model to exploit the new World Bank data on the content of preferential trade agreements, using the three measures of the "depth" of preferential trade agreements discussed earlier (total depth, core depth, and principal component analysis depth). Bilateral GVC integration is measured in two ways: trade in parts and components and trade in value added. Data on trade in parts and components have the advantage of being available for a larger set of countries and years covered by the new dataset on preferential trade agreements. Trade in value added is a more precise measure of GVC involvement, but data are limited to a small sample of countries (41) and time coverage is limited to 1995–2011.[7]

The empirical approach is based on the standard augmented gravity model, which has been widely used to assess the impact of preferential trade agreements on trade flows (see Baier and Bergstrand 2007). Unlike in the standard approach, which uses a dummy variable to identify the presence of a trade agreement between a country pair, Osnago, Rocha, and Ruta (2016) used the three measures of the "depth" of preferential trade agreements discussed earlier (total depth, core depth, and principal component analysis depth). Their regressions of the impact of preferential trade agreement depth on GVC trade included a set of fixed effects and control for various determinants of bilateral trade. Signing deep agreements has a large and positive impact on GVC trade (figure 8.5). Adding a provision to a preferential trade agreement increases bilateral trade in parts and components 1.5% and re-exported value added 0.4%. This means that signing the deepest preferential trade agreement in the sample doubles trade in parts and components and increases re-exported value added about 22%.

The analysis of the impact of preferential trade agreements on GVC trade presents two difficult econometric challenges.

FIGURE 8.5 The impact of deep preferential trade agreements on two types of global value chain trade

Marginal trade impact



Source: Osnago, Rocha, and Ruta 2016.

Note: Total depth is the simple count of (legally enforceable) provisions in a preferential trade agreement. Core depth is a count of how many core provisions are included and legally enforceable in a preferential trade agreement. Principal component analysis depth is an index that accounts for most of the variability in the data.

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. Osnago, Rocha, and Ruta (2016) attempted to address both problems.

First, to take into consideration the indirect effects that preferential trade agreements by third countries may have on GVC trade of other countries, the depth variable of interest needs to be weighted to take into account the international input-output structure. Following the methodology proposed by Noguera (2012), Osnago, Rocha, and Ruta (2016) found that accounting for the depth of third-country agreements increases the impact of preferential trade agreements on GVCs.

The second empirical concern is endogeneity. Deep preferential trade agreements may stimulate the creation of GVCs by providing common disciplines that allow internalizing cross-border policy spillovers and address credibility problems. But countries already involved in GVCs may be more likely to sign deep preferential trade agreements because cross-border production creates a demand for deep provisions. The fixed-effect approach partially controls for this reverse causality since it compares country pairs before and after a preferential trade agreement is signed. But other time-varying country pair characteristics may not be controlled for. Osnago, Rocha, and Ruta (2016) adopted an instrumental variable approach to address this type of endogeneity, using as an instrument for the depth of the preferential trade agreement between country *i* and country *j* the (weighted) average depth of all the agreements signed by countries *i* and *j* with any other country, excluding the agreements they have in common. Results of the analysis confirm the relevance of deep agreements in boosting GVC trade.

An alternative approach for determining the importance of deep preferential trade agreements for GVCs is to look at the effect of depth on different sectors. The effect of deep preferential trade agreements should be stronger in sectors that are more integrated in GVCs. To test this, Osnago, Rocha, and Ruta (2016) exploited the decomposition of gross exports into value-added components available for 13 manufacturing sectors in the World Input-Output Database for 1995–2011. They augmented 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 preferential trade agreements have a larger impact on GVC-intensive sectors.[8]

Global value chains and the content of preferential trade agreements

This section digs further into the relationship between deep preferential trade agreements and GVCs and explores empirically potential heterogeneity in the effects of deep preferential trade agreements.[9] Following Osnago, Rocha, and Ruta (2016), it considers two dimensions of heterogeneity: splitting the provisions into different categories (WTO-plus and WTO-extra) and dividing preferential trade agreements by the level of development of country pairs (North–North, North–South, and South–South). These extensions allow for investigation of the types of provisions that drive the relationship between deep agreements and GVCs among different sets of countries.

Countries can have different reasons for signing trade agreements, depending on, among other things, the level of liberalization already achieved. World Bank data show that North–North preferential trade agreements and North–South preferential trade agreements tend to have similar depth (number of provisions covered by the agreement) and South–South preferential trade agreements 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. North–North and North–South preferential trade agreements tend to have more WTO-extra provisions, though for North–South agreements they are less likely to be legally enforceable (figure 8.6). South–South agreements tend to focus on WTO-plus issues, which are the more traditional trade policy areas.

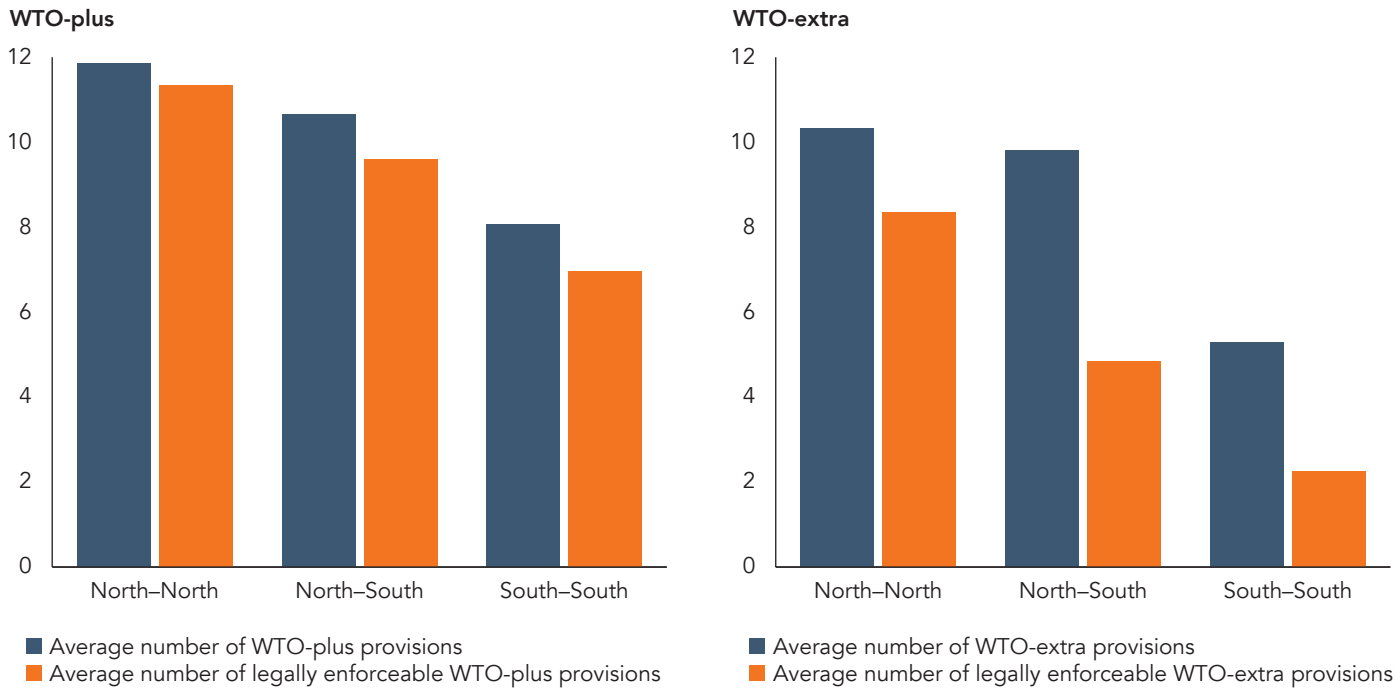
There is no formal theory to guide the analysis of differential effects of deep preferential trade agreements across countries' level of development, but a plausible argument is that deep preferential trade agreements matter for developed and developing economies for different reasons. With trade among developed countries already largely liberalized and domestic institutions robust, North–North deep agreements aim mostly to internalize cross-border policy spillovers. Deep agreements have additional roles for developing countries, since trade generally faces higher barriers and domestic institutions are 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 for border and behind-the-border policies. Since tariffs between developing countries are often still high, South–South preferential trade agreements affect GVC participation mostly through traditional trade liberalization.

To investigate the effect of the content of preferential trade agreements depending on countries' level of development, Osnago, Rocha, and Ruta (2016) ran three regressions on different groups of countries: North–North, North–South, and South–South. To allow for a broader sample of countries, data on trade in parts and components are used in these regressions to measure the extent of GVC integration among country pairs. In each regression, the key explanatory variable is the number of WTO-plus and WTO-extra provisions in a preferential trade agreement rather than preferential trade agreement depth.

The content of preferential trade agreements matters for GVC integration, and the impact varies by countries' level of development. WTO-plus provisions, such as tariff reduction, drive the effect of deep preferential trade agreements on South–South trade in parts and components. Each additional WTO-plus provision boosts South–South GVC integration 8.3%. WTO-extra provisions, such as investment and competition policy, drive the effects of North–South trade in parts and components. An

FIGURE 8.6 The depth of preferential trade agreements by the type or provisions and the development level of members

Number of provisions



Source: Osnago, Rocha, and Ruta 2016.

Note: WTO-plus provisions include legally enforceable regulations on policy areas that are under the current mandate of World Trade Organization (WTO) customs regulations, such as export taxes, antidumping measures, and technical barriers to trade. WTO-extra provisions are outside the WTO mandate and include a wide-ranging set of policy areas, from investment to environmental laws and nuclear safety.

additional WTO-extra provision in a North–South preferential trade agreement increases GVC integration 4.3%.

Global value chains and the choice of preferential trade agreement partners

From a normative perspective the issue is whether the international fragmentation of production changes the merits of regionalism relative to multilateralism. From a positive perspective the question is whether the presence of GVCs (or the possibility of anchoring a country to them) changes the way countries select their trading partners. This section briefly looks at both issues from a theoretical perspective and then applies the 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, preferential trade agreements are suboptimal to a multilateral agreement from a global welfare perspective. However, preferential arrangements may still be efficient from the perspective of an individual country, for both economic and noneconomic reasons. First, countries may benefit from a preferential trade agreement at the expense of other countries not included in the agreement. This would be the case where exports from members displace exports from nonmembers. Second, countries may have noneconomic reasons to sign trade agreements, because preferential trade agreements can strengthen security ties or work as a building block for political integration. As these arguments are beggar-thy-neighbor or noneconomic, preferential trade agreements are an inefficient substitute for multilateral trade liberalization from an economic point of view.

GVCs alter this logic by creating new rationales for preferential trade agreements: the unbundling of stages of production across borders creates new forms of international policy spillovers and time-consistency problems. These in turn generate demand for deeper forms of integration. For deep agreements involving behind-the-border policies, a tradeoff arises between economies of scale and heterogeneity of preferences.[10] This tradeoff is well known in the public economics literature that deals with fiscal federalism (Oates 1999). While noneconomic arguments and new beggar-thy-neighbor gains (such as a "rule of law" externality) may still drive the decisions to form preferential trade agreements, 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

preferential trade agreements may complement rather than substitute for the multilateral trading system because they allow for coordinating or harmonizing policies that could not be coordinated or harmonized at the global level.

From a positive perspective the literature on shallow preferential trade agreements struggled with the notion of the ideal trade partner (Schiff and Winters 2003). Two main sets of economic characteristics increase the benefits of forming a preferential trade agreement with a specific partner. The first is trade intensity, which suggests that the two countries are "natural" trade partners. Characteristics such as geographic proximity that increase trade intensity among partners make it more convenient to reduce bilateral tariffs. The second has to do with comparative advantage: complementarities in production or consumption increase the benefit of forming a preferential trade agreement.

Are these characteristics relevant in the context of GVCs? The answer is not obvious, and the literature is not yet developed. Some characteristics still matter. For instance, proximity may be important in selecting preferential trade agreement partners because face-to-face communication is relevant to managing supply chains. Similarly, comparative advantage can be defined at the task level, with complementarities—say, between different stages of production—guiding the choice of preferential trade agreement partners. But other characteristics would appear to matter too, such as cross-country differences in policy preferences. If GVCs require deep agreements to function smoothly, ideal preferential trade agreement partners should not have policy preferences that are too different, since this would increase the cost of coordinating and harmonizing policies.

There is a new focus in the literature on the experience of China in choosing preferential trade agreement partners. To characterize preferential trade agreements from the point of view of GVCs, Cheng and others (2016) borrowed the "smile curve." The horizontal axis represents a continuum of tasks or stages of GVC from upstream to downstream covering research and development, intermediates, assembly, processing, marketing, and after-sale services. The vertical axis depicts the value added generated from various tasks or stages. Based on this notion, Cheng and others (2016) defined vertical preferential trade agreements as agreements driven by comparative advantage at the task level—agreements formed as a result of the vertical division of labor along the supply chain, with member economies locating at different GVC positions.

With this framework in mind, Cheng and others (2016) asked whether China's preferential trade agreements exploit complementarities in production along the supply chain. China has concluded and is implementing 13 preferential trade agreements involving 21 individual economies[11] and is negotiating or has proposed 11 other bilateral and regional preferential trade agreements, along with the 16-member Regional Comprehensive Economic Partnership. By quantifying China's GVC linkage with its preferential trade agreement and non–preferential trade agreement partners, Cheng and others found that GVC complementarities are important in the choice of preferential trade agreement partners for China.

The future of the relationship between deep agreements and global value chains

The past 25 years have been a period of deepening trade agreements and growing intensity of GVCs. Will this trend continue in the next quarter century? Given the growing backlash to globalization in advanced economies, this is no longer a rhetorical question. There are reasons for optimism, as GVCs and preferential trade agreements reinforce each other and make slipping backward less likely. But the future of this relationship should not be taken for granted because cross-border production decisions depend on expectations concerning trading partners' future trade policies. Negative expectations could result in a reversal of the current trends toward GVC expansion and deeper integration.

Some observers have argued that the current globalization backlash has similarities to the backlash of the early 20th century and that this may lead to a prisoner's dilemma, where countries escalate protectionism even though it is not in their interest, 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 those of the early 20th century.

Trade agreements have stimulated the creation of GVCs by internalizing cross-border policy externalities, lowering trade costs, and providing deeper common disciplines that facilitate the operation of economic activities spanning multiple borders. In turn, GVCs have changed the political economy of trade policy, discouraging protectionism and creating a demand for deep integration. The higher the domestic content of foreign-produced final goods, the lower the tariffs set by governments (Blanchard, Bown, and Johnson 2016) and the higher the GVC trade with partners, the deeper the agreements countries sign (Orefice and Rocha 2014). This two-way relationship between GVCs and preferential trade agreements supports the view that trade disintegration (protectionism, undoing trade agreements) is unlikely.

Despite these dramatic changes, however, the future of the relationship between preferential trade agreements and GVCs should not be taken for granted. GVCs are the result of firms' investment and sourcing decisions, which are endogenous because they depend on expectations of future trade policies. If firms expect a change in future trade policy, they will take this into account in their decisions, possibly leading them to renationalize (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's dilemma, the current situation may be described as a trust dilemma (or a coordination game) where what is rational to choose depends on beliefs about what others will do.

A simple game illustrates the trust dilemma that may characterize the relationship between preferential trade agreements

and GVCs—referred to here as the trust dilemma of deep integration (table 8.1). Consider two players, Home and Foreign, and assume that each 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, by contrast, requires no cooperation with the other player but also leads to lower welfare.

The trust dilemma of deep integration has two pure-strategy Nash equilibria. The first is the upper-left corner of table 8.1, where Home and Foreign cooperate (2,2); the second is the lower-right corner, where the two players defect and choose not to cooperate (1,1). With global welfare inferior in the no-cooperation strategy, this equilibrium can be described as a coordination failure. Importantly, this equilibrium can be the result of a self-fulfilling prophecy in that it can be triggered by the belief that the other player will not choose to cooperate.

While only an example, the game shows why continuing trust in the willingness of others to cooperate is essential to the future of the relationship between preferential trade agreements and GVCs. 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 for the course of policy could lead to a reversal and result in an inferior equilibrium where production is 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 does not induce them to opt for national production, with policymakers offering protection and undoing trade agreements.

TABLE 8.1 The trust dilemma of deep integration

Players: Home, Foreign	Global value chains and deep agreements	National production and no agreement
Global value chains and deep agreements	2, 2	0, 1
National production and no agreement	1, 0	1, 1

Source: Author's elaboration.

Conclusions

New World Bank data on the content of trade agreements show that preferential trade agreements are becoming deeper. First, economic theory indicates that preferential trade agreements and GVC integration are related, as the smooth functioning of cross-border production activities calls for the regulation of behind-the-border policy areas. Theory also points out that, in a GVC context, preferential trade agreements and the multilateral trade system generally complement each other because some policy areas can be more efficiently regulated within smaller groups of like-minded countries. But many important questions on the relationship between preferential trade agreements and GVCs remain open. One is on the content (or, equivalently, the efficient design) of deep preferential trade agreements; another is on the optimal choice of preferential trade agreement partners. The literature has investigated these questions 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 preferential trade agreements and on measures of GVC integration, some progress has been made in illuminating the extent of the relationship between preferential trade agreements and GVCs. Recent evidence shows that deep preferential trade agreements boosts GVC integration and that undoing this depth is likely to hurt GVCs. The content of preferential trade agreements also matters: WTO-extra provisions are key drivers of GVCs for North–South preferential trade agreements, while WTO-plus provisions are important for South–South GVC integration. And an analysis of China's trade agreements indicates that the choice of the "right" preferential trade agreement partners is affected by a country's GVC position, stressing the importance of comparative advantage at the task level among other factors.

On the future of GVCs and deep agreements, there are reasons for optimism and reasons for concern. In the past 25 years governments signed deep preferential trade agreements and firms fragmented production. These decisions reinforced each other and sustained a cooperative equilibrium. In the next 25 years changing expectations for 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 relationship between preferential trade agreements and GVCs.

Notes

1. This chapter uses the term "preferential trade agreements" rather than "regional trade agreements" since some of these agreements are not necessarily between countries within the same region or in regional proximity.
2. This section draws on Hofmann, Osnago, and Ruta (2017).
3. See Freund and Ornelas (2010), WTO (2011), and Limao (2016) for recent surveys of the literature on preferential trade agreements.
4. This database offers the most comprehensive and up-to-date data available on 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.
5. See Maggi (2014), Bagwell, Bown, and Staiger (2015), Bagwell and Staiger (2016), and Grossman (2016) for recent reviews.
6. This section is based on Osnago, Rocha, and Ruta (2016).
7. 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, Wei, and Zhu (2016) and come from the World Input-Output Database.
8. This section looked at the impact of preferential trade agreements in boosting GVC trade. A related question is whether the undoing of a preferential trade agreement would negatively affect GVCs. Mulabdic, Osnago, and Ruta (2017) studied the effect that EU membership had on GVC and overall trade of the United Kingdom, most notably with its European partners, and then used this information to assess the future of U.K.–EU trade under different scenarios.
9. This section is based on Osnago, Rocha, and Ruta (2016).
10. Maggi (2014) discusses a similar rationale. 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 preferential trade agreement or in an agreement involving a subset of members within the WTO, such as a plurilateral or critical-mass agreement.
11. The preferential trade agreements are with Australia; Chile; Costa Rica; Hong Kong, China; Iceland; Macao, China; New Zealand; Pakistan; Peru; the Republic of Korea; Singapore; Switzerland; and the 10-member Association of Southeast Asian Nations (Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam).

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APPENDIX 1
Authors' conferences

First Authors' Conference: Background Papers

Beijing, March 17–18, 2016

Organized by the Research Institute for Global Value Chains at University of International Business and Economics and China Development Research Foundation

Co-sponsored by Bill & Melinda Gates Foundation

Thursday, March 17

8:00 a.m.–8:30 a.m.	**Opening remarks**
Speakers	Dr. Anabel Gonzalez, Senior Director of Trade & Competitiveness Global Practice, World Bank Dr. Hubert Escaith, Chief Statistician, WTO Dr. Nadim Ahmad, Chief of Trade & Competitiveness Statistics Division, OECD Dr. David Dollar, Senior Fellow, Brookings Institution Fang Jin, Deputy Secretary General, China Development Research Foundation Professor Zhao Zhongxiu, Vice President, UIBE
8:30 a.m.–9:30 a.m.	**Characterizing global value chains**
Speakers	Wang Zhi, UIBE, Wei Shangjin, ADB, Yu Xinding, UIBE, and Zhu Kunfu, UIBE
Discussant	Satoshi Inomata, IDE–JETRO
9:30 a.m.–10:30 a.m.	**Global value chains and their domestic foundations**
Speakers	Cosimo Beverelli, Robert B. Koopman, Simon Neumueller, and Victor Kummritz, WTO
Discussant	Meng Bo and Jiyoung Kim, IDE–JETRO
10:45 a.m.–11:45 a.m.	**Estimation of cumulative trade cost along global value-chains**
Speakers	Antonia Diakantoni, Hubert Escaith, Michael Roberts, and Thomas Verbeet, WTO
Discussant	Nadim Ahmad, OECD
11:45 a.m.–12:45 p.m.	**Taxation reform on intermediate imports and its implications for structure adjustment of Chinese economy—a CGE model–based analysis**
Speakers	Wang Fei and Pei Jianso, UIBE, He Jianwu, DRC
Discussant	David Dollar, Brookings institution

2:00 p.m.–3:00 p.m.	**Measuring smile curves in global value chains**
Speakers	Ye Ming, Fudan University, Meng Bo, IDE–JETRO and Wei Shangjin, ADB
Discussant	Ju Jiandong, Shanghai University of Economics and Finance
3:00 p.m.–4:00 p.m.	**Participation of developing countries in global value chains**
Speaker	Przemyslaw Kowalski, Javier Lopez Gonzalez, Alexandros Ragoussis, and Cristian Ugarte, OECD
Discussant	Joseph Mariasingham, ADB
4:15 p.m.–5:15 p.m.	**Middle income trap and GVCs**
Speakers	Gianluca Santoni, Daria Taglioni, Deborah Winkler, World Bank, and Victor Kummritz, WTO
Discussant	Li Zhigang, ADB
5:15 p.m.–6:15 p.m.	**Production transformation in emerging economies**
Speakers	Nadim Ahmad and Annalisa Primi, OECD
Discussant	Yu Jiantuo, CRDF
6:30 p.m.–7:30 p.m.	**Dinner**
Participant	All

Friday, March 18

8:00 a.m.– 9:00 a.m.	**Services trade and GVCs**
Speakers	Erik van der Marel, ECIPE, and Sebastian Saez, World Bank
Discussant	Cosimo Beverelli, WTO
9:00 a.m.–10:00 a.m.	**Services in Global Value Chains: From Inputs to Value-Creating Activities**
Speakers	Sebastien Miroudot, OECD
Discussant	Li Shantong, DRC
10:10 a.m.–11:10 a.m.	**Preferential Trade Agreements and Global Value Chains**
Speakers	Alen Mulabdic, Alberto Osnago, Michele Ruta, World Bank, Nadia Rocha, WTO
Discussant	Andrew Crosby, ICTSD
11:10 a.m.–12:10 p.m.	**How does the Selection of FTA Partner(s) Matter in the Context of GVCs? The Experience of China**
Speakers	Cheng Dazhong, Fudan University, Wang Xinkui, Shanghai WTO Center, Xiao Zhiguo, Fudan University, Yao Weiqun, Shanghai WTO Center
Discussant	Robert B. Koopman, WTO
12:15 a.m.–2:00 p.m.	**ICTSD - WEF Joint Launching of the E15 Report on "Strengthening the Global Trade and Investment System in the 21st Century" in partnership with Caixin Insight Group and UIBE/RIGVCs**
Participant	All
2:00 p.m.–3:00 p.m.	**Micro structure of global imbalance and the development of global value chains**
Speakers	Yang Jun, UIBE, Li Xin, Beijing Normal University, Wang Zhi, UIBE
Discussant	Nick Hope, Stanford Center for International Development
3:00 p.m.–4:00 p.m.	**Local investment climates and participation in global value chains**
Speakers	David Dollar, Brookings, Ge Ying and Yu Xinding, UIBE
Discussant	Hubert Escaith, WTO
4:10 p.m.–5:10 p.m.	**Neighboring institutions matter for the competitiveness of your value chain**
Speaker	Rodrigo Wagner, University of Chile
Discussant	Ma Hong, Tsinghua University
5:10 p.m.-6:00 p.m.	**Keynote speech: The forces driving the future of supply chains and the tradable part of the global economy**
Speaker	Michael Spence, the Noble Prize laureate in Economics

6:00 p.m.–6:30 p.m.	**Closing remarks**
Speakers	Dr. David Dollar, Senior Fellow, Brookings Institution Dr. Anabel Gonzalez, Senior Director of Trade & Competitiveness Global Practice, World Bank Robert B. Koopman, Chief Economist, WTO Dr. Nadim Ahmad, Chief of Trade & Competitiveness, OECD Dr. Ricardo Melendez-Ortiz, CEO, ICTSD Wang Zhi, Professor and Director, RIGVC

Second Authors' Conference: Chapters

Washington, November 28–29, 2016

Monday, November 28

8:30 a.m.–9:00 a.m.	**Opening**
Presenters	Anabel Gonzalez, WBG and Robert Koopman, WTO
9:00 a.m.–10:20 a.m.	**Chapter 1 Historical review of the development of GVCs and analytical frameworks**
Presenter	Satoshi Inomata, IDE–JETRO
Discussant	Juan Blyde, IADB and Robert Koopman, WTO
10:40 a.m.–12:00 p.m.	**Chapter 2 Recent trends in global trade and GVCs**
Presenters	Zhi Wang, UIBE, Bo Meng, IDE–JETRO
Discussants	Gaaitzen de Vries, University of Groningen and Deborah Winkler, WBG
1:30 p.m.–2:50 p.m.	**Chapter 3 Accumulated trade costs and their impact on the development of GVCs**
Presenter	Hubert Escaith, WTO
Discussants	Yu Xinding, UIBE and Jose G Reis, WBG
2:50 p.m.–4:10 p.m.	**Chapter 4 GVCs and the development agenda**
Presenter	Nadim Ahmad, OECD
Discussants	Nadia Rocha, WBG and Heiwai Tang, John Hopkins University
4:30 p.m.–5:50 p.m.	**Chapter 5 The "middle-income trap" and upgrading along GVCs**
Presenter	Daria Taglioni, WBG
Discussants	Gary Gereffi, Duke University and Qi Yinan, UIBE

Tuesday, November 29

9:00 a.m.–10:20 a.m.	**Chapter 6 Services trade liberalization and GVCs**
Presenters	Aaditya Mattoo and Cecilia Heuser, WBG
Discussants	Przemyslaw Kowalski, OECD and J. Bradford Jensen, Georgetown University
10:40 a.m.–12:00 p.m.	**Chapter 7 Local investment climates, institutional quality, and GVCs**
Presenter	David Dollar, Brookings Institution
Discussants	Cosimo Beverelli, WTO and Rodrigo A. Wagner, Tufts University
1:30 p.m.–2:50 p.m.	**Chapter 8 Regional trade agreements and GVCs**
Presenter	Michele Ruta, WBG
Discussants	Dazhong Cheng, Fudan University and Michael Ferrantino, WBG
3:30 p.m.–6:00 p.m.	**Executive summary**
Presenters	David Dollar, Brookings Institution and Zhi Wang, UIBE
Discussants	All

The importance of the global value chain (GVC) phenomenon has stimulated researchers to develop statistics and analysis based on the value added in trade. The GVC phenomenon also demands that researchers analyze the discrete tasks or phases in the production process. Data are now available on the value added traded among major economies during 1995–2014. This first *Global Value Chain Development Report* draws on the expanding research that uses data on the value added in trade. Its main objective is to reveal the changing nature of international trade that can be seen only by analyzing it in terms of value added and value chains.

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