Deep Trade Agreements and Welfare Gains: Strategies for Latin American Integration

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INSTITUTO DE ECONOMÍA 12, 2025
Serie Documentos de Trabajo DT 25/25

ISSN: 1510-9305 (en papel)
ISSN: 1688-5090 (en línea)

Agradecimientos o reconocimientos institucionales, financiadores, etc.

Este trabajo forma parte de mi tesis de doctorado, dirigida por Pedro Moncarz, a quien expreso mi agradecimiento por su generosidad al compartir su conocimiento y por su dedicación en la supervisión de esta investigación.

Agradezco de manera especial a Marcel Vaillant, a Flavia Rovira y a Manuel Flores por sus valiosos comentarios y aportes en distintas etapas del trabajo.

Extiendo también mi agradecimiento a las y los colegas del Instituto de Economía (IECON) y, en particular, al grupo de Macro y Comercio, incluyendo a Adriana Peluffo, por sus aportes, que nutrieron el desarrollo de este estudio.

Asimismo, agradezco a las y los participantes del congreso organizado por el IECON, donde este trabajo fue presentado por primera vez en 2024, así como a las y los colegas que participaron en el congreso “Repensando el desarrollo en América Latina”, organizado por CAF y la Universidad Nacional Autónoma de México (UNAM), en especial a Gabriel Porcile, comentarista de mi trabajo, y a las y los participantes del European Trade Study Group (ETSG). Sus comentarios críticos y sugerencias contribuyeron de manera importante a mejorar la versión final del manuscrito.

Cualquier error u omisión que subsista es de mi exclusiva responsabilidad.

Forma de citación sugerida para este documento: Villano, S. (2025) “Deep Trade Agreements and Welfare Gains: Strategies for Latin American Integration”. Serie Documentos de Trabajo, DT 25/25. Instituto de Economía, Facultad de Ciencias Económicas y Administración, Universidad de la República, Uruguay.

Deep Trade Agreements and Welfare Gains: Strategies for Latin American Integration

A Dynamic Structural Gravity Model Approach to Trade Policy

Sebastian Villano*

Resumen

Este trabajo analiza cómo la liberalización comercial y la firma de acuerdos de integración repercuten sobre el crecimiento y el bienestar en América Latina y el Caribe (ALC), con énfasis en el papel de los acuerdos comerciales profundos. Distinguimos, por un lado, acuerdos menos profundos, que otorgan preferencias arancelarias o establecen áreas de libre comercio en bienes y, en algunos casos, también en servicios, sin incorporar un número amplio de disciplinas regulatorias adicionales; y, por otro lado, acuerdos profundos, que combinan libre comercio en bienes y servicios con compromisos más extensos en inversión, propiedad intelectual, competencia, compras públicas, estándares regulatorios y otros ámbitos de política económica.

El análisis utiliza un Modelo de Gravedad Estructural Dinámico del Comercio (SGMT) formulado como un modelo de equilibrio general dinámico con crecimiento vía acumulación de capital. Se trabaja con un conjunto de datos mejorado, que corrige sesgos de medición y, en particular, amplía y precisa la cobertura de los acuerdos comerciales. Sobre esta base, se realizan simulaciones contrafácticas para comparar distintas estrategias de integración: profundizar los acuerdos vigentes dentro de ALC y firmar acuerdos profundos entre la región y los principales polos económicos globales.

Los resultados muestran que los acuerdos profundos generan efectos sobre el comercio aproximadamente tres veces mayores que los acuerdos superficiales o de profundidad intermedia. Además, las ganancias dinámicas de bienestar asociadas a estos acuerdos —medidas en términos de consumo real— duplican los efectos estáticos. Esta diferencia refleja la importancia de la acumulación de capital y de los ajustes de largo plazo, mecanismos que solo pueden captarse adecuadamente en un modelo dinámico.

Aunque gran parte del comercio intrarregional de ALC ya se realiza bajo acuerdos preferenciales, las simulaciones indican que modernizar y profundizar los acuerdos existentes genera ganancias de bienestar más relevantes que priorizar la firma de nuevos acuerdos, incluso con socios extrarregionales. En particular, los escenarios en los que ALC actúa como bloque integrado y firma acuerdos profundos con grandes hubs globales —como Europa, Norteamérica o Asia— aparecen como la opción que maximiza las ganancias agregadas de bienestar.

En conjunto, el estudio aporta evidencia cuantitativa para el diseño de la política comercial en la región: sugiere que el principal margen de mejora no está solo en abrir más mercados, sino en avanzar hacia una integración más profunda y coherente que refuerce la resiliencia regional, mejore la competitividad y sostenga el crecimiento de largo plazo en América Latina y el Caribe.

Código JEL: F13, F15, F47.

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Abstract

This paper examines how trade liberalization and the signing of integration agreements affect growth and welfare in Latin America and the Caribbean (LAC), with a particular focus on the role of deep trade agreements. We distinguish between, on the one hand, less deep agreements that grant tariff preferences or establish free trade areas mainly in goods and, in some cases, also in services, without incorporating a broad set of additional regulatory disciplines; and, on the other hand, deep agreements that combine free trade in goods and services with more extensive commitments in areas such as investment, intellectual property, competition policy, government procurement, regulatory standards and other dimensions of economic policy.

The analysis relies on a dynamic Structural Gravity Model of Trade (SGMT), formulated as a dynamic general equilibrium model with growth driven by capital accumulation. It uses an improved dataset that corrects measurement biases and, in particular, extends and refines the coverage of trade agreements. On this basis, the paper conducts counterfactual simulations to compare alternative integration strategies: deepening existing agreements within LAC and signing deep agreements between the region and major global economic hubs.

The results show that deep agreements generate trade effects that are roughly three times larger than those associated with shallow or medium-depth agreements. In addition, the dynamic welfare gains from deep agreements—measured in terms of real consumption—are about twice as large as their static effects. This gap highlights the importance of capital accumulation and long-run adjustment margins, which can only be captured adequately in a dynamic framework.

Although a large share of intraregional trade in LAC already takes place under preferential agreements, the simulations indicate that modernizing and deepening existing commitments yields larger welfare gains than prioritizing the signing of new agreements, even with extra-regional partners. In particular, scenarios in which LAC acts as an integrated bloc and signs deep agreements with major global hubs—such as Europe, North America or Asia—emerge as the option that maximizes aggregate welfare gains.

Taken together, the findings provide quantitative evidence for trade policymaking in the region: they suggest that the main margin for improvement lies not only in opening additional markets, but in moving towards deeper and more coherent integration that strengthens regional resilience, enhances competitiveness and supports long-run growth in Latin America and the Caribbean.

Keywords: Deep trade agreements, Latin America, regional integration, dynamic gravity model, trade policy.

JEL Classification: F13, F15, F47.

I. Introduction

The global trading system has entered a phase of heightened geopolitical tension and "geoeconomic fragmentation," characterized by the escalation of the US–China trade war, the proliferation of export controls, and the strategic reconfiguration of global value chains. These developments have revived concerns about the vulnerability of open economies to external shocks and have brought trade policy back to the center of the debate on growth and development.

Latin America and the Caribbean (LAC) confront these global headwinds while facing persistent economic, social, and environmental challenges that demand a comprehensive reevaluation of their development strategies. Fragmentation in the world economy has reshaped production networks and trade patterns, and the growing backlash against international trade has reinforced the relevance of rigorous trade policy analysis, consolidating it as a priority research area (Caliendo and Parro, 2021).

In the post-war period, trade negotiations significantly reduced traditional barriers to international trade. However, as tariffs declined globally, trade policies began incorporating non-tariff measures and domestic regulations that, in practice, act as new barriers to trade (Grossman et al., 2019). As a result, global markets remain far from fully integrated.

Economic integration has been a key development strategy in LAC, with preferential trade agreements (PTAs) playing a central role over the past three decades. Despite an extensive network of intra-regional agreements covering over 80% of trade, their impact on trade growth remains limited. Baldwin (2011) highlights how modern regionalism differs qualitatively from the 1990s. Additionally, while LAC countries have pursued trade liberalization through various agreements, its effects on economic growth and welfare have fallen short of expectations (Mesquita Moreira et al., 2019; Rodrik, 2006).

Since the 1990s, there has been an increase in the signing of deep trade agreements that go beyond market access. In that decade, only 25% of global bilateral relations were covered by trade agreements, mostly partial and shallow. Today, that percentage has risen to 40%, with an increasing proportion of broader and deeper agreements. These modern agreements cover areas such as investment regulation, trade in services, customs procedures, regulatory measures, and intellectual property rights protection, among others (Rocha and Ruta, 2023). However, significant heterogeneity persists in the depth and scope of these agreements within LAC.

A central challenge for the region is to reverse the weak productivity growth of recent decades, a prerequisite for closing the per capita income gap with more advanced countries. Trade liberalization and deeper international integration are key tools to achieve this goal (Sanguinetti et al., 2021). In this sense, deep trade agreements are effective policy instruments for promoting meaningful integration that fosters trade, growth, and development.

This study analyzes the effects of trade liberalization and economic integration on growth in LAC. It argues that a shift towards deeper integration strategies could transform the region into a more resilient and interconnected economic bloc, capable of withstanding global shocks and achieving sustainable development. Additionally, it evaluates the outcomes of different international insertion strategies in terms of trade and welfare, providing elements for the design of national and regional public policies.

The analysis is grounded in the dynamic structural gravity model of trade (SGMT) developed by Anderson et al. (2020). The results focus on examining the transmission channels of trade policy to international trade and output, both in the short and long term, and evaluating its effects on welfare, measured through real consumption.

This study is connected to previous research on LAC, such as Moncarz et al. (2023), who highlight the limited trade integration and explore policy tools to address this, and Sanguinetti et al. (2022), who analyze the structural barriers impeding trade expansion within the region. These studies provide a foundation for understanding the systemic issues that this work seeks to address through innovative modeling and policy analysis. It also relates to analyses by Rocha and Ruta (2023) and Fontagné et al. (2023) on regional integration and deep agreements.

This paper introduces several innovations to the analysis of trade integration. First, it enhances trade policy identification through the development of a comprehensive database with broader coverage of preferential trade agreements (PTAs), particularly in LAC economies, building on previous efforts by the World Bank (Fernandes et al., 2023). Second, it advances the specification of trade costs by distinguishing between discriminatory and non-discriminatory trade policy instruments. A key contribution lies in the identification and modeling of both channels—preferential and multilateral—highlighting their distinct effects on trade and economic performance through counterfactual simulation exercises.

Although trade agreements vary widely in scope and ambition, much of the empirical literature continues to rely on dummy variables to capture their effects. As Limão (2016) notes, this approach overlooks the multidimensional nature of agreement depth and can introduce significant measurement error when assessing their true economic impact. The failure to account for legal and regulatory heterogeneity limits our understanding of how trade agreements actually influence trade flows, productive structure, or welfare.

To address this shortcoming, this paper classifies trade agreements into three levels—shallow, medium, and deep—based on legal depth, regulatory content, and tariff coverage. This refined classification enables a more accurate representation of integration intensity across bilateral relationships and allows for a more meaningful analysis of their economic effects.

Third, the analysis is embedded in a dynamic general equilibrium framework with asymmetric trade costs—i.e., directional trade frictions that vary by geography, tariffs, and non-tariff barriers—allowing for the simulation of alternative integration strategies. The model estimates the effects of deep trade agreements (DTAs) under counterfactual scenarios that reflect two types of policy shifts: (i) the formation of new deep agreements where no agreement currently exists, and (ii) the upgrading or deepening of existing agreements toward more complex institutional arrangements. This approach is particularly relevant for LAC, a region where trade integration has long relied on relatively shallow and outdated frameworks. The study evaluates the potential of deeper integration—either through new or strengthened agreements—to enhance trade, output, and real consumption-based welfare, thereby reinforcing the region's integration architecture.

The main findings show that deeper trade agreements yield substantially larger gains in trade and integration—up to three times greater than those associated with traditional, tariff-based PTAs. Counterfactual simulations involving the three major global economic hubs—North America, Europe, and Asia (China, Japan, and Korea)—indicate that all LAC countries benefit from deeper integration, although the magnitude of gains varies significantly across countries.

While deeper integration with Europe delivers the highest average welfare gains, no single external partner is optimal for all. Intra-regional integration within LAC emerges as a particularly effective strategy for most economies in the region. Moreover, macro-regional strategies that combine deeper intra-LAC ties with preferential access to major global hubs—especially North America—consistently outperform approaches based solely on extra-regional agreements. These results underscore the value of hybrid trade strategies that simultaneously strengthen regional institutions and enhance global linkages.

The remainder of the paper is structured as follows: Section II describes the database of agreements and trade flows, with classifications by type and legal depth. Section III presents the theoretical framework. Section IV details the methodology and model specification. Section V reports the empirical results and simulation exercises. Section VI concludes with policy implications.

II. Database and Descriptive Analysis

Trade agreements have played an increasingly central role in shaping the structure and geography of international trade over the past three decades. This section provides a comprehensive empirical overview of the evolution, typology, and depth of PTAs between 1995 and 2017, forming the empirical foundation for the simulation exercises developed in the following sections. Rather than offering a purely descriptive account, the analysis aims to uncover structural patterns and institutional dynamics of trade integration.

The organization of this section follows a sequential and analytical logic. It begins with a global overview of the proliferation and typology of PTAs, analyzing the extent to which these agreements have shaped bilateral trade relationships across regions and over time (II.1 – Global Trends in PTA Coverage and Types). The second subsection shifts the focus to the depth of agreements, introducing a novel classification framework that captures the legal, regulatory, and institutional content of trade commitments (II.2 – Agreement Depth: Classification and Dynamics). Finally, the third part focuses exclusively on the LAC region, exploring the region's integration strategies, the structure of intra- and extra-regional trade, and the diversity of agreements in terms of both form and depth (II.3 – Trade Agreements and Regional Integration in Latin America and the Caribbean).

This three-part structure—from global to regional, and from formal classification to effective trade flows—allows for a coherent examination of both the historical trajectory and current architecture of preferential trade. It highlights the increasingly complex role of PTAs as institutional vehicles for economic integration and provides a consistent empirical base for identifying the channels and margins along which regional trade in LAC can be expanded, deepened, or redirected.

II.1 - Global Trends in PTA Coverage and Types

The database includes 291,088 bilateral trade relationships among 113 countries over the period 1995–2017. In 2017, 66% of these country-pairs did not share a preferential trade agreement (PTA), yet they accounted for only one-third of global trade. By contrast, the remaining 34% of dyads—governed by some form of agreement—concentrated two-thirds of trade flows, underscoring the central role of PTAs in shaping the global trading system.

The data reveal a clear and sustained trend toward greater integration via PTAs. These agreements have become more comprehensive in both coverage and legal depth, consistent with the findings of Rocha and Ruta (2023). In 1995, just 27% of bilateral relationships were covered by a PTA, representing 62% of global trade. By 2017, these shares had increased to 39% of dyads and 66% of trade flows, respectively. The peak coverage occurred in 2016, when 42% of relationships were governed by agreements accounting for 71% of global trade (Annex Table A.1).

To classify these agreements, the study adopts the WTO typology, supplemented with data from ALADI and the OAS. Agreements are grouped into five broad categories: Partial Scope Agreements and Unilateral Preferences (PTA_SGP), Free Trade Agreements (FTA), Customs Unions (CU), Generalized System of Preferences (GSP), and Economic Integration Agreements (EIA). Many PTAs combine elements from these categories, creating hybrid arrangements that vary in liberalization depth and legal enforceability[1].

Over the sample period, PTA_SGP remained the most frequent format, accounting for 58% of all preferential dyads. However, its relevance declined over time: the number of such links fell by 38% between 1995 and 2017. In contrast, FTA and CU arrangements quadrupled, while hybrid agreements incorporating EIA disciplines—FTA_EIA and CU_EIA—expanded by 1,960% and 228%, respectively. Figure 1 illustrates these trends, showing the increasing prevalence of deeper and more institutionalized forms of integration.

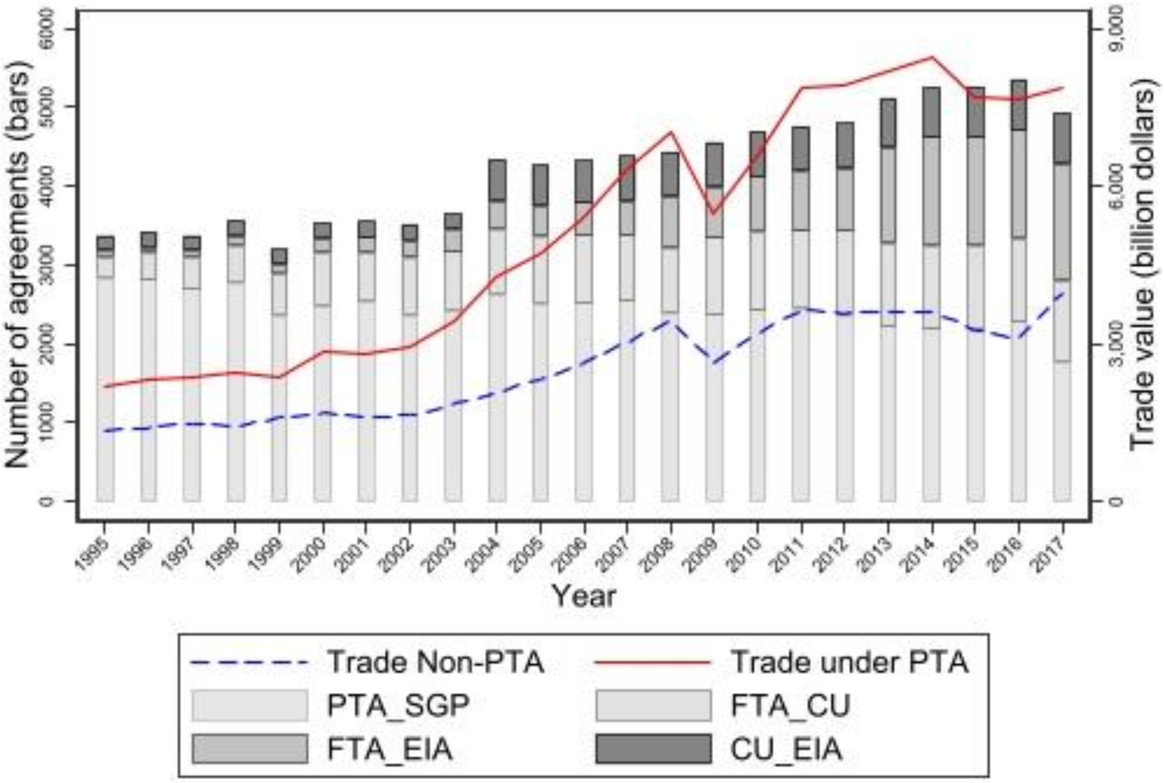
To estimate coverage, we assume that all bilateral trade between countries with a binding agreement falls under its legal framework. While this assumption may overstate the effect of partial or unilateral agreements, its bias is limited for broader, reciprocal arrangements.

At the regional level, Europe leads in both the number of agreements and the value of trade conducted under deep arrangements, particularly those combining Customs Unions (CU) with Economic Integration Agreements (EIA). Asia, by contrast, records the largest trade volumes under partial-scope and unilateral preference arrangements (PTA_SGP). Latin America has shown a rapid expansion in both the number and depth of its trade agreements, while Africa continues to display a relatively high share of

[1] The specialized literature (Estevadeordal & Suominen, 2009; Baldwin, 2011; Antràs & Staiger, 2012) classifies trade agreements into categories such as WTO, WTO+, and WTO++ to reflect varying levels of depth and coverage. This study follows the WTO's official classifications, simplifying them for analytical purposes while ensuring alignment with the study's objectives

uncovered trade relationships, despite gradual improvements. Further details are provided in Annex Table A.2.

Figure 1 - Evolution of Trade and Number of Agreements by Type



See Tables A.2 and A.3 in Annex A for details. Source: Author's calculation.

II.2 - Characterization of Trade Agreements

Building on recent contributions by Fontagné et al. (2023) and the World Bank's Deep Trade Agreements (DTA) Database (Mattoo et al., 2020; Fernandes et al., 2023), this section classifies trade agreements according to their legal depth and regulatory scope. Beyond the typological approach used earlier, we group agreements into three tiers—shallow, medium, and deep—based on their institutional architecture, disciplinary coverage, and degree of legal enforceability. This taxonomy is complemented by an original composite indicator of legal complexity, introduced in Section IV.3, which enables a more granular analysis of modern preferential trade arrangements.

Deep Trade Agreements (DTA) are the most advanced form of integration, combining broad market access with robust commitments in disciplines such as investment, services, competition policy, and standards. Medium Trade Agreements (MTA) include Free Trade Agreements (FTA) and Customs Unions (CU) that incorporate some regulatory content, but do not reach the comprehensive scope of DTAs. In contrast, Shallow Trade Agreements (STA) tend to be partial-scope or unilateral preference schemes, with limited commitments beyond tariff reductions on goods.

Out of the 291,088 possible bilateral trade dyads observed across 113 countries between 1995 and 2017, a total of 97,763 (33%) were covered by at least one trade agreement. Within this subset, 58% corresponded to shallow agreements, 26% to medium-depth agreements, and 16% to deep agreements. Although limited-commitment schemes still dominate numerically, their relative weight has declined significantly over time. In 1995, most PTA-covered dyads were shallow; by 2017, the share of deep agreements had increased from 7% to 26% of all dyads governed by PTAs. The distribution of agreements by type and depth for the period 1995–2017 is summarized below:

Table 1 - Number of Agreements by Type and Agreement Level, 1995–2017

Level / Type	PTA_SGP	FTA_CU	FTA_EIA	CU_EIA	Total
Shallow	**56,219** (57.5)				**56,219** (57.5)
Medium		**18,262** (18.7)	**7,051** (7.2)	**530** (0.5)	**25,843** (26.4)
Deep			**6,203** (6.3)	**9,498** (9.7)	**15,701** (16.0)
Total	**56,219** (57.5)	**18,262** (18.7)	**13,254** (13.5)	**10,028** (10.2)	**97,763** (100)

*Values in parentheses represent percentages of the total relationships with agreements
Source: Author's calculation.

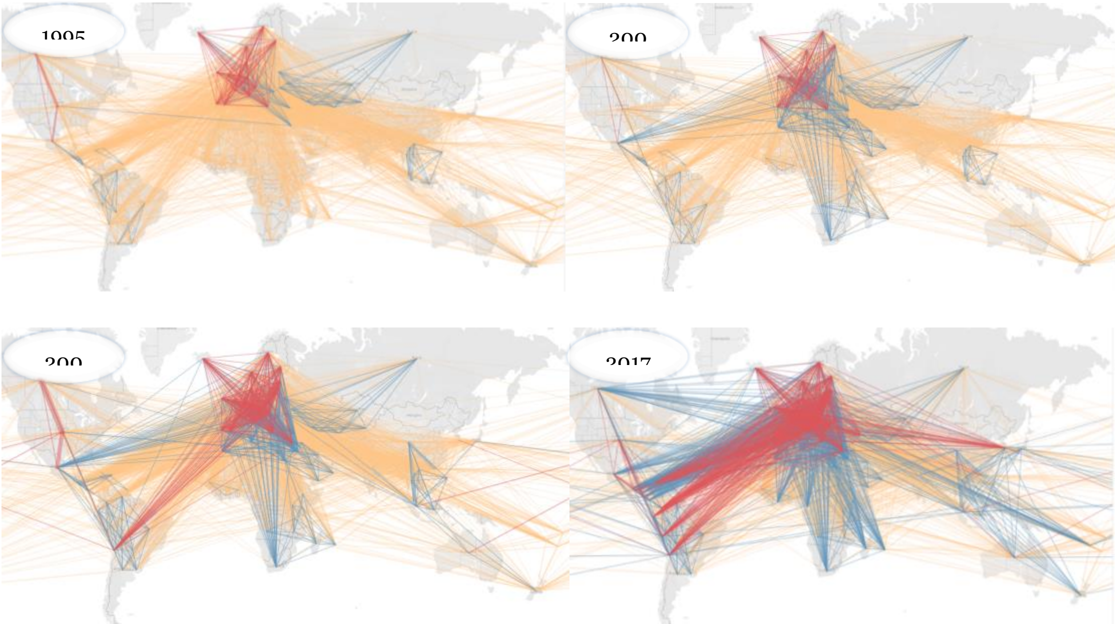
Compared to previous studies, the dataset employed here includes 72% more agreements than the corpus used in Fontagné et al. (2023), offering more complete coverage—especially for developing and emerging economies where agreement proliferation has been substantial but underreported. This broader scope allows for a more accurate mapping of global integration dynamics.

These compositional changes are even more striking when considering trade values. In 2017, although deep agreements represented just one-quarter of PTA-covered dyads, they accounted for 35% of the total value of trade under PTAs. In comparison, shallow and medium agreements contributed 16% each. Moreover, trade conducted under MTA grew fourteenfold, while trade under DTA nearly tripled between 1995 and 2017 (Annex Table A.4). These patterns reinforce the growing role of legal depth and regulatory disciplines in shaping global trade flows.

From a regional perspective, deep agreements are concentrated in Europe and North America, where comprehensive frameworks dominate both in number and value. Latin America has also significantly expanded its DTA network, particularly through extra-regional ties. In contrast, Asia remains the primary hub for medium-depth agreements, while shallow agreements continue to prevail in Asia and parts of Africa. These variations reflect divergent integration strategies: some economies are increasingly embedded in institutionalized, rule-based systems, while others prioritize flexible, goods-focused liberalization paths.

The evolution of bilateral relationships by agreement depth and region is summarized in Figure 2, which illustrates the changing structure of the global PTA network between 1995, 2005, and 2017. Each panel presents the number of dyads under STA, MTA, and DTA, highlighting the acceleration of deep integration and the decline of purely shallow frameworks across world regions.

Figure 2 - Changes in Bilateral Relationships by Agreement Type between 1995 2000 2005 and 2017



References: Deep Medium Shallow
Source: Author’s calculation.

In sum, the analysis confirms a dual transition: first, from limited and fragmented agreements toward more comprehensive and binding frameworks; and second, from purely market-access oriented PTAs to arrangements that increasingly regulate investment, services, competition, and standards. These trends underscore the rising strategic importance of deep integration in shaping not just trade flows, but also the broader architecture of the global economy.

II.3 - Regional Patterns and LAC Integration Strategies

Latin America and the Caribbean[2] presents a distinctive pattern of integration within the global trade system, marked by strong reliance on PTAs despite its modest share in global trade. In 2017, the region accounted for just 6% of global manufacturing exports, with trade flows concentrated toward North America (55%), followed by intra-regional partners (18%), Asia (14%), and Europe (11%). However, these flows are overwhelmingly structured by legal agreements: although only 37% of LAC's bilateral relationships were covered by PTAs, these accounted for 85% of the region’s total trade value. This high intensity of agreement usage—relative to the number of signed treaties—reveals a dense and selective reliance on institutionalized trade channels.

Two features stand out in LAC’s integration strategy. First, trade with its two main partners—North America and the LAC region itself—is almost entirely governed by PTAs (98% and 94% of exports, respectively). Second, the relative weight of extra-regional partners under preferential schemes is also notable: 58% of trade with Europe and 47% with Asia occurs under PTAs. Between 1995 and 2017, while the number of trade relationships governed by agreements expanded moderately (+13.9%), the value of trade

[2] Mexico is classified as part of Latin America and the Caribbean throughout this study and is therefore excluded from aggregate measures reported for North America.

under these agreements rose by 282%, indicating a shift toward deeper and more economically significant forms of integration.

This evolution is particularly visible in the proliferation of hybrid legal forms that combine Free Trade Agreements with Economic Integration Agreements (FTA_EIA), which rose from just 4 to 472 bilateral relationships during the period. These arrangements became the dominant PTA type in the region and, by 2017, accounted for 52% of total LAC trade value. Even as non-reciprocal preferential schemes—such as the Generalized System of Preferences (GSP)—faded due to LAC's graduation from eligibility, trade with non-agreement partners increased significantly (+639%). Nonetheless, by 2017, such trade still represented just 11% of total regional flows (see Annex Table A.1).

At the intra-regional level, trade remains modest in relative terms—17.6% of LAC's total exports in 2017—but highly structured by formal agreements. Brazil leads intra-LAC exports (31%), followed by Mexico (18%) and Argentina (13%). Among the 255 intra-regional dyads, only 45% lacked a governing agreement, and these accounted for just 6% of trade value. Conversely, the 55% of dyads covered by PTAs channeled 94% of trade, underscoring the role of legal frameworks in sustaining regional commerce.

A closer look at the typology of intra-regional agreements reveals clear differences in legal depth and associated trade intensity. FTA_EIA arrangements were the most frequent and influential, representing 35% of dyads and 27% of trade. FTA_CU covered 28% of relationships and 22% of trade, while PTA_SGP agreements accounted for 27% of dyads but only 14% of flows. Although CU_EIA agreements were the least common (9% of relationships), they facilitated the largest share of intra-LAC trade (31%), confirming that deeper commitments are associated with higher trade levels.

This logic extends to the classification of PTAs by legal depth. Figure 3 and Annex Table A.5 provide a detailed view of this transformation. In 1995, shallow trade agreements (STA) accounted for 29% of all LAC dyads and facilitated 46% of trade value. By 2017, these shares had dropped to 13% and 12%, respectively. At the same time, medium-depth agreements (MTA) rose from 3% to 14% of dyads and from 12% to 19% of trade value. Deep trade agreements (DTA), meanwhile, experienced the most dramatic growth—expanding from just 0.1% to 9% of dyads and capturing 54% of regional trade by 2017, up from 33% in 1995.

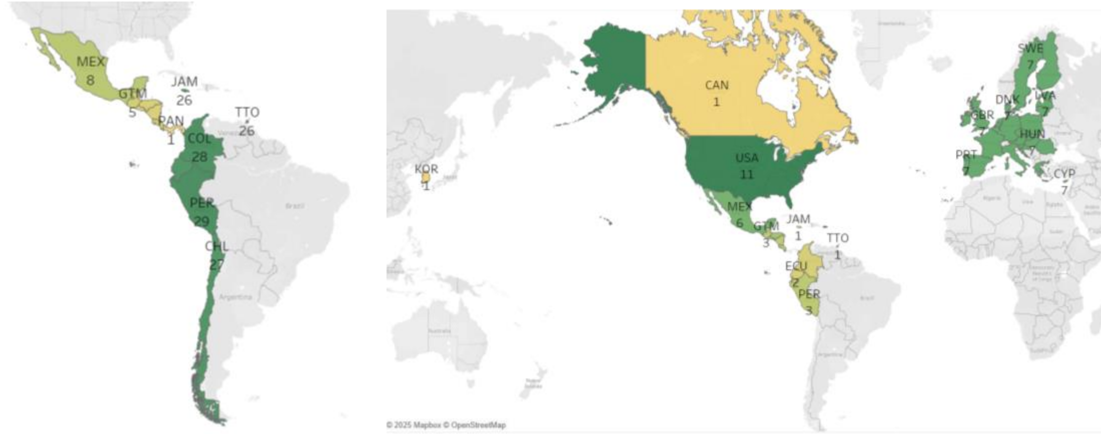
The asymmetry of DTA patterns is striking. Mexico's relationship with the United States alone accounts for 82% of all LAC trade under DTA, revealing a high level of concentration. However, other countries—such as Peru—show more diversified engagement. As of 2017, Peru had 29 DTA relationships (Panel I), including intra-regional ties with Ecuador, Colombia, and Mexico (Panel II). This configuration reflects a layered evolution of integration: early commitments within the Andean Community (founded in 1969) were later reinforced by deeper and more ambitious agreements, such as the Multiparty Trade Agreement with the European Union (EU).

Trade destination patterns further highlight regional asymmetries. Table 2 presents the breakdown of exports by partner region and agreement coverage. While only 15% of LAC exports are sent to countries without agreements—mainly in Asia (48%) and Europe

(31%)—85% go to partners with PTAs, especially in North America (64%) and within the region itself (20%).

Figure 3 - Trade Relationships Under DTA with Latin America and the Caribbean in 2017

I - LAC Partners **II - Partners for LAC Economies**



References: Number of relationships with agreements; scales vary according to maximum values.

Panel I - 1 33 Panel II- 1 11

Source: Author's calculation.

This structure masks significant differences across countries. Mercosur members—especially Uruguay—report high shares of exports without agreements, largely due to the expiration of GSP preferences and the absence of FTAs with key partners in Asia and Europe. In contrast, countries such as Bolivia, Chile, El Salvador, Haiti, Honduras, Mexico, and Peru conduct over 95% of their trade under PTAs. Notably, Chile and Peru have leveraged their broad agreement portfolios to diversify trade destinations, while Haiti and Mexico remain heavily concentrated on North America.

In intra-regional exchanges, most agreements are classified as MTA, which account for 58% of relationships and 66% of trade. DTA and STA each represent 14% of trade value, despite differing significantly in legal depth.

In summary, LAC's integration strategy has evolved toward deeper and more complex institutional frameworks, especially with extra-regional partners. While 85% of exports are already covered by PTAs, significant potential remains—particularly for countries with limited agreement networks or shallow commitments. Pacific Basin economies have taken the lead in signing DTA, while Atlantic Basin countries maintain a more balanced distribution of trade across agreement depths. These asymmetries suggest an untapped opportunity to update and expand the region's trade architecture. Section V explores national and regional policy options aimed at bridging these gaps through expanded coverage and deeper commitments.

Table 2 - Trade by LAC Countries and Partner Regions, 2017 (Values in percentage)

Country	No Agreement							With Agreement						
	AFR	ASA	EUR	LAC	NAM	OCN	Total No Ag.	AFR	ASA	EUR	LAC	NAM	OCN	Total W/A
ARG	5.1	33	33.1	3.1	25	0.7	**49.7**	2.7	17.2	6.0	71.2	0	2.8	**50.3**
BOL	2.7	76.6	1.3	13.8	0	5.6	**2**	0	25.6	8.9	42.5	22.9	0.1	**98**
BRA	8.5	44	43.5	3.8	0	0.2	**41.4**	2.4	14.8	2.0	47.5	32.7	0.5	**58.6**
CHL	19.8	67.2	2.1	10.8	0	0.1	**3.1**	0	40.1	13.8	22.5	23.0	0.6	**96.9**
COL	8.2	60.8	2.3	28.3	0	0.4	**9.3**	0	3.8	11.3	54.6	30.1	0.1	**90.7**
CRI	2.9	53	0.8	39.9	0	3.4	**5.8**	0	7.6	15.9	36.4	39.6	0.5	**94.2**
CUB	1.4	47.3	48.2	2.8	0.3	0	**84.5**	0	41.3	17.6	36.7	0	4.3	**15.5**
DOM	1.1	29.7	0.2	39.2	29.5	0.3	**36**	0	3.1	16.2	6.1	73.6	0.9	**64**
ECU	1.2	86.5	0.4	10	1.9	0.1	**27.4**	0	2.4	32.5	40.1	24.7	0.2	**72.6**
GTM	29.93	23.8	0.1	45.1	0	1.8	**8.8**	0	0.3	10.2	58.0	31.4	0.0	**91.2**
HND	3.1	48.8	3.8	43.1	0	1.2	**3.4**	0	0.4	10.9	27.3	61.2	0.2	**96.6**
HTI	2.3	13.3	0.7	83.7	0	0	**2.6**	0	0.9	5.5	4.2	89.1	0.2	**97.4**
JAM	12.3	13.4	57.7	13	0	3.6	**13**	0	5.5	39.0	3.6	51.9	0	**87**
MEX	6	84.5	1	6.9	0	1.7	**3.4**	0	1.7	6.4	5.8	85.7	0.4	**96.6**
NIC	20.1	13.4	0.1	66.1	0	0.3	**5.4**	0	0.8	7.6	24.0	67.4	0.1	**94.6**
PAN	1.9	21.8	0	76.2	0	0	**41.2**	0	6.0	20.4	64.9	8.5	0.2	**58.8**
PER	22.9	29.3	0.7	44.5	0	2.5	**3.2**	0	23.1	23.6	24.7	28.2	0.3	**96.8**
PRY	3.8	94	0.1	2.1	0	0	**19.1**	0.7	12.6	20.6	62.7	3.3	0	**80.9**
SLV	10	67.4	0.1	22.3	0	0.2	**5.3**	0	1.9	3.9	48.2	45.9	0.1	**94.7**
TTO	19.9	34.3	0.3	45.4	0	0.1	**18.8**	0	0.8	17.7	15.4	66.0	0.2	**81.2**
URY	2.9	48.4	41.6	5.8	1.1	0.1	**53.6**	0.4	12.1	3.0	71.8	12.2	0.3	**46.4**
VEN	3.8	63.7	26.2	5.8	0.5	0	**47.3**	0	5.1	0.3	27.9	66.7	0	**52.7**
LAC	7.2	48.2	31.3	6.9	5.8	0.5	**15.3**	0.4	7.7	7.8	19.5	64.1	0.5	**84.7**

References: a) Percentages of the Totals are calculated with respect to the total exports of each country. The percentage for each region refers to the Total without agreement or Total with agreement, as applicable.
Source: Author's calculation.

III. Theoretical Framework

This section develops the modelling framework used to quantify the effects of trade policy on trade, income and welfare. The starting point is a standard structural gravity model of trade (SGMT) in the CES–Armington tradition, which summarizes how bilateral trade costs and country size shape trade flows, prices and multilateral resistances. Building on this static structure, the model is then extended into a structural dynamic gravity model of trade (SDGMT) by embedding capital accumulation and transitional growth in the spirit of Anderson, Larch and Yotov (2020).

The gravity model has long been the workhorse for empirical trade analysis. Early contributions such as Tinbergen (1962) related bilateral trade to economic size and distance, while subsequent work provided rigorous microfoundations. Anderson (1979) and Armington (1969) introduced product differentiation by place of origin with CES preferences; Bergstrand (1985, 1989) and Deardorff (1998) offered general-equilibrium interpretations under monopolistic competition and factor proportions; Eaton and Kortum (2002) and Melitz (2003) embedded gravity in Ricardian and firm-heterogeneity settings; and Anderson and van Wincoop (2003) highlighted the central role of multilateral resistances. Surveys by Head and Mayer (2014), Costinot and Rodríguez-Clare (2014) and Yotov et al. (2016) show that, despite their different microfoundations, these models converge to a relatively small set of "structural gravity" equations with common comparative statics. More recently, the "universal gravity" approach of Allen, Arkolakis and Takahashi (2021) formalizes this unifying view, showing that a wide class of trade and geography models can be represented by a small number of aggregate demand and supply equations combined with iceberg trade frictions.

Within this broad class of models, the present paper adopts a CES–Armington SGMT with monopolistic competition as the static core. This static block characterizes the general-equilibrium allocation of trade flows, multilateral resistances, prices, production and expenditure for given trade costs. The model is then augmented with a simple but powerful dynamic block in which trade-induced changes in relative prices affect savings, investment and capital accumulation, generating transitional growth dynamics. In what follows, Section III.1 presents the static SGMT, while Section III.2 introduces the SDGMT and discusses the transmission channels through which trade liberalization affects income and welfare over time.

III.1 - Static Structural Gravity Model of Trade (SGMT)

Consider a world with Ncountries. Goods are differentiated by place of origin (Armington, 1969), and each country $i$produces a differentiated variety that can be consumed domestically or traded internationally. Preferences are identical and homothetic across countries. In each period t, the representative consumer in country $j$aggregates varieties from all origins through a CES utility function with elasticity of substitution $\sigma > 1$and love of variety. Under monopolistic competition and iceberg trade frictions $t_{ij,t} \geq 1$, one unit arriving in $j$requires $t_{ij,t}$units shipped from i. Producer prices at origin are denoted $p_{i,t}$, so that consumer prices in $j$are $p_{ij,t} = p_{i,t}t_{ij,t}$.

Aggregating individual demands and imposing market clearing yields the standard structural gravity system. Bilateral trade flows from exporter i to importer j at time t are given by

$$X_{(ij,t)} = \frac{E_{(j,t)}\,Y_{(i,t)}}{Y_t}\left(\frac{t_{(ij,t)}}{P_{(j,t)}\,\Pi_{(i,t)}}\right)^{1-\sigma} \qquad \text{(I)}$$

where $X_{ij,t}$ is nominal trade from i to j, $E_{j,t}$ is total expenditure in j, $Y_{i,t}$ is the value of production in i, and Y_t is world output. The terms $P_{j,t}$ and $\Pi_{i,t}$ are the importer and exporter multilateral resistance (MR) indices, summarizing how each country's geography and trade policy context shape its average inward and outward trade barriers. They are implicitly defined by

$$\left(\Pi_{(i,t)}\right)^{1-\sigma} = \sum_j \left(\frac{t_{(ij,t)}}{P_{(j,t)}}\right)^{1-\sigma} \frac{E_{(j,t)}}{Y_t} \qquad \text{(II)}$$

$$\left(P_{(j,t)}\right)^{1-\sigma} = \sum_i \left(\frac{t_{(ij,t)}}{\Pi_{(i,t)}}\right)^{1-\sigma} \frac{Y_{(i,t)}}{Y_t} \qquad \text{(III)}$$

and they play the central role emphasized by Anderson and van Wincoop (2003): bilateral trade depends on bilateral costs *relative* to these multilateral resistance terms.

Factory-gate prices of the variety produced in country i are

$$p_{(i,t)} = \left(\frac{Y_{(i,t)}}{Y_t}\right)^{\frac{1}{1-\sigma}} \frac{1}{\gamma_i \Pi_{(i,t)}} \qquad \text{(IV)}$$

where γ_i is a country-specific constant. Let $Q_{i,t}$ denote the physical quantity produced in i, and let $\phi_{i,t}$ be a parameter relating production and expenditure so that aggregate expenditure in country i satisfies

$$E_{(i,t)} = \phi_{(i,t)}\,Y_{(i,t)} = \phi_{(i,t)}\,p_{(i,t)}Q_{(i,t)} \qquad \text{(V)}$$

In the general theoretical structure, $\phi_{i,t}$ allows for differences between income and expenditure (for instance, through net factor payments or financial flows). In the simulations conducted in this paper, balanced trade is imposed for all countries and periods by setting $\phi_{i,t} = 1$, so that $E_{i,t} = Y_{i,t}$. This assumption keeps the focus on how trade costs and prices shape trade flows and welfare, abstracting from the additional complications of net foreign asset dynamics.

Equations (I)–(V), together with market-clearing conditions equating supply to the sum of domestic and foreign demands, define the static SGMT. The structure is representative of the broad family of models surveyed by Head and Mayer (2014) and Costinot and Rodríguez-Clare (2014), and it belongs to the "universal gravity" class characterized by Allen et al. (2021): given trade elasticities and observed trade shares, the general-equilibrium response of trade flows, prices and incomes to trade-cost shocks is pinned down by these gravity equations.

This static SGMT is particularly well suited to disentangle the channels through which trade policy affects trade and welfare. Consider a bilateral trade liberalization between countries $i$and j, such as the formation of a PTA. The most immediate effect comes from the direct reduction in the bilateral iceberg cost $t_{ij,t}$ in equation (I), holding $Y_{i,t}$, $E_{j,t}$, Y_t, $P_{j,t}$ and $\Pi_{i,t}$ fixed. This partial-equilibrium effect captures the direct increase in bilateral trade between the liberalizing partners. However, because bilateral frictions enter the MR indices in (II)–(III), a change in $t_{ij,t}$also modifies the entire pattern of inward and outward trade barriers faced by all countries. These MR channels transmit the shock through the global trade network, affecting trade with third countries and feeding back into producer prices and nominal incomes via (IV)–(V). In the SGMT, static welfare gains from trade liberalization are therefore the outcome of a general-equilibrium reweighting of bilateral trade costs, filtered through multilateral resistances and relative prices.

In this static version, the production quantities $Q_{i,t}$ are treated as exogenous endowments. The short-run adjustment to trade policy operates through reallocation of expenditure across varieties and changes in producer and consumer prices, not through changes in capital stocks or factor supplies. To capture how trade policy affects income and welfare over time, it is natural to allow production to respond via capital accumulation. This is the role of the dynamic extension.

III.2 - Structural Dynamic Gravity Model of Trade (SDGMT)

To study the medium- and long-run implications of trade liberalization for income and welfare, the SGMT is embedded in a dynamic framework with endogenous capital accumulation, following Anderson, Larch and Yotov (2020).

The key idea of the SDGMT is to preserve the multi-country CES–Armington structure and gravity equations at each date, while letting country size and income evolve according to a simple macro growth mechanism. Trade costs then matter not only for the static allocation of expenditure but also for the intertemporal margin: they shape the relative prices that enter households' saving and investment decisions. The complete derivation of the consumer's intertemporal optimization problem and the resulting law of motion for capital is provided in Annex B.

On the production side, the endowment $Q_{i,t}$ of the static model is replaced by a Cobb–Douglas technology with reproducible capital. Output in country $i$at time $t$is

$$Y_{(i,t)} = p_{(i,t)}\, A_{(i,t)}\, L_{(i,t)}^{1-\eta}\, K_{(i,t)}^{\eta} \qquad \text{(VI)}$$

where $A_{i,t}$is total factor productivity, $L_{i,t}$is labor (assumed inelastically supplied), $K_{i,t}$is the capital stock, and $\eta \in (0,1)$is the capital share. The factory-gate price $p_{i,t}$and the multilateral resistances $P_{i,t}$, $\Pi_{i,t}$ are still determined by the SGMT block via (I)–(V), so production is fully consistent with the gravity structure.

On the demand side, each country is populated by a representative, infinitely-lived household that chooses sequences of consumption and investment to maximize lifetime utility, subject to an intertemporal budget constraint and a capital accumulation equation. Period utility is CES in Armington consumption, consistent with the static gravity block, and intertemporal preferences are standard with discount factor β and curvature parameter γ. The household takes as given the sequence of prices generated by the SGMT, including the producer price $p_{i,t}$ and the aggregate consumption–investment price index summarized by the importer MR $P_{i,t}$. Solving the consumer's problem yields a Euler equation for optimal savings and a law of motion for capital that can be written in the compact form

$$K_{(i,t+1)} = \left[\frac{\gamma\delta\phi_{(i,t)}(\eta\, p_{(i,t)}A_{(i,t)}L_{(i,t)}^{1-\eta}K_{(i,t)}^{\eta-1})}{(1-\gamma+\gamma\delta)\, P_{(i,t)}}\right]^{\delta} K_{(i,t)} \qquad \text{(VII)}$$

where $\delta \in (0,1]$summarizes depreciation and adjustment costs, and $P_{i,t}$is the multilateral resistance index as importer. In line with the static block and the simulations in this paper, I maintain $\phi_{i,t} = 1$(balanced trade), so capital accumulation is driven by relative prices, technology and factor endowments rather than by net foreign asset positions. The full derivation of (VII), including the intertemporal budget constraint and Euler equation, is presented in the Appendix, following Anderson, Larch and Yotov (2020).

Equations (VI)–(VII), together with (I)–(V), define the SDGMT: a dynamic general equilibrium model in which trade costs shape both the contemporaneous allocation of trade flows and the path of capital and income over time. When $\delta = 0$, the capital accumulation channel is shut down and the system collapses back to the static SGMT, which makes clear that the dynamic model is an extension of, rather than an alternative to, the standard structural gravity framework.

The growth mechanism of the SDGMT is straightforward but rich enough to capture transitional dynamics. The structure of the economy has two interconnected levels. At the first level lies the SGMT: bilateral trade between $i$and $j$responds negatively to trade costs and positively to country size, while the aggregate measures of trade costs as seller ($\Pi_{i,t}$) and buyer ($P_{j,t}$) summarize the geography of trade and determine how changes in bilateral frictions propagate through the network. At the second level lies the macro growth block: production and expenditure, together with aggregate prices, link trade to capital accumulation. The competitiveness of an economy is summarized by its factory-gate price $p_{i,t}$, which is the producer price before trade costs. Lower trade frictions reduce the incidence of iceberg costs in multilateral resistances, which in turn increase the equilibrium factory-gate price $p_{i,t}$relative to the aggregate import price $P_{i,t}$. This relative price—the terms of trade in the model, $p_{j,t}/P_{j,t}$—is the key variable driving savings and investment. Welfare in country $j$at time $t$is measured by real consumption, defined as $w_{j,t} = c_{j,t} = E_{j,t}/P_{j,t}$.

The mechanism operates as follows. When trade costs fall, a country becomes more open: its relative price of own output to the consumption–investment basket, $p_{j,t}/P_{j,t}$, rises. In the static SGMT, this improves real income through the usual channels: multilateral resistances fall, trade expands, and the country's real consumption increases. In the dynamic SDGMT, the same relative price change raises the return to saving and investment. Given an employment path, the dynamics of income depend on factor productivity and the saving rate. Productivity is exogenous and follows its own process, but the saving rate is determined endogenously by the consumer's intertemporal optimization. A higher $p_{j,t}/P_{j,t}$increases the marginal value product of capital (via $p_{j,t}$and the term in brackets in (VII)) and reduces the relative cost of future consumption (through a lower effective price index $P_{j,t}$), tilting optimal decisions toward higher savings. The result is faster capital accumulation, which raises future output via the production function (VI).

This set of interactions occurs simultaneously in prices and trade flows, while the effect on capital operates with a one-period lag through (VII). The dynamics of the capital stock therefore depend on the dynamics of income, which in turn depend on the relative price, and on the level of physical production; both can be expressed as functions of trade costs and multilateral resistances. Over time, the economy transitions to a new steady state with a higher capital stock, higher output and higher per capita consumption. In summary, the SGMT block captures the static reallocations of trade and the immediate welfare effects of trade-cost changes, while the SDGMT shows that these shocks also generate a "growth dividend": by improving the terms at which countries trade, trade liberalization strengthens the incentives to save and invest, amplifying static welfare gains through the dynamics of capital accumulation and income.

IV - Methodology

This section is structured into three main parts. First, it provides a detailed characterization of trade policy and its components. Second, it introduces the empirical specification of the gravity model, designed to identify the channels through which trade policy influences trade costs. These costs are subsequently used in impact simulations to assess their effects on trade flows and economic output. Finally, it offers a comprehensive description of the database construction process employed in the analysis.

IV.1 - Characterization of Trade Policy

Trade costs are differentiated into two primary categories: permanent factors, such as geography and cultural characteristics, and dynamic factors, which evolve over time and are predominantly shaped by trade policy interventions.

Trade policy is divided into two main components: discriminatory policies, which vary by trading partner, and non-discriminatory policies, which apply uniformly across all partners. Discriminatory policies primarily pertain to preferential trade agreements, while non-discriminatory policies include multilateral tariffs and generalized market access measures.

Discriminatory Trade Policy

Discriminatory trade policies are characterized by the differential treatment of trading partners, altering relative trade costs and reshaping the allocation of trade flows across origins. The formation of PTAs introduces substitution effects typically described as "trade diversion" and "trade creation": trade diversion shifts imports away from non-preferential suppliers toward partners inside the agreement, while trade creation replaces domestic production with imports from preferential partners. Consistent with recent contributions (e.g. Yotov, 2024; Moncarz et al., 2023), properly capturing these mechanisms requires incorporating domestic trade data, since part of the adjustment to discriminatory policy takes the form of reallocation between internal and external markets rather than only between foreign suppliers.

Empirically, discriminatory policies are often proxied by a single binary indicator for the presence of a PTA between two countries at a given point in time. In contrast to the empirical literature that measures PTA depth using continuous indices or detailed provision-level indicators of "deep" integration—typically built from datasets such as DESTA or the World Bank's Deep Trade Agreements database (e.g. Limão, 2016; Dür, Baccini and Elsig, 2014; Orefice and Rocha, 2014; Fontagné et al., 2023)—the present study adopts a tripartite classification (shallow, medium and deep PTAs) defined in Section II.1.2.

This discrete, theory-consistent typology remains parsimonious enough for structural gravity estimation, while still capturing the key distinction between agreements that primarily liberalize tariffs and those that extend integration to behind-the-border measures and broader regulatory disciplines. In this way, it aligns the empirical analysis with the recent literature on deep trade agreements and their heterogeneous macroeconomic effects, while keeping the structure compatible with the SGMT/SDGMT framework developed in Section III.

At the same time, PTAs represent only one element of the broader discriminatory policy environment. Residual MFN tariffs and sectoral exclusions that persist even under preferential regimes, as well as non-tariff measures such as technical regulations, SPS requirements or contingent protection, continue to shape relative trade costs when no full FTA is in place. The empirical strategy adopted below should therefore be interpreted as capturing the combined effect of observed preferential regimes and the pattern of remaining trade frictions, rather than the impact of PTAs in isolation from the broader trade policy environment.

Non-Discriminatory Trade Policy

Non-discriminatory trade policies, in this framework, refer to measures that alter the general level of trade costs in a way that applies broadly across trading partners, rather than targeting specific dyads. Typical examples include MFN tariff reductions, across-the-board tariff reforms, and horizontal measures that affect all suppliers equally. These instruments shape what is often termed the "border effect": the wedge between the costs of trading internationally and those of trading domestically, which may be reduced or reinforced depending on the direction of policy changes.

In this study, non-discriminatory trade policies are proxied primarily through tariff data, which provide a direct and observable indicator of the overall restrictiveness of the trade regime. While tariffs remain the most tractable component for long time spans, other non-discriminatory measures—such as improvements in customs procedures, logistics, or transparency—also matter for aggregate trade costs. Data limitations for the historical period under analysis, however, prevent a systematic incorporation of trade facilitation indicators, so their effects are only indirectly captured.

To complement the tariff dimension, the analysis also considers the number of bilateral liberalized relationships that each country maintains through trade agreements. Following Moncarz et al. (2023), this variable (NLBR) is interpreted as a proxy for the cumulative liberalization environment surrounding a country: it reflects not only the direct tariff concessions vis-à-vis specific partners, but also the progressive implementation of complementary policies, such as special regimes, investment-related provisions, and broader regulatory commitments. In this sense, NLBR captures an extensive margin of openness that extends beyond any single bilateral PTA and approximates the overall intensity of a country's liberalization strategy.

Moreover, the empirical specification controls for systemic globalization effects that influence trade flows for all countries simultaneously. These effects—captured by the indicator IT_t—include technological progress in transport and communication, major global shocks (such as financial crises), and other structural changes that alter the relative importance of domestic versus international trade. As documented by Baier et al. (2019), these global forces tend to foster deeper integration and increase the elasticity of trade with respect to trade costs, regardless of country-specific policy choices.

Finally, trade complementarity enters as a key structural control, measuring the degree of alignment between the export specialization of country $i$and the import demand of country j. These variable captures underlying supply–demand compatibility that can amplify or dampen the impact of both discriminatory and non-discriminatory policies. For instance, the often-limited complementarity observed within Latin America is partly related to similar production structures and export baskets across countries, which constrains the scope for intraregional trade expansion (Deardorff, 1998). Including trade complementarity in the empirical model ensures that the estimated effects of MFN liberalization and broader openness are not confounded with these structural features of the production and demand patterns.

IV.2 - Empirical Form and Method

The SGMT provides a structural framework to explain bilateral trade flows between an exporter and an importer at a given point in time. Trade between $i$and $j$depends on their economic size—normalized by world income—and on bilateral trade costs relative to multilateral resistances. In this setting, both country size and multilateral resistances are treated as endogenous objects that must be recovered consistently in estimation.

A key empirical challenge is precisely this endogeneity of multilateral resistances to trade costs. The standard solution in the structural gravity literature is to use origin–time and destination–time fixed effects, which absorb country size and multilateral resistances, together with origin–destination fixed effects to capture time-invariant bilateral trade costs.

Time-varying trade costs are then identified from changes in policy and other bilateral determinants. For the estimation of the SGMT, this study follows state-of-the-art methods that exploit domestic trade data (Larch et al., 2019; Anderson et al., 2020; Yotov, 2023), building on theoretical models that micro-found the gravity equation, such as Eaton and Kortum (2002) and Anderson and van Wincoop (2003).

Following the literature, the empirical specification adopted in this paper is as follows:

$$X_{ijt} = \exp\begin{bmatrix}\psi_{it} + n_{jt} + \mu_{ij} + \alpha_1 DTA_{ijt} + \alpha_2 MTA_{ijt} + \alpha_3 STA_{ijt} + \\ \gamma_1 ln\left(1 + MFN_{ijt}\right) + \gamma_2 NLBR_{ijt} + \delta TC_{\mathrm{ijt}} + \varphi IT_t\end{bmatrix} + \varepsilon_{ijt} \qquad \text{(VIII)}$$

Here, the variables are defined as follows:

- $DTA_{ijt}, MTA_{ijt}, STA_{ijt},$ are binary variables that take the value 1 if, at time t, countries i and j are linked by a trade agreement of a specific depth. Dyads without any agreement constitute the omitted category and serve as the reference group in the estimation.

- $NLBR_{ijt}$ represents the product of the number of preferential bilateral relationships that countries i and j have at time t. This variable accounts for all bilateral relationships derived from agreements such as free trade areas, customs unions, or economic unions. It captures the cumulative effect of agreements between partners and does not necessarily equal zero when two countries lack an agreement. The central idea is that PTAs not only liberalize tariffs but also eliminate other barriers to trade.
- MFN_{jt} is the tariff applied by importer j to imports from any origin at time t, regardless of the existence of a PTA. Its value and evolution inform the degree of trade openness.
- TC_{ijt} measures the degree of trade complementarity between the export structure of country iii and the import structure of country j.
- IT_{ijt} is a binary variable that takes the value 1 if X_{ijt} represents an international trade flow at time t (i.e., $i \neq j$). This variable controls for the globalization effect, capturing general trends influencing international trade flows (Baier et al., 2019).

The fixed effects ψ_{it}, n_{jt} y μ_{ij} correspond to origin-time, destination-time, and origin-destination effects, respectively. Unlike Anderson et al. (2020), this paper assumes that trade costs can be asymmetric, $\mu_{ij} \neq \mu_{ji}$.

The empirical Equation (VIII) combines three theoretical equations (I to III) with three unknowns (t_{ij}, P_j y Π_i). To identify the system, a normalization is applied, setting the multilateral resistance of a single country as a buyer to one for each period. For this study, $P_{Germany} = 1$.

The estimation relies on the Poisson Pseudo-Maximum Likelihood (PPML) estimator introduced by Santos Silva and Tenreyro (2006), refined for high-dimensional fixed effects by Correia et al. (2020), and corrected for small-sample bias following Weidner and Zylkin (2021). This approach is well-suited to structural gravity models, as it accounts for heteroskedasticity, accommodates zero trade flows, and allows for the inclusion of origin-time, destination-time, and dyadic fixed effects, which control for multilateral resistances and unobserved bilateral factors. The bias correction enhances consistency when estimating nonlinear models with multiple fixed effects, ensuring credible identification of trade policy impacts

Building on the approach of Frankel and Romer (1999), Anderson et al. (2020) demonstrate the empirical relationship between trade openness, capital accumulation, and economic growth. Using a system of equations, they estimate key parameters such as the share of capital in production (α), the depreciation rate of capital (δ), and the elasticity of substitution across varieties (σ). This study extends these insights to analyze the dynamic implications of trade policies on trade flows and economic performance.[3]

IV.3 - Database

The database of bilateral trade transactions, encompassing both international and domestic flows, covers a total of 113 countries, representing approximately 94% of global

[3] See a summary of the equations from Anderson et al. (2020) in Annex B.2.

trade during the period 1995-2017. This analysis focuses on the Manufacturing Industries sector (Sector D) as defined by the International Standard Industrial Classification (ISIC, Revision 3).

The database was constructed through the sequential development of four core datasets: gross output, total exports, domestic transactions, and bilateral trade flows, all measured in current U.S. dollars. These components were subsequently harmonized and integrated—following appropriate adjustments for consistency and comparability—into a unified dataset that consolidates international trade flows with their domestic counterparts, enabling a comprehensive representation of economic transactions at the country-pair level.

Aggregate trade data were sourced from CEPII's BACI database, which harmonizes trade statistics based on the declarations of importing and exporting countries, with values reported in FOB terms. The original source of these data is COMTRADE. Additional data on production and value-added were incorporated from the National Accounts - Analysis of Principal Aggregates (AMA) database of UNSTATS and the World Bank's World Development Indicators (WDI). Furthermore, the OECD Input-Output Tables (IOTs) provided supplementary information on production, gross exports, and net exports.

To construct the variable representing the degree of liberalization in bilateral relationships, data on trade agreements were obtained from the Dynamic Gravity Dataset (DGD) of the United States International Trade Commission (USITC). These data were further refined and cross-verified with information from ALADI, the OAS, and the WTO. The trade complementarity variable was calculated using the methodology proposed by Moncarz et al. (2023). Additionally, the Most Favored Nation (MFN) tariff data were sourced from the Teti (2023) database, which reports applied tariff rate by each importing country on an annual basis. In this context, the MFN tariff is interpreted as the applied tariff in the absence of any preferential trade agreement between the trading partners.

The calibration of the dynamic model's production function employs variables consistent with Anderson et al. (2020), utilizing data from version 10.1 of the Penn World Tables for the base year 2017. These tables provide essential information on GDP, employment, capital stock, and total factor productivity (TFP). In counterfactual exercises designed to evaluate relative productive capacities across countries at a single point in time, real GDP on the production side at constant purchasing power parity (PPP) prices, was used as the baseline. Employment was measured in effective units, calculated as the product of the number of employed individuals and the human capital index, which reflects average years of schooling. The capital stock was derived from the constant national price series, while TFP was measured using the PPP-7yadjusted series. This methodology ensures consistency and precision in analyzing the impacts of trade liberalization on key economic indicators.

Trade Agreements Database

Out of a total of 291,088 possible bilateral relationships (113 countries over 23 years), this database identifies 97,763 relationships covered by some form of PTA, representing 33.6% of the total. Compared to other widely used datasets, such as the Deep Trade Agreement Database (Fernández et al., 2023), the Dynamic Gravity Database (Gurevich and Herman, 2018), the CEPII Gravity Database, and the Database on Economic

Integration Agreements (Bergstrand, 2021), this dataset stands out as the most comprehensive for the selected sample of countries and years.

A rigorous process of validation and quality control ensures that all agreements included are supported by their presence in at least two recognized sources, such as ALADI, the OAS, and the WTO. Methodological details regarding the construction of the database, particularly for cases where multiple agreements coexist or where discrepancies across sources arise, are documented in Annex C. The agreements were classified into three levels, based on typology, scope, and depth.

The combination of multiple data sources allowed for the construction of an updated database that includes the "Agreement Level" variable. Each bilateral relationship is classified according to its associated agreement, detailing the entry into force, typology, depth, and the number of disciplines included. The primary data sources are Teti (2023) for tariff preferences, the WTO for agreement typology, and the World Bank's Deep Trade Agreement (DTA) Database for provisions and disciplines. The latter organizes 937 provisions into 17 areas, including border issues, cross-border issues (e.g., services and factor movements), and non-trade objectives (e.g., labor and environmental standards). Plurilateral agreements, which encompass multiple bilateral relationships, often exhibit heterogeneity in the provisions applied, reflecting the complexity of trade negotiations.

The Depth variable captures the extent of integration in each agreement, focusing on the inclusion of disciplines and the accumulation of provisions. While this measure has limitations, such as treating provision counts as proxies for liberalization depth, it remains a valuable indicator. For instance, agreements within the European Union demonstrate high levels of liberalization despite fewer provisions due to the absence of rules of origin or anti-dumping mechanisms in intra-regional trade. In general, higher values for the Depth variable correspond to newer agreements with broader and more ambitious regulatory commitments, consistent with those identified by Fontagné et al. (2023).

The final classification integrates three dimensions: (i) agreement typology and basic content (based on WTO classifications), (ii) tariff coverage and legal depth, and (iii) the scope and number of advanced regulatory provisions, as captured in the World Bank's Deep Trade Agreement Database. Based on these criteria, PTAs are categorized as follows:

1. **Deep Trade Agreements.** Agreements that meet the following three conditions: a) Legal form: Free Trade Agreements in goods and services or Customs Unions with additional Economic Integration provisions (FTA_EIA or CU_EIA); b) Market access: Tariff preferences covering at least 90% of trade flows, consistent with the stated agreement type; c) Regulatory scope: Inclusion of more than 300 substantive provisions, signaling broad and legally binding commitments across trade-related disciplines such as investment, services, competition, standards, and public procurement.

2. **Medium Trade Agreements.** These are agreements that do not fully qualify as DTA, yet display meaningful legal commitments. Specifically, they meet the following: a) Legal form: Either FTAs in goods and selected services disciplines (FTA_EIA, CU_EIA) or FTAs restricted to goods (FTA_CU); b) Market access: Tariff coverage of at least 70%

of bilateral trade; c) Regulatory scope: More than 130 provisions, but falling short of the threshold and comprehensiveness required to be classified as DTA.

3. **Shallow Trade Agreements.** Agreements that do not meet the criteria for either DTA or MTA, typically reflecting limited commitments. Specifically: a) Legal form: Partial scope agreements, unilateral preference schemes (e.g., GSP), or FTAs with limited or unfulfilled liberalization targets; b) Market access: Tariff preferences covering less than 70% of trade flows; c) Regulatory scope: Fewer than 130 provisions, often with outdated, narrow, or weakly enforceable commitments.

This comprehensive classification allows for a more accurate analysis of bilateral trade relationships, particularly in the context of Latin America and the Caribbean (LAC). By expanding agreement coverage and addressing longstanding data gaps, the database improves the empirical foundation for analyzing the legal depth, disciplinary scope, and institutional content of PTAs. While not all relationships fully meet the established classification thresholds, ambiguous or overlapping cases are reviewed individually to ensure consistency and analytical rigor. A summary of agreements and bilateral relationships is presented in Table C.1 of Annex C[4].

V. Results

This section reports the main findings in two stages. First, it presents the empirical results from the gravity model estimation, emphasizing the interpretation of key coefficients. This analysis provides a consistent framework for identifying the determinants of bilateral trade and their interaction with trade costs, multilateral resistances, and other structural factors.

Second, the model specification facilitates the simulation of future scenarios through counterfactual exercises on trade integration. These simulations are used to assess policy strategies at both national and regional levels, with an emphasis on enhancing formal trade ties via deep agreements. These agreements may arise in two primary contexts: the establishment of new agreements where none existed before or the enhancement of existing agreements to greater depth.

Within this framework, two complementary approaches to integration were examined: (i) the negotiation of bilateral agreements, either between LAC countries and extra-regional partners or among countries within the region, and (ii) the formation of macro-agreements, positioning LAC as a unified bloc in negotiations with other extra-regional blocs. Both approaches were evaluated based on their implications for trade, economic growth, and overall welfare.

[4] In contrast to conventional datasets—which often omit agreements not directly notified by member states under Article XXIV of the GATT—this database includes trade agreements signed under the legal umbrella of the 1979 Enabling Clause and administered through the ALADI framework. As a result, many South-South agreements in LAC that fall outside formal WTO notifications are now explicitly identified, categorized by type and depth, and incorporated into the analysis. This approach significantly improves the representativeness of the data for LAC countries. For details, see Table C.2 in Annex C on the notification status of ALADI member states and the corresponding agreement list. Due to its extensive size, the full database is not reproduced in the text but is available from the author upon request.

V.1 - Model Estimation

The results of various specifications of the structural gravity equation are summarized in Table 3. Parameters of interest were estimated using multiple specifications, with the most suitable model selected to clearly identify trade policy channels and project future integration scenarios. Across all cases, the estimates are statistically significant at conventional levels and align with expected signs. The preferred specification is presented in columns (5) and (6) of the table.

Non-discriminatory trade policy measures—such as MFN tariffs and trade facilitation—exhibit the expected signs. The MFN variable captures the effect of unilateral tariff liberalization by importers, serving as a proxy for the non-preferential treatment applied uniformly across trading partners. Estimated coefficients for this variable range between −5.0 and −5.4, consistent with results reported in the gravity literature. These estimates imply that reductions in MFN tariffs significantly increase bilateral import values, highlighting the role of multilateral openness in lowering trade costs and expanding trade flows.[5]

While trade facilitation shows a positive relationship with trade flows, its statistical significance varies. In the selected specification (column 5), the coefficient is significantly different from zero. However, after applying bias corrections (column 6), the effect becomes inconclusive.

Additionally, the variable capturing complementarity between the sectoral structure of imports and exports (TC) isolates the desired effects while mitigating noise in the estimation of other trade policy variables.

Discriminatory trade policies are examined through three levels of trade agreements. As shown in column 6 of Table 3, the existence of a DTA between a pair of countries is associated with a significant increase in trade flows, approximately 26.9%. MTA yield a smaller but still positive effect of 7.8%, while STA result in a trade increase of 6.9%.

Comparing agreements reveals that bilateral trade facilitated by DTA more than triples the effect of MTA. Robustness checks across different time horizons yield consistent results. The chosen specification uses 2-year intervals, following techniques suggested by Yotov (2020).[6]

Table 3 - Results of the Structural Gravity Equation, 1995–2017

	(1)	(2)	(3)	(4)	(5)	(6)
DTA_{ijt}	0.273***	0.297***	0,249***	0.267***	0,220***	**0.238***
MTA_{ijt}	0.093**	0.088**	0,078***	0.069**	0,079***	**0.075**
STA_{ijt}	0.085***	0.085**	0,066*	0.063*	0,068***	**0.067**

[5] The MFN variable is defined as ln(1 + MFN/100), where MFN is the ad valorem tariff rate expressed as a percentage. For example, a reduction in the tariff from 10% to 5% implies a change from ln(1 + 0.10) ≈ 0.0953 to ln(1 + 0.05) ≈ 0.0488. The difference between these values is approximately −0.0465. Applying the estimated coefficient (e.g., −5.4), this change translates into an increase in trade flows of about exp(−5.4 × −0.0465) − 1 ≈ 25%. This interpretation corresponds to a semi-elasticity framework, where a discrete reduction in the MFN rate leads to a proportional increase in bilateral trade flows.

6 For a comparison of all specifications, and intervals see Table A8a and A8b in Annex.

$NLBR_{ijt}$					0.0000356^{**}	**0.0000356**
$\ln(1 + MFN_{ijt})$			$-5{,}051^{***}$	-5.196^{***}	-5.238^{***}	**-5.409^{***}**
TC_{ijt}	1.550^{***}	1.4517^{***}	$1{,}441^{***}$	$1{,}386^{***}$	$1{,}393^{***}$	**1.331^{***}**
Bias Correction	No	Yes	No	Yes	No	Yes
Observations	148.16	148.16	148.16	148.16	148.164	148.164

Robust standard errors are reported. *** p<0.01, ** p<0.05, * p<0.1. All models control for globalization effects and include origin-time, destination-time, and origin-destination fixed effects. Odd years from 1995 to 2017. Source: Author's calculation.

V.2 - Counterfactual Analysis: Scenarios and Equilibria

The analysis quantifies the impact of alternative trade integration scenarios, focusing on the role of preferential agreements. Counterfactual simulations model hypothetical policy changes—such as the implementation of DTAs—to estimate their effects on trade, output, and welfare. Results are evaluated against a baseline scenario with no changes in existing trade relations, using the estimated coefficients from column (6) of Table V.1 as the reference. This framework enables the identification of outcome variations attributable to the simulated interventions.

In the counterfactual scenarios (CFL), trade costs are adjusted to reflect the implementation of trade agreements. In all cases, DTA are assumed between trading partners. These agreements may either replace preexisting, shallower agreements (MTA or STA) or establish entirely new agreements where none previously existed.

The analysis consists of three primary exercises:

1. **CFL.1**: Evaluating the effects of deep integration between LAC countries and major global hubs—China, Japan, and Korea (CJK); the EU[7]; or NAM.
2. **CFL.2**: Simulating deep intra-regional integration among LAC countries.
3. **CFL.3**: Combining deep intra-regional integration with linkages to one of the global hubs mentioned above.

The transmission channels of these gains operate through a reduction in bilateral trade costs (t_{ijt})among countries within the agreement. This decline lowers the aggregate import price index (P_{jt}), making both domestic and foreign goods relatively cheaper for consumers. It also reduces the exporter's multilateral resistance (Π_{it}), effectively decreasing selling prices in destination markets. These effects, together with the relative size of the destination economy (Y_{jt}/Y_t), contribute to an increase in the factory-gate output price (p_{jt}), which reflects higher competitiveness and profitability. In turn, rising output prices boost income, thereby stimulating capital accumulation, production, and aggregate expenditure.

For each scenario, changes are analyzed across two equilibria:

7 The EU consists of the EU (27) plus the EFTA countries and the UK.

- **Static equilibrium**: A short-term scenario assuming no capital accumulation, where physical output (Q_{jt}) remains fixed.
- **Dynamic equilibrium**: A long-term scenario where capital accumulation and production growth are allowed, representing a transition to a new steady state (Q_{jt} adjusts accordingly). For details, see Annex B.2 (Derivation of the dynamic model).

To conduct these counterfactual exercises, parameters from Anderson et al. (2020) are utilized. The capital share in output (α) is set at 0.54, and the capital depreciation rate (δ) at 0.14. The elasticity of substitution (σ) is set at 5.5, consistent with the average reported in relevant studies (Head and Mayer, 2014; Fontagné et al., 2023). For robustness, sensitivity analyses adjust these parameters to values used in other studies, specifically $\sigma = 3.5$ and $\alpha = 0.7$.

The production function is calibrated for the base year (2017) using data from version 10.1 of the Penn World Tables, which provides comprehensive information on GDP, employment, capital stock, and TFP. For the simulation exercises, we adopt the balanced trade assumption ($E_{it} = Y_{it}$), following Anderson and Yotov (2020). This restriction simplifies the general equilibrium framework by equating expenditure with income in each country and period, allowing static and dynamic scenarios to be simulated within a consistent model structure. While this implies the elimination of trade deficits and surpluses, it preserves the relative effects of trade policy shocks and facilitates the interpretation of changes in output, prices, and welfare across countries.

Due to data limitations, three countries (Cuba, Samoa, and Tonga) were excluded from the counterfactual exercises, reducing the final sample to 110 countries. The results are expressed as percentage variations in key variables (exports, prices, multilateral resistances, and welfare, measured as real consumption) between the counterfactual scenarios and the baseline period.

CFL.1 - Integration with the Three Global Hubs

This simulation evaluates the bilateral reduction of trade costs through the establishment of DTA between a LAC country and one of the three major global trade hubs: CJK, the EU, or NAM. This hypothetical framework reflects historical patterns where LAC countries have independently negotiated agreements with external partners.

The baseline scenario, which outlines the current state of intra-regional and inter-regional trade relations for each LAC country, is summarized in Annex A, Table A.10. As discussed in Section II, there is significant heterogeneity among LAC countries in terms of both the number and depth of their trade agreements. For this reason, the simulation exercises compare the effects of implementing new or enhanced DTA with the baseline scenario where no changes occur in existing bilateral policies. For countries already governed by DTA, no additional effects are estimated, as the policy conditions remain unchanged.

Together, the three global hubs account for 79% of global trade and 82% of world production, with CJK contributing 48% of production and 28% of trade, the EU representing 20% of production and 39% of trade, and NAM accounting for 13% of production and 12% of trade. These figures highlight the centrality of these hubs in global trade dynamics, making them strategic partners for LAC countries seeking to deepen their integration into global value chains.

The results of the counterfactual simulations are presented in Table 4, distinguishing between non-signatory countries, signatory countries (including LAC participants), and global aggregates. The analysis also separates the results into two dimensions: the static model, and the dynamic model.

When comparing these models, it becomes evident that the dynamic framework amplifies the benefits of DTA significantly. Welfare gains for signatory countries nearly double when capital accumulation is considered, underscoring the importance of incorporating endogenous growth mechanisms in the evaluation of trade policies. Among the LAC countries, agreements with the EU generate the largest improvements in welfare, with gains of 0.70% and an increase in trade flows of 2.47%.

In contrast, agreements with NAM and CJK yield welfare gains of 0.32% and 0.30%, respectively, with trade growth of 1.93% and 3.17%. At a global level, agreements with the EU also provide the most significant impact, contributing 0.19% to global welfare and expanding global trade by 1.14%. While NAM and CJK agreements also enhance welfare and trade, their effects are smaller in magnitude, with NAM yielding 0.09% welfare growth and 0.82% trade expansion, and CJK generating 0.11% welfare growth and 0.96% trade expansion.

The simulation results indicate that the benefits of integration extend beyond signatory countries, generating positive spillover effects for much of the global economy. These effects are a natural consequence of the general equilibrium structure of the model, where changes in trade costs between specific partners alter global trade patterns and multilateral resistances. While most non-signatory countries experience modest welfare gains, some display marginal losses, reflecting the uneven transmission of indirect effects and the heterogeneous exposure to trade reallocation. These asymmetries underscore the complex, second-order effects that trade agreements can generate across the global network.

Despite overall global welfare gains, the distribution of benefits is highly heterogeneous—both across regions and among LAC countries. Disaggregated results show that no single integration strategy delivers uniformly optimal outcomes. Figure 4 illustrates these differences: the left panel compares welfare effects of integration with each of the three global hubs, while the right panel incorporates regional integration as an alternative scenario.

Table 4 – Welfare[a] and Trade Variations: Treated vs. Non-Treated Countries Across Counterfactual Scenarios

	(1)		(2)		(3)		(4)	
Static	**UE**		**NAM**		**CJK**		**LAC**	
	Welfare	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**
Treated	**0.33**	**2.00**	**0.15**	**2.02**	**0.14**	**2.77**	**0.41**	**4.67**
LAC	0.26	2.98	0.17	2.03	0.19	2.05	0.41	4.67

Non-Treated	0.00	-0.08	0.01	0.11	0.01	0.07	0.00	-0.04
World	**0.09**	**0.82**	**0.04**	**0.60**	**0.05**	**0.65**	**0.03**	**0.35**
Dynamic								
Treated	**0.70**	**2.47**	**0.32**	**1.93**	**0.30**	**3.17**	**0.86**	**5.16**
LAC	0.54	3.33	0.36	1.93	0.41	2.49	0.86	5.16
Non-Treated	0.00	0.11	0.01	-0.12	0.02	0.35	0.00	0.10
World	**0.19**	**1.14**	**0.09**	**0.40**	**0.11**	**0.96**	**0.07**	**0.52**

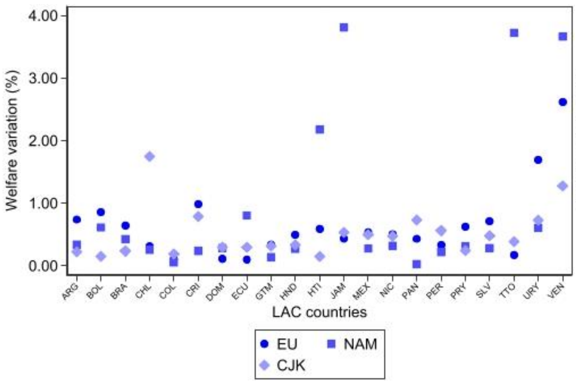
References for country grouping: Treated Countries: Refers to countries that are members of a specific agreement; Non-Treated Countries: Refers to countries that are not members of the specified agreement; LAC: Refers to countries in the Latin American and Caribbean region that are members of the specific agreement; World: Represents the aggregate of all countries globally, including both treated and non-treated countries. a- Welfare changes are measured as proportional variations in real consumption. For country j, the welfare index is defined as: $w_j = W_j^B/W_j^B = c_j^C/c_j^B$, where $c_j$denotes real consumption, and superscripts $C$and Brefer to the counterfactual and baseline equilibria, respectively. Throughout the paper, I report welfare changes in percentage terms, $100 \times (w_j - 1)$. See Annex B.2 for details. Source: Author's calculation.

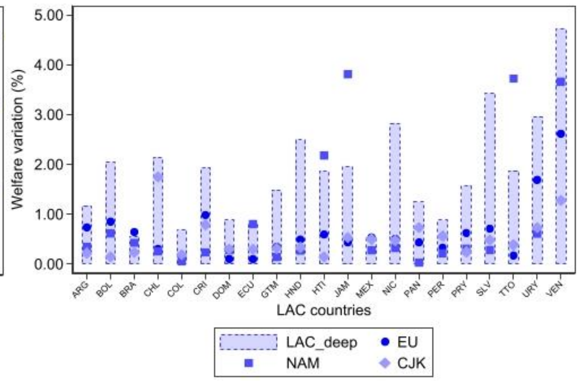
The empirical specification also captures the interaction between discriminatory and non-discriminatory trade liberalization—particularly through trade facilitation mechanisms—which magnify the broader impacts of trade agreements. These spillover effects extend benefits beyond signatory countries and are especially pronounced under deep integration scenarios. This dynamic is explored in greater depth in the CFL-3 counterfactual, with specific outcomes presented in Figure 5.

Countries deepening their ties with Asia stand out for achieving significant welfare improvements. For example, Chile is projected to see an increase of 1.75%, Mexico 0.50%, Colombia 0.19%, and Peru 0.56%. On the other hand, nearly half of the economies, particularly those within Mercosur and Central America, realize greater gains by strengthening their relationships with the EU. In this group, Argentina would experience a welfare gain of 0.74%, Brazil 0.65%, Uruguay 1.69%, Costa Rica 0.99%, and El Salvador 0.71%.

For smaller economies in Central America and the Caribbean, such as Jamaica (3.81%) and Trinidad and Tobago (3.72%), integration with NAM proves to be the most advantageous. Similarly, South American economies like Ecuador (0.80%) and Venezuela (3.66%) also derive their highest welfare benefits from partnerships with NAM. These results underscore the diversity in outcomes based on each country's unique economic structure, regional ties, the geophagy and integration strategies.

Figure 4 – Welfare Variation for LAC Countries Under Trade Liberalization Scenarios





Source: Author's calculation.

The findings highlight that there is no single preferred trade partner for all countries. Even at an aggregate level, the impacts on welfare, trade flows, and the underlying mechanisms driving these changes are far from homogeneous. Nevertheless, a robust conclusion is that any form of regional integration consistently yields average benefits for participating countries. This underscores the importance of defining optimal strategies while recognizing that any path of integration outperforms the alternative of inaction.

Economic theory predicts that smaller and more open economies tend to benefit disproportionately from trade liberalization and deeper integration—a result formalized in Arkolakis, Costinot, and Rodríguez-Clare (2012), where welfare gains depend crucially on trade elasticity and the share of expenditure on domestic goods. The findings of this study strongly confirm this prediction. While larger economies such as Argentina, Brazil, Colombia, and Mexico display more moderate welfare improvements, the smallest and most open economies—including Haiti, Jamaica, Trinidad and Tobago, Uruguay, and Venezuela—experience the largest gains in welfare and competitiveness. Their higher degree of trade openness amplifies the effects of reduced trade costs, making them more responsive to integration shocks and fully consistent with the theoretical framework.

Other studies conduct exercises closely aligned with the approach taken in this paper, differing primarily in the modeling framework and in certain characteristics of the underlying database, as previously discussed. Notably, Fontagné et al. (2023) estimate the joint welfare gains from regional integration in LAC at 0.73%, a result that falls between our static and dynamic estimates—0.41% and 0.86%, respectively[8].

CFL.2 - Deep Regional Integration

This counterfactual exercise analyzes the transition toward deeper integration among LAC countries. DTAs are expected to significantly strengthen the overall structure of trade relations by increasing the density and institutional depth of existing exchanges. Moreover, they create opportunities to establish new trade linkages—either by formalizing previously unregulated bilateral relations or by upgrading the scope and

[8] The lower static estimate in our case is largely attributable to the more comprehensive identification of intra-regional PTAs in our database, which avoids the upward bias observed in Fontagné et al. due to the underrepresentation of regional agreements.

commitments of shallow or medium-depth agreements. This mechanism is particularly relevant in the intra-regional context, where marked asymmetries in agreement depth still hinder the full realization of integration potential.

Although 94% of intra-regional trade in LAC is currently governed by some form of trade agreement, only a small fraction corresponds to deep and comprehensive agreements of the latest generation (DTA). Among the trade relationships covered by agreements (55%), medium-level agreements dominate, accounting for 70% of intra-regional trade. By contrast, deep agreements account for only 15% of trade, a proportion comparable to shallow agreements.

The results highlight that a strategy focused on deepening regional integration surpasses, in aggregate terms, any integration strategy involving global hubs. For signatory countries, moving toward deep intra-regional integration results in an average welfare gain of 0.86% and a 5.16% increase in trade flows, as detailed in Table 4.

When disaggregating these results by country, deep intra-regional integration emerges as the most beneficial strategy for the majority of LAC economies. Smaller countries in particular stand out as the primary beneficiaries, achieving significant growth in real consumption and trade. For instance, welfare gains under this scenario are largest in Venezuela (4.73%), El Salvador (3.44%), Uruguay (2.96%), and Nicaragua (2.82%). Larger economies such as Brazil and Mexico also experience welfare improvements, although to a lesser extent, with increases of 0.56% and 0.53%, respectively. (Table 5)

The welfare improvements observed under the deep intra-regional integration scenario are largely explained by an average trade expansion of 5.2%, though variations exist among the countries involved. Bolivia records the highest trade growth (14.6%), followed by Paraguay (14.2%), Argentina (12.3%), and Uruguay (12.0%). In contrast, Mexico shows the smallest trade growth, with an increase of just 1.7%.

Regional integration not only proves to be the preferred strategy at the regional level but also serves as a complementary approach to agreements with extra-regional partners. From both political and economic perspectives, deepening intra-regional ties is a viable and effective path, particularly for countries with strong economic influence in LAC. Moreover, this strategy offers a practical solution for nations with limited capacity to negotiate new agreements: strengthening and expanding the depth of existing agreements generates greater benefits than pursuing entirely new partnerships.

CFL.3 – Macro Agreements: Regional Integration Combined with a Hub

This exercise evaluates a scenario that combines intra-regional integration with a macro-regional agreement, simulating the inclusion of LAC as a bloc in an agreement with one of the major global economic hubs: the EU, CJK, or NAM. The results indicate that this integrated approach yields superior benefits compared to the previous exercises, although the ranking of benefits varies depending on the chosen trade partner. While individual agreements demonstrated the largest gains with the EU, followed by CJK and NAM, macro-regional integration alters this pattern. In this scenario, an agreement with NAM results in the highest average gains for LAC countries, generating a welfare increase of 1.63% and a trade expansion of 15.2%. This configuration also delivers the greatest global benefits, with a 0.62% increase in global welfare—double the impact achieved through agreements with other hubs—and a 9.4% rise in global trade. (Table 5)

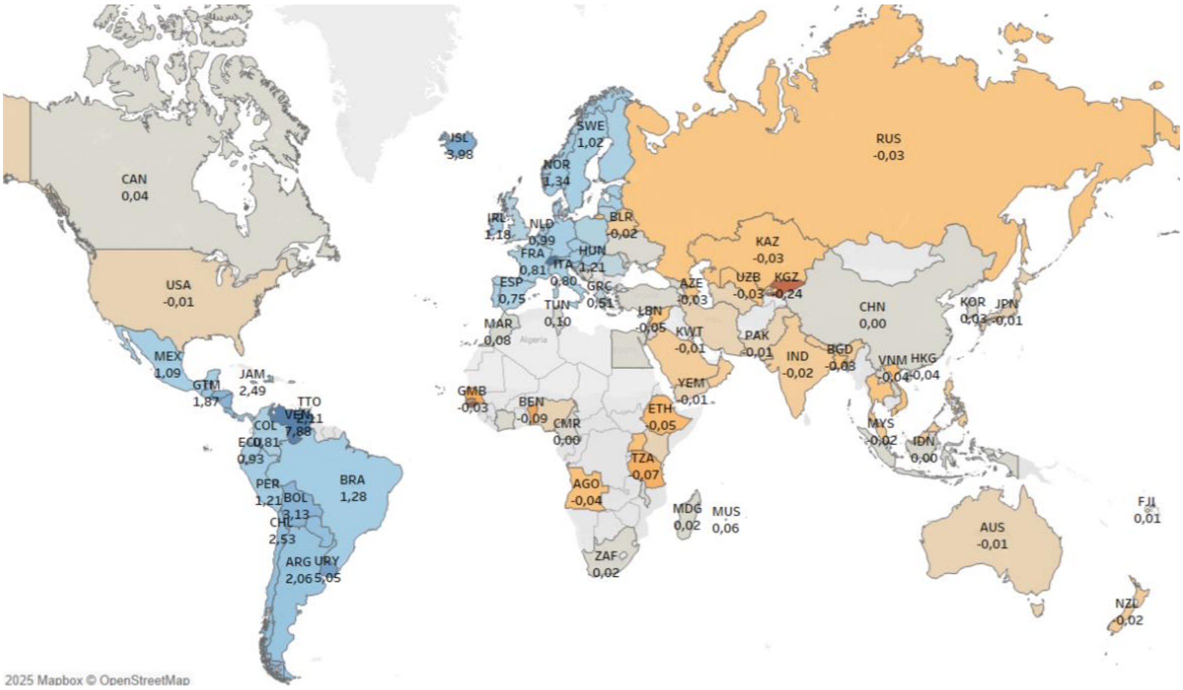
The distributive effects of this agreement are notable, impacting both the participating countries and those excluded. On average, signatory countries experience a 1.51% increase in welfare and a 17.9% rise in trade. Non-signatory countries also benefit indirectly, though to a lesser extent, with welfare gains of 0.30% and trade growth of 6.9%. Among LAC countries, smaller economies emerge as the primary beneficiaries of trade agreements, although the magnitude of these impacts depends on the chosen trade partner. For instance, under the LAC-EU scenario, Venezuela achieves a substantial welfare increase of 7.6% and trade growth of 12.4%, while Uruguay reports a welfare gain of 4.9% and trade expansion of 19.6%. These variations underscore that trade agreements function not only as policy instruments between signatory countries, but also as catalysts of broader systemic effects. Their impact is mediated by structural asymmetries, production patterns, and geographic conditions, including the relative isolation or centrality of countries in the global trade network, as discussed in Villano (2024). As shown in Table 5, the outcomes of integration strategies are far from uniform, reflecting the diverse ways in which countries are positioned to benefit—or not—from deeper trade commitments.

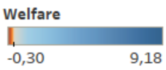
The global effects of these agreements reveal notable heterogeneity. Countries outside LAC, such as Canada, Morocco, and Tunisia, register marginal welfare gains, while others—including Russia, the United States, and Australia—experience slightly negative effects, with estimated welfare losses of around −0.03%. These moderate impacts contrast with the more substantial costs of exclusion faced by smaller economies such as Kazakhstan and Côte d'Ivoire, which exhibit welfare declines of −0.2% and −0.15%, respectively. These findings highlight the complexity of trade policy interdependence and the presence of global spillover effects—even for non-signatory countries—driven by shifts in trade patterns and multilateral resistances, as illustrated in Figure 5.

To understand the propagation of these effects, the theoretical framework underpinning this analysis is critical. The proposed gravity model captures how trade liberalization among signatory countries transmits its impacts to the rest of the world through multilateral resistances and other transmission channels. Furthermore, the empirical specification incorporates trade facilitation as an additional mechanism, enhancing non-discriminatory trade processes and indirectly benefiting non-signatory countries. The reallocation of trade flows can lead to diverse outcomes, including some that are ambiguous, as reflected in the variability of impacts observed across different contexts.

This theoretical framework builds on the structural gravity equation system (I–V), which comprehensively accounts for both direct and indirect effects of trade agreements. Specifically, Equation VII establishes a policy function for capital accumulation, linking it to key variables such as technology levels, labor endowments, and the capital stock. This relationship demonstrates a direct connection between capital accumulation and domestic producer prices, as well as an inverse relationship with multilateral resistances as importers, further elucidating the mechanisms through which trade agreements influence global economic dynamics.

Figure 5 – Welfare Variation for LAC and Non-LAC Countries Under the LAC-EU Scenario



Welfare  variation

Source: Author’s calculation.

Capital accumulation, driven by trade liberalization, has significant positive effects on member countries but can have adverse impacts on non-members. According to the gravity Equation (I), economic growth among member countries leads to an increase in both intra-regional trade and trade with non-member countries. However, reduced capital accumulation in non-member countries can diminish their exports and imports. Nonetheless, the economic growth of member countries may boost non-member exports if the positive effects of agreements outweigh the standard trade diversion forces.

Indirect effects also play a critical role, operating through changes in trade costs as described in Equations (I) to (III). These channels demonstrate how trade agreements among specific countries can indirectly affect others not involved in the agreements. Even when direct benefits are not apparent, the interconnected nature of global trade ensures that non-signatory economies are influenced, further emphasizing the broad reach of trade policy interventions.[9]

[9] For further details, see Yotov et al. (2016).

Table 5 - Welfare and Trade Variation for LAC Countries and Groups by Trade Liberalization Scenarios

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
LAC-CTY	**EU**		**NAM**		**CJK**		**LAC Deep**		**LAC&EU**		**LAC&NAM**		**LAC&CJK**	
	Welfare	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**	**Welfare**	**Trade**
ARG	0.74	7.79	0.34	3.02	0.22	2.52	1.16	12.30	2.06	20.30	1.37	19.64	1.40	15.25
BOL	0.86	6.65	0.61	4.70	0.15	1.35	2.05	14.62	3.13	21.31	2.46	23.50	2.23	16.42
BRA	0.65	8.58	0.43	5.24	0.23	3.33	0.56	7.80	1.28	16.09	0.83	16.45	0.81	11.52
CHL	0.31	1.04	0.25	0.59	1.75	6.31	2.14	6.52	2.53	6.65	2.62	13.29	3.93	13.04
COL	0.11	1.38	0.05	0.41	0.19	2.29	0.70	8.25	0.81	8.63	0.89	16.47	0.89	10.88
CRI	0.99	2.71	0.23	0.43	0.79	2.33	1.93	4.57	3.00	6.32	2.87	12.96	2.77	7.20
DOM	0.11	0.62	0.28	1.41	0.30	1.66	0.88	4.06	1.02	3.75	1.82	15.24	1.20	6.05
ECU	0.10	0.88	0.80	5.71	0.29	2.33	0.80	5.96	0.93	5.95	1.41	15.58	1.12	8.66
GTM	0.34	1.63	0.14	0.52	0.32	1.58	1.49	6.77	1.87	7.45	1.98	15.36	1.84	8.75
HND	0.50	1.45	0.27	0.64	0.34	1.01	2.49	6.13	3.04	6.58	3.82	16.44	2.87	7.47
HTI	0.59	3.52	2.18	13.64	0.15	0.94	1.87	8.92	2.64	12.04	3.10	22.78	2.04	10.22
JAM	0.43	1.42	3.81	9.87	0.53	1.62	1.96	4.72	2.49	5.27	4.75	16.76	2.55	6.67
MEX	0.54	1.61	0.28	0.70	0.50	1.55	0.53	1.71	1.09	2.33	2.42	13.93	1.05	3.53
NIC	0.51	1.33	0.32	0.76	0.47	1.17	2.82	6.17	3.39	6.49	3.98	15.71	3.35	7.65
PAN	0.43	3.83	0.03	0.05	0.73	5.95	1.25	11.18	1.72	14.16	1.41	18.47	2.03	17.74
PER	0.33	2.47	0.22	1.33	0.56	3.81	0.88	5.27	1.21	6.47	1.21	12.81	1.46	9.36
PRY	0.63	6.00	0.31	2.22	0.24	2.22	1.57	14.22	2.40	20.61	1.76	21.10	1.84	16.89
SLV	0.71	1.37	0.28	0.43	0.48	0.98	3.44	6.84	4.24	7.21	4.79	15.97	4.00	8.17
TTO	0.17	0.64	3.72	11.35	0.39	1.27	1.87	5.97	2.11	5.72	4.84	20.04	2.30	7.59
URY	1.69	6.99	0.61	2.05	0.73	3.38	2.96	11.98	5.05	18.98	3.35	18.72	3.74	15.69
VEN	2.62	4.56	3.66	6.26	1.28	2.68	4.73	7.65	7.88	11.64	7.00	17.00	6.13	10.67
LAC	**0.54**	**3.33**	**0.36**	**1.93**	**0.41**	**2.49**	**0.86**	**5.16**	**1.47**	**7.73**	**1.63**	**15.21**	**1.29**	**7.96**
Treated	0.70	2.47	0.32	1.93	0.30	3.17	0.86	5.16	1.21	3.17	1.51	17.96	0.86	8.97
Non-treated	0.00	0.11	0.01	-0.12	0.02	0.35	0.00	0.10	0.00	-0.88	0.30	6.49	0.02	0.64
World	**0.19**	**1.14**	**0.09**	**0.40**	**0.11**	**0.96**	**0.07**	**0.52**	**0.32**	**0.88**	**0.62**	**9.41**	**0.29**	**2.43**

Source: Author's calculation.

V.3 - Model Sensitivity, Limitations, and Future Research

To evaluate the robustness of the findings, 200 simulations of trade costs were performed using the structural gravity model specified in Equation VIII. This process involved generating pseudo-random realizations of the estimated parameters based on the variance-covariance matrix. Key coefficients-including trade policy variables ($DTA_{ijt}, MTA_{ijt}, STA_{ijt}, MFN_{ijt}, NLBR_{eit}$), and other complementarity and the globalization measures (TC_{ijt}, IT_t)- were assessed under the assumption that fixed effects for origin-time (ψ_{it}), destination-time (n_{jt}), and origin-destination (μ_{ij}) remained constant. Each realization of trade costs was used to resolve the model for both baseline scenarios and counterfactual equilibria. The interquartile ranges of outcome variables, such as welfare, capital, and trade flows, were then calculated to evaluate the reliability of the results.

The simulations demonstrated that the confidence intervals for treated countries and global aggregates were consistently positive and statistically significant. These outcomes support the robustness of the observed positive effects in the counterfactual exercises, reinforcing the validity of the model framework (see Table A.11 in the Annex)[10].

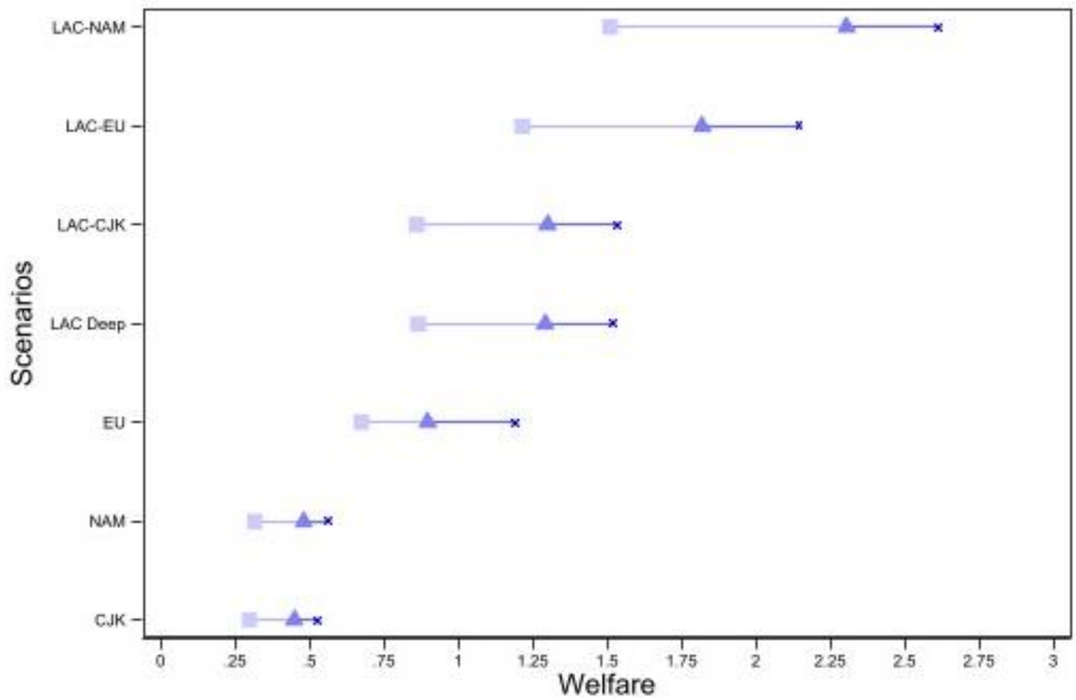
Sensitivity analyses were conducted to further examine the influence of key model parameters. The first adjustment examines the implications of raising the capital share in income (α), consistent with the notion that in more advanced and outward-oriented economies, capital intensity plays a larger role in shaping welfare outcomes. The second adjustment explored the consequences of reducing the elasticity of substitution between products by origin (σ), a parameter that affects terms of trade and real production. A lower σ implies reduced differentiation between products from various countries, amplifying the benefits of trade liberalization.

Three distinct parameter sets were employed to conduct the sensitivity analyses. The values used to estimate the counterfactual scenarios, as specified in Section V.1, are taken as the Base Parameters, which serve as the reference point. In this specification, the elasticity of substitution (σ) set at 5.5 and a capital share in income (α) of 0.5. The R1 Parameters adjust α, increasing it to 0.7 to represent economies with a higher reliance on capital for output production. Finally, the R2 Parameters lower σ to 3.5, as suggested by Anderson et al. (2020), which captures reduced differentiation between products by origin and enhances the terms of trade effects.

Under the R1 parameters, the higher capital share resulted in a 47% increase in average welfare compared to the base scenario. In contrast, the R2 parameters produced an even greater improvement, with welfare rising by 78% relative to the baseline. These findings, illustrated in Figure 6, emphasize the substantial impact of parameter variations on the magnitude of trade agreement outcomes.

[10] The effects of the agreement on non-participating countries can be either positive or negative, and in many cases, they are not significantly different from zero.

Figure 6 – Sensitivity Analysis of Capital Share and Elasticity Parameters for Treated Countries Across Different Scenarios



References: Scenarios Base (α = 5.5; α = 0.5) R1 (α = 0.7) R2 (α = 3.5) code
Source: Author's calculation.

The simulation results confirm that reductions in trade costs—achieved here through the signing or deepening of trade agreements—generate welfare gains across all Latin American and Caribbean (LAC) countries. This outcome is consistent with theoretical expectations in general equilibrium models and aligns with previous literature emphasizing the long-term benefits of trade liberalization (Costinot and Rodríguez-Clare, 2013; Balistreri and Tarr, 2022).

However, the primary contribution of this study does not lie in confirming that liberalization improves welfare per se, but rather in comparing the relative performance of alternative integration strategies under a unified modeling framework. The simulations evaluate two relevant margins of policy reform: (i) the formation of new deep agreements where none currently exist, and (ii) the upgrading of existing preferential arrangements toward more comprehensive and institutionalized frameworks. This allows for a nuanced assessment of trade and welfare effects, capturing both the extensive margin (network expansion) and intensive margin (legal and regulatory depth).

The modeling approach—rooted in dynamic structural gravity with monopolistic competition—provides a tractable platform for these comparisons. While it abstracts from richer production structures, the relative magnitude and direction of estimated gains are consistent with more complex settings. For instance, quantitative Ricardian models with sectoral linkages (Eaton and Kortum, 2002; Caliendo and Parro, 2015) or models with firm-level heterogeneity (Melitz, 2003) often yield higher absolute gains, but similar qualitative patterns. The present framework thus offers a simplified yet policy-relevant lens for evaluating the strategic choices facing LAC economies.

Despite these strengths, several limitations warrant discussion. First, the analysis focuses exclusively on trade in manufactured goods. While this sector represents the core of modern PTAs, the exclusion of services, agriculture, and investment flows limits the scope of the results, especially given the increasing importance of these dimensions in deep integration. Second, the model abstracts from transitional dynamics, labor market frictions, and distributional consequences. Welfare is measured through representative-agent real consumption, omitting adjustment costs and equity considerations that may influence political feasibility. Third, the assumption of balanced trade, though necessary for coherence across scenarios, precludes analysis of external imbalances and macro-financial linkages.

Furthermore, the dataset covers agreements signed up to 2017 and does not capture emerging disciplines related to digital trade, environmental standards, or new-generation value chain agreements. While the classification of agreements by legal depth and institutional complexity improves over existing datasets, there remains scope for further refinement using text-based methods or regulatory intensity scores.

Future research could address these gaps through several avenues. Introducing multi-sector structures and input-output linkages would allow for richer assessments of specialization and spillovers. Incorporating firm heterogeneity could capture selection effects, quality upgrading, and participation in global value chains. Additional extensions might consider capital accumulation, endogenous investment responses, or sector-specific policy complementarities such as infrastructure or institutional quality.

Moreover, linking macro simulations with micro-level data—on firms, workers, or households—would support more inclusive and evidence-based trade policymaking. Exploring how different types of agreements affect inequality, structural transformation, and institutional convergence across LAC countries remains a promising research frontier. Advancing along these lines will be key to designing more resilient and inclusive integration strategies for the region in an increasingly complex global economy.

VI. Conclusions

This study set out to assess the state of regional integration in Latin America and the Caribbean through a comprehensive classification of trade relationships, providing a clearer foundation for identifying impactful trade policies. This approach reduces estimation biases and helps uncover the key channels through which integration operates.

Despite the increase in participation in preferential trade agreements, substantial asymmetries persist in their depth. Intra-regional agreements remain limited in scope and enforcement, underscoring the need to strengthen and deepen existing institutional arrangements.

The empirical results confirm that access to goods markets, while necessary, is not sufficient to generate sustained economic growth. Meaningful progress requires deep trade agreements that extend beyond tariff elimination to include disciplines on services, investment, regulatory standards, and intellectual property, supported by enforcement mechanisms. Deep Trade Agreements thus emerge as critical instruments for expanding trade and strengthening international competitiveness. This finding is consistent with the literature, which highlights the disproportionate long-term gains associated with deeper forms of integration.

The theoretical framework is based on the structural gravity model in its dynamic form, which captures the effects of trade liberalization on growth while accounting for asymmetric trade costs. Within this framework, trade policy is decomposed into non-discriminatory components—linked to multilateral openness—and discriminatory components—associated with preferential trade agreements.

Simulation exercises show that any strategy involving deeper integration yields higher welfare compared to remaining outside preferential frameworks. On average, agreements with Europe generate the highest welfare gains for LAC countries, followed by those with North America and the group of key Asian economies (China, Japan, and Korea). However, no single external integration path proves universally optimal across the region. The magnitude and distribution of gains vary significantly by country, reflecting differences in geographic proximity, existing trade architecture, and underlying productive structures. These results suggest that optimal integration strategies are context-specific and should be tailored to each country's structural characteristics and existing trade relationships.

A key result is that deep intra-regional integration can yield greater benefits than agreements with large global hubs. Smaller and less integrated economies—especially those with shallow or fragmented trade commitments—stand to gain the most from deeper integration. These countries benefit disproportionately from liberalization and expanded institutional coverage, leading to enhanced market access and competitiveness. Regional integration not only emerges as the most effective path within LAC countries, but also serves as a strategic complement to extra-regional agreements. From both economic and political standpoints, reinforcing intra-regional ties is a pragmatic and viable approach—particularly for countries with greater influence in the region. Moreover, for economies with limited capacity to negotiate new accords, upgrading and deepening existing agreements generates higher returns than pursuing entirely new partnerships.

In light of these findings, policy efforts should prioritize the strategic deepening of regional integration as a foundation for broader international engagement. The complementarity between regional and extra-regional integration—particularly under deep agreements—amplifies welfare gains and enhances the resilience of trade structures in the face of global disruptions.

While the analysis offers robust and policy-relevant results, it abstracts from certain real-world complexities. The model assumes balanced trade, excludes services and investment flows, and does not capture transitional or distributional effects. Addressing these aspects in future research—by incorporating financial frictions, sectoral heterogeneity, or firm-level data—would enhance the realism and scope of the simulations.

Looking ahead, promising avenues for future work include integrating domestic policy variables (e.g., education, infrastructure, investment incentives), exploring sector-specific effects, and analyzing how different types of agreements influence inequality, institutional convergence, and technological upgrading. These extensions are key to designing more inclusive and forward-looking integration strategies in LAC.

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ANNEX A – Tables and Figures

Table A.1 - Trade and Relationships by Agreement Type and Region, 2017

Type_Agreement/ Region	Value		Participation (%)		Variation (%)	
	Relations[a]	Trade[b]	Relations	Trade	Relations	Trade
No_agreem	**7,723**	**39,802**			**-17**	**195**
AFR	1,346	313	17.4	0.8	-16	381
ASA	2,343	21,564	30.3	54.2	-7	300
EUR	1,902	10,387	24.6	26.1	-32	148
LAC	1,561	1,079	20.2	2.7	-7	639
NAM	162	6,179	2.1	15.5	-24	84
OCN	409	280	5.3	0.7	-12	-19
PTA_SGP	**1,759**	**12,353**			**-38**	**89**
AFR	587	325	33.4	2.6	-9	39
ASA	624	10,252	35.5	83.0	-16	187
EUR	121	451	6.9	3.7	-81	-75
LAC	322	842	18.3	6.8	-56	7
NAM	4	337	0.2	2.7	-20	221
OCN	101	148	5.7	1.2	11	402
FTA_CU	**1,049**	**7,074**			**290**	**320**
AFR	270	688	25.7	9.7	100	100
ASA	215	1,367	20.5	19.3	113	226
EUR	447	4,599	42.6	65.0	282	288
LAC	85	298	8.1	4.2	70	343
NAM	7	120	0.7	1.7	600	996
OCN	25	1	2.4	0.01	100	100
FTA_EIA	**1,483**	**33,139**			**1,960**	**926**
AFR	31	44	2.1	0.1	100	100

ASA	169	16,984	11.4	51.3	100	100
EUR	735	3,330	49.6	10.0	1,085	751
LAC	472	4,424	31.8	13.3	11,700[c]	675
NAM	51	7,653	3.4	23.1	1,175	246
OCN	25	704	1.7	2.1	1,150	1,201
CU_EIA	**642**	**26,322**			**228**	**157**
AFR	6	13	0.9	0.05	100	100
ASA	9	286	1.4	1.1	100	100
EUR	603	25,635	93.9	97.4	231	153
LAC	24	388	3.7	1.5	71	202

References: a) Relations: count number; b) Trade: values in hundreds of millions usd; Participation: percentage; Variation: 2017 over 1995 in percentage; c) Variation of 11,700 % results from the increase from 4 relation in 1995 to 472 in 2017.
Source: Author's calculation.

Table A.2 - Value of trade and number of agreements with and without an agreement, per year.

	Trade value (one hundred million dollars)				Number of relationships			
	No agreement		By agreement		No agreement		By agreement	
1995	13,491	38%	21,688	62%	9,278	73%	3,378	27%
1996	14,070	38%	22,984	62%	9,232	73%	3,424	27%
1997	14,843	39%	23,622	61%	9,279	73%	3,377	27%
1998	14,209	37%	24,462	63%	9,088	72%	3,568	28%
1999	15,906	40%	23,648	60%	9,448	75%	3,208	25%
2000	16,825	37%	28,479	63%	9,121	72%	3,535	28%
2001	16,155	37%	27,871	63%	9,098	72%	3,558	28%
2002	16,355	36%	29,365	64%	9,134	72%	3,522	28%
2003	18,556	35%	34,398	65%	9,002	71%	3,654	29%
2004	20,821	33%	42,564	67%	8,317	66%	4,339	34%
2005	23,154	33%	47,029	67%	8,381	66%	4,275	34%
2006	26,373	33%	53,809	67%	8,326	66%	4,330	34%
2007	30,370	32%	63,202	68%	8,266	65%	4,390	35%
2008	34,382	33%	70,156	67%	8,217	65%	4,439	35%
2009	26,488	33%	54,643	67%	8,094	64%	4,562	36%
2010	32,080	33%	65,907	67%	7,957	63%	4,699	37%
2011	36,457	32%	78,619	68%	7,892	62%	4,764	38%
2012	35,807	31%	79,068	69%	7,852	62%	4,804	38%
2013	36,157	31%	81,863	69%	7,533	60%	5,123	40%
2014	36,062	30%	84,511	70%	7,401	58%	5,255	42%
2015	32,728	30%	77,187	70%	7,390	58%	5,266	42%
2016	31,049	29%	76,580	71%	7,296	58%	5,360	42%
2017	39,802	34%	78,888	66%	7,723	61%	4,933	39%
Total	**582,142**	**33%**	**1,190,542**	**67%**	**193,325**	**66%**	**97,763**	**34%**

Source: Author's calculation

Table A.3 - Agreements by type and depth over time

year	Total relationships by type							Agreed relationships				
	No_agreem	PTA_Other	FTA_CU	FTA_EIA		CU_EIA		PTA_SGP	FTA_CU	FTA_EIA	CU_EIA	Total
	No_agreem	Shallow	Medium	Medium	Deep	Medium	Deep					
1995	9,278	2,841	269	10	62	14	182	84.1	8.0	2.1	5.8	3,378
1996	9,232	2,823	333	10	62	14	182	82.4	9.7	2.1	5.7	3,424
1997	9,279	2,700	407	12	62	14	182	80.0	12.1	2.2	5.8	3,377
1998	9,088	2,781	475	54	62	14	182	77.9	13.3	3.3	5.5	3,568
1999	9,448	2,367	527	56	62	14	182	73.8	16.4	3.7	6.1	3,208
2000	9,121	2,486	671	114	62	20	182	70.3	19.0	5.0	5.7	3,535
2001	9,098	2,533	621	140	62	20	182	71.2	17.5	5.7	5.7	3,558
2002	9,134	2,369	725	160	62	24	182	67.3	20.6	6.3	5.8	3,522
2003	9,002	2,426	748	184	90	24	182	66.4	20.5	7.5	5.6	3,654
2004	8,317	2,637	812	210	150	24	506	60.8	18.7	8.3	12.2	4,339
2005	8,381	2,517	842	234	152	24	506	58.9	19.7	9.0	12.4	4,275
2006	8,326	2,527	855	224	194	24	506	58.4	19.7	9.7	12.2	4,330
2007	8,266	2,553	829	232	200	24	552	58.2	18.9	9.8	13.1	4,390
2008	8,217	2,386	833	296	348	24	552	53.8	18.8	14.5	13.0	4,439
2009	8,094	2,374	979	283	350	24	552	52.0	21.5	13.9	12.6	4,562
2010	7,957	2,438	985	354	346	24	552	51.9	21.0	14.9	12.3	4,699
2011	7,892	2,447	997	350	394	24	552	51.4	20.9	15.6	12.1	4,764
2012	7,852	2,353	1,087	372	416	24	552	49.0	22.6	16.4	12.0	4,804
2013	7,533	2,225	1,058	686	524	24	606	43.4	20.7	23.6	12.3	5,123
2014	7,401	2,198	1,057	747	623	24	606	41.8	20.1	26.1	12.0	5,255
2015	7,390	2,193	1,051	756	624	36	606	41.6	20.0	26.2	12.2	5,266
2016	7,296	2,286	1,052	757	623	36	606	42.6	19.6	25.7	12.0	5,360
2017	7,723	1,759	1,049	810	673	36	606	35.7	21.3	30.1	13.0	4,933
Total	**193,325**	**56,219**	**18,262**	**7,051**	**6,203**	**530**	**9,498**	**57.5**	**18.7**	**13.6**	**10.3**	**97,763**

Source: Author's calculation

Table A.4 - Time evolution of trade by level and type of agreement. Values in millions of dollars

Year	No_agreem	Agreement								Total
		Level			Type_Agreement				Total Agreement	
		Shallow	Medium	Deep	PTA_Other	FTA_CU	FTA_EIA	CU_EIA		
1995	1,349,057	652,720	188,127	1,327,910	652,720	168,305	322,920	1,024,812	2,168,757	3,517,813
1996	1,407,019	666,895	241,068	1,390,389	666,895	219,281	373,119	1,039,058	2,298,353	3,705,371
1997	1,484,314	675,156	284,165	1,402,869	675,156	258,310	412,142	1,016,581	2,362,189	3,846,504
1998	1,420,909	659,083	304,632	1,482,468	659,083	244,837	470,850	1,071,413	2,446,183	3,867,091
1999	1,590,645	524,715	320,410	1,519,641	524,715	256,519	523,242	1,060,290	2,364,766	3,955,411
2000	1,682,500	739,610	469,087	1,639,158	739,610	364,620	703,876	1,039,749	2,847,855	4,530,355
2001	1,615,529	731,252	464,116	1,591,735	731,252	367,737	652,494	1,035,619	2,787,102	4,402,631
2002	1,635,547	807,732	493,336	1,635,419	807,732	383,094	662,582	1,083,079	2,936,487	4,572,034
2003	1,855,565	881,956	709,966	1,847,874	881,956	499,916	786,556	1,271,368	3,439,796	5,295,362
2004	2,082,110	1,049,387	714,089	2,492,962	1,049,387	449,461	949,958	1,807,631	4,256,437	6,338,548
2005	2,315,411	1,098,887	911,784	2,692,224	1,098,887	498,569	1,181,853	1,923,585	4,702,894	7,018,306
2006	2,637,292	1,246,180	1,104,459	3,030,248	1,246,180	568,440	1,427,284	2,138,984	5,380,888	8,018,179
2007	3,037,015	1,468,831	1,340,890	3,510,465	1,468,831	649,359	1,616,513	2,585,483	6,320,186	9,357,200
2008	3,438,197	1,629,564	1,596,610	3,789,421	1,629,564	758,949	1,806,266	2,820,816	7,015,595	10,453,792
2009	2,648,832	1,408,562	1,195,763	2,860,018	1,408,562	582,748	1,364,742	2,108,290	5,464,342	8,113,175
2010	3,208,035	1,713,916	1,662,570	3,214,191	1,713,916	667,636	1,914,913	2,294,212	6,590,677	9,798,711
2011	3,645,665	2,036,422	2,015,535	3,809,980	2,036,422	815,699	2,344,455	2,665,361	7,861,937	11,507,602
2012	3,580,665	1,959,520	2,235,308	3,712,010	1,959,520	821,847	2,678,672	2,446,798	7,906,837	11,487,503
2013	3,615,719	2,006,324	2,258,538	3,921,390	2,006,324	781,807	2,824,383	2,573,738	8,186,252	11,801,971
2014	3,606,244	2,058,975	2,356,352	4,035,768	2,058,975	780,595	2,949,866	2,661,658	8,451,094	12,057,338
2015	3,272,757	1,583,543	2,509,584	3,625,597	1,583,543	654,518	3,120,466	2,360,197	7,718,724	10,991,481
2016	3,104,909	1,646,374	2,449,741	3,561,874	1,646,374	673,794	2,937,817	2,400,004	7,657,989	10,762,897
2017	3,980,233	1,235,345	2,783,625	3,869,839	1,235,345	707,419	3,313,862	2,632,184	7,888,810	11,869,042
Total	**58,214,168**	**28,480,948**	**28,609,753**	**61,963,449**	**28,480,948**	**12,173,460**	**35,338,830**	**43,060,913**	**119,054,151**	**177,268,318**

Source: Author’s calculation

Table A.5 - Types and Leve lof Agreement in LAC. Value of trade, Number of relations, variation and participation. 1995-2017.

Number of Relations	No_agreem	Agreement by type				
Variables		**PTA_Other**	**FTA_CU**	**FTA_EIA**	**CU_EIA**	**Total**
1995	1,671	725	50	4	14	793
2017	1,561	322	85	472	24	903
Participation 2017	63.4	13.1	3.4	19.2	1.0	36.6
Variation 2017/1995	-6.6	-55.6	70.0	11,700	71.4	13.9

Value of trade	No_agreem	Agreement by type				
Variables		**PTA_Other**	**FTA_CU**	**FTA_EIA**	**CU_EIA**	**Total**
1995	14,598	78,654	6,727	57,058	12,850	155,289
2017	107,864	84,180	29,782	442,355	38,805	595,121
Participation 2017	15.3	12.0	4.2	62.9	5.5	84.7
Variation 2017/1995	638.9	7.0	342.7	675.3	202.0	283.2

Number of Relations	No_agreem	Agrement by level			
Variables		**Shallow**	**Medium**	**Deep**	**Total**
1995	1,671	725	66	2	793
2017	1,561	322	354	227	903
Participation 2017	63.4	13.1	14.4	9.2	36.6
Variation 2017/1995	-6.6	-55.6	436.4	11250.0	13.9

Value of trade	No_agreem	Agrement by level			
Variables		**Shallow**	**Medium**	**Deep**	**Total**
1995	14,598	78,654	20,183	56,452	155,289
2017	107,864	84,180	133,017	377,925	595,122
Participation 2017	15.3	12.0	18.9	53.8	84.7
Variation 2017/1995	638.9	7.0	559.1	569.5	283.2

a) **Value of trade in millon dollars. Participation in percentage over total; b) Variation in percentage 2017 over 1995.** Source: Author's calculation

Table A.6 - Temporal evolution of the number of agreed relationships by level and region.

	Shallow							Medium							Deep						
year	AFR	ASA	EUR	LAC	NAM	OCN	Total	AFR	ASA	EUR	LAC	NAM	OCN	Total	AFR	ASA	EUR	LAC	NAM	OCN	Total
1995	643	744	633	725	5	91	2841		101	123	66	1	2	293			238	2	4		244
1996	650	738	616	718	5	96	2823	16	116	148	74	1	2	357			238	2	4		244
1997	620	718	577	685	5	95	2700	24	117	204	83	3	2	433			238	2	4		244
1998	628	748	601	699	7	98	2781	57	174	220	87	3	2	543			238	2	4		244
1999	595	496	562	609	7	98	2367	98	174	231	89	3	2	597			238	2	4		244
2000	520	676	530	661	5	94	2486	158	198	340	104	3	2	805			238	2	4		244
2001	529	674	586	645	5	94	2533	142	192	315	125	4	3	781			238	2	4		244
2002	506	649	479	641	3	91	2369	157	219	395	130	5	3	909			238	2	4		244
2003	515	644	546	627	3	91	2426	158	232	423	134	5	4	956			252	16	4		272
2004	629	805	310	771	6	116	2637	194	268	429	146	5	4	1046		2	621	27	6		656
2005	611	766	289	729	8	114	2517	195	289	434	171	5	6	1100		2	621	27	7	1	658
2006	632	771	288	716	4	116	2527	197	299	441	153	6	7	1103		2	621	63	13	1	700
2007	649	793	255	734	4	118	2553	202	309	406	155	6	7	1085		2	672	64	13	1	752
2008	639	776	216	634	3	118	2386	204	319	455	161	6	8	1153		2	744	140	13	1	900
2009	594	825	220	635	3	97	2374	250	283	531	178	11	33	1286		2	744	141	14	1	902
2010	638	812	226	659	3	100	2438	252	337	531	189	11	43	1363		2	744	137	14	1	898
2011	632	819	254	639	3	100	2447	254	331	534	196	12	44	1371		26	768	137	14	1	946
2012	583	803	223	640	3	101	2353	302	343	588	192	14	44	1483		29	771	151	16	1	968
2013	599	828	233	459	3	103	2225	308	352	701	348	15	44	1768		31	878	203	16	2	1130
2014	599	861	170	462	3	103	2198	309	358	751	349	16	45	1828		31	978	202	16	2	1229
2015	595	851	168	474	3	102	2193	309	364	757	348	17	48	1843		31	978	203	16	2	1230
2016	605	884	194	472	28	103	2286	310	361	757	352	17	48	1845		31	978	202	16	2	1229
2017	587	624	121	322	4	101	1759	307	362	782	354	42	48	1895		31	1003	227	16	2	1279

Source: Author's calculation

Table A.7- Trade by region of destination, by country of LAC. Values in percentages[a] for 2017.

	No Agreement							By agreement							
Country	AFR	ASA	EUR	LAC	NAM	OCN	Sub total sin acuerdo	AFR	ASA	EUR	LAC	NAM	OCN	Sub total with agreement	Total value (cientos de mill usd)
ARG	5.1	33.0	33.1	3.1	25.0	0.7	**49.7**	0.2	1.5	0.5	97.5	0.0	0.2	**50.3**	**427**
BOL	2.7	76.6	1.3	13.8	0.0	5.6	**2.0**	0.0	5.3	1.9	88.0	4.8	0.0	**98.0**	**27**
BRA	8.5	44.0	43.5	3.8	0.0	0.2	**41.4**	0.2	1.4	0.2	95.0	3.1	0.1	**58.6**	**1,312**
CHL	19.8	67.2	2.1	10.8	0.0	0.1	**3.1**	0.0	18.4	6.3	64.5	10.5	0.3	**96.9**	**423**
COL	8.2	60.8	2.3	28.3	0.0	0.4	**9.3**	0.0	0.4	1.3	94.8	3.4	0.0	**90.7**	**138**
CRI	2.9	53.0	0.8	39.9	0.0	3.4	**5.8**	0.0	3.1	6.5	74.1	16.1	0.2	**94.2**	**90**
CUB	1.4	47.3	48.2	2.8	0.3	0.0	**84.5**	0.0	0.3	0.1	99.5	0.0	0.0	**15.5**	**14**
DOM	1.1	29.7	0.2	39.2	29.5	0.3	**36.0**	0.0	0.7	3.8	77.9	17.3	0.2	**64.0**	**80**
ECU	1.2	86.5	0.4	10.0	1.9	0.1	**27.4**	0.0	0.4	4.9	91.0	3.7	0.0	**72.6**	**80**
GTM	29.3	23.8	0.1	45.1	0.0	1.8	**8.8**	0.0	0.1	3.0	87.5	9.4	0.0	**91.2**	**75**
HND	3.1	48.8	3.8	43.1	0.0	1.2	**3.4**	0.0	0.2	4.4	71.0	24.4	0.1	**96.6**	**61**
HTI	2.3	13.3	0.7	83.7	0.0	0.0	**2.6**	0.0	0.1	0.7	87.4	11.7	0.0	**97.4**	**11**
JAM	12.3	13.4	57.7	13.0	0.0	3.6	**13.0**	0.0	1.5	10.7	73.5	14.3	0.0	**87.0**	**11**
MEX	6.0	84.5	1.0	6.9	0.0	1.7	**3.4**	0.0	1.1	4.2	38.0	56.4	0.3	**96.6**	**3,756**
NIC	20.1	13.4	0.1	66.1	0.0	0.3	**5.4**	0.0	0.5	4.7	53.0	41.7	0.1	**94.6**	**41**
PAN	1.9	21.8	0.0	76.2	0.0	0.0	**41.2**	0.0	0.1	0.2	99.7	0.1	0.0	**58.8**	**1**
PER	22.9	29.3	0.7	44.5	0.0	2.5	**3.2**	0.0	5.7	5.8	81.5	6.9	0.1	**96.8**	**217**
PRY	3.8	94.0	0.1	2.1	0.0	0.0	**19.1**	0.1	1.2	1.9	96.5	0.3	0.0	**80.9**	**39**
SLV	10.0	67.4	0.1	22.3	0.0	0.2	**5.3**	0.0	1.4	2.8	62.6	33.1	0.1	**94.7**	**59**
TTO	19.9	34.3	0.3	45.4	0.0	0.1	**18.8**	0.0	0.3	5.9	71.8	22.0	0.1	**81.2**	**47**
URY	2.9	48.4	41.6	5.8	1.1	0.1	**53.6**	0.1	3.2	0.8	92.5	3.3	0.1	**46.4**	**72**
VEN	3.8	63.7	26.2	5.8	0.5	0.0	**47.3**	0.0	0.5	0.0	93.0	6.5	0.0	**52.7**	**50**

LAC	7.2	48.2	31.3	6.9	5.8	0.5	**15.3**	0.1	2.1	2.1	77.9	17.6	0.1	**84.7**	**7,030**

a-Values in percentages in relation to the total value and in each region in relation to sub-totals. Source: Author's calculation

Table A.8- Comparison of areas of CPTPP provisions with selected previous agreements of its members ordered in descending order by the number of provisions (2018)

Provision areas / PTA	CPTPP[a)]	ASEAN - Australia - New Zealand[b)]	ASEAN - Australia - New Zealand[c)]	Canada - Peru	NAFTA	Japan - Australia	ASEAN - Australia - New Zealand[d)]	Malaysia - Australia	Australia - Chile	Japan - Peru	Peru - Singapore	Pacific Alliance[e)]	Pacific Alliance[f)]	Canada - Chile
Trade and customs facilitation	30	33	26	34	21	20	25	25	21	21	23	15	23	15
Anti-dumping and countervailing duties	8	12	10	7	16	6	7	7	4	6	7	5	7	4
Technical barriers to trade	13	16	13	12	15	9	8	8	13	10	13	17	18	7
Sanitary and phytosanitary	50	29	27	35	33	24	27	27	33	22	21	31	30	30
Rules of origin	22	24	21	16	19	16	21	21	16	20	21	27	25	17
Export taxes	31	18	20	23	19	25	20	20	22	16	21	17	11	23
Subsidies	13	15	13	11	19	11	15	15	10	14	14	13	13	11
Services	34	24	28	18	23	17	17	17	13	10	21	33	32	3
Investment	43	25	34	0	0	15	35	35	0	25	0	12	0	0
Competition Policies	27	24	18	19	16	21	17	17	19	19	16	15	23	10
Public procurement	75	42	25	61	52	51	0	0	54	51	51	0	0	59
Intellectual property	93	51	48	36	23	44	54	54	31	42	32	38	30	23
State-owned companies	44	37	42	40	42	37	36	36	41	29	32	40	41	38
Environment regulation	34	6	3	18	23	3	5	5	6	8	4	11	6	13
Labor regulations	16	9	0	17	2	0	3	3	3	1	1	3	13	12
Capital movement	50	51	50	37	40	44	49	49	51	40	42	35	37	34
Visa and asylums	17	16	16	10	18	17	16	16	12	12	11	9	5	8
Total	600	432	394	394	381	360	355	355	349	346	330	321	314	307

a) CPTPP in the bilateral version between Australia and Chile; b) New Zealand-Singapore version; c) Australia-Singapore version; d) New Zealand-Malaysia version; e) Mexico-Chile Version; f) Peru-Chile version.

Source: Author's calculation based on World Bank's Deep Trade Agreement database.

Table A.9.a - Different model specifications, with bias correction for odd years (2017 to 1995)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	11
RTA	0.1157***										
DTA		0.2978***	0.2972***	0.2901***	0.1095	0.1088*	0.0569	0.2658***	0.2672***	0.2375***	0.2081***
		(0.069)	(0.064)	(0.063)	(0.069)	(0.065)	(0.064)	(0.061)	(0.058)	(0.057)	(0.058)
FTA		0.0613	0.0884**	0.0900**	-0.1123***	-0.0858**	-0.0937***	0.0433	0.0695**	0.0749**	0.0592*
		(0.038)	(0.036)	(0.036)	(0.039)	(0.036)	(0.036)	(0.034)	(0.031)	(0.031)	(0.032)
PTA_other		0.0860**	0.0847**	0.0860**	-0.0370	-0.0385	-0.0434	0.0634*	0.0626*	0.0669**	0.0433
		(0.041)	(0.040)	(0.039)	(0.038)	(0.037)	(0.036)	(0.034)	(0.033)	(0.033)	(0.033)
ln_AT					-3.7065***	-3.7277***	-4.0722***				
					(0.511)	(0.514)	(0.521)				
ln_NMF								-5.3456***	-5.1957***	-5.4093***	-5.3350***
								(0.719)	(0.682)	(0.662)	(0.680)
NRTAei				0.0000			0.0000*			0.0000	
				(0.000)			(0.000)			(0.000)	
NRTAeia											0.0000**
											(0.000)
CD_D	1.4802***		1.4517***	1.4389***		1.4577***	1.3945***		1.3862***	1.3308***	1.3486***
	(0.277)		(0.273)	(0.280)		(0.268)	(0.274)		(0.265)	(0.271)	(0.268)
t3	0.0998***	0.1091***	0.0995***	0.0987***	0.0775***	0.0677***	0.0604***	0.0466**	0.0383*	0.0324*	0.0351*
	(0.013)	(0.011)	(0.013)	(0.012)	(0.015)	(0.017)	(0.016)	(0.018)	(0.020)	(0.019)	(0.019)
t4	0.1415***	0.1473***	0.1401***	0.1392***	0.1034***	0.0967***	0.0880***	0.0519**	0.0480*	0.0409*	0.0642**

	(0.016)	(0.015)	(0.016)	(0.016)	(0.018)	(0.020)	(0.021)	(0.024)	(0.025)	(0.025)	(0.025)
t5	0.2756***	0.2829***	0.2752***	0.2734***	0.2275***	0.2206***	0.2057***	0.1626***	0.1594***	0.1471***	0.1449***
	(0.025)	(0.024)	(0.025)	(0.024)	(0.024)	(0.026)	(0.025)	(0.031)	(0.031)	(0.031)	(0.031)
t6	0.2848***	0.2845***	0.2852***	0.2826***	0.2112***	0.2123***	0.1917***	0.1411***	0.1459***	0.1292***	0.1305***
	(0.026)	(0.029)	(0.026)	(0.026)	(0.026)	(0.025)	(0.024)	(0.032)	(0.031)	(0.030)	(0.030)
t7	0.3305***	0.3237***	0.3197***	0.3155***	0.2354***	0.2312***	0.2013***	0.1421***	0.1430***	0.1183***	0.1146***
	(0.032)	(0.035)	(0.032)	(0.034)	(0.031)	(0.029)	(0.031)	(0.036)	(0.035)	(0.035)	(0.033)
t8	0.3790***	0.3728***	0.3659***	0.3612***	0.2793***	0.2722***	0.2395***	0.1741***	0.1728***	0.1457***	0.1425***
	(0.036)	(0.038)	(0.037)	(0.039)	(0.032)	(0.032)	(0.033)	(0.038)	(0.038)	(0.037)	(0.035)
t9	0.3036***	0.3020***	0.2903***	0.2837***	0.2024***	0.1904***	0.1472***	0.0916**	0.0860**	0.0503	0.0420
	(0.037)	(0.039)	(0.037)	(0.043)	(0.036)	(0.036)	(0.041)	(0.042)	(0.041)	(0.043)	(0.039)
t10	0.4396***	0.4350***	0.4251***	0.4177***	0.3311***	0.3213***	0.2737***	0.2172***	0.2140***	0.1748***	0.1569***
	(0.045)	(0.044)	(0.046)	(0.051)	(0.041)	(0.042)	(0.047)	(0.046)	(0.047)	(0.048)	(0.044)
t11	0.4364***	0.4418***	0.4215***	0.4113***	0.3316***	0.3116***	0.2498***	0.2133***	0.2007***	0.1499***	0.1253**
	(0.048)	(0.046)	(0.049)	(0.057)	(0.045)	(0.046)	(0.054)	(0.052)	(0.052)	(0.054)	(0.049)
t12	0.4525***	0.4593***	0.4377***	0.4265***	0.3512***	0.3294***	0.2624***	0.2372***	0.2226***	0.1677***	0.1412***
	(0.052)	(0.053)	(0.053)	(0.063)	(0.052)	(0.052)	(0.062)	(0.055)	(0.055)	(0.059)	(0.055)
t13	0.4936***	0.4988***	0.4776***	0.4656***	0.3870***	0.3657***	0.2942***	0.2791***	0.2649***	0.2067***	0.2017***
	(0.056)	(0.056)	(0.057)	(0.069)	(0.055)	(0.055)	(0.066)	(0.057)	(0.057)	(0.063)	(0.054)
	(0.031)										
Observations	.	.	.	.	.	.	.	.	.	.	.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculation

Table A.9.b- Different model specifications, for different time intervals.

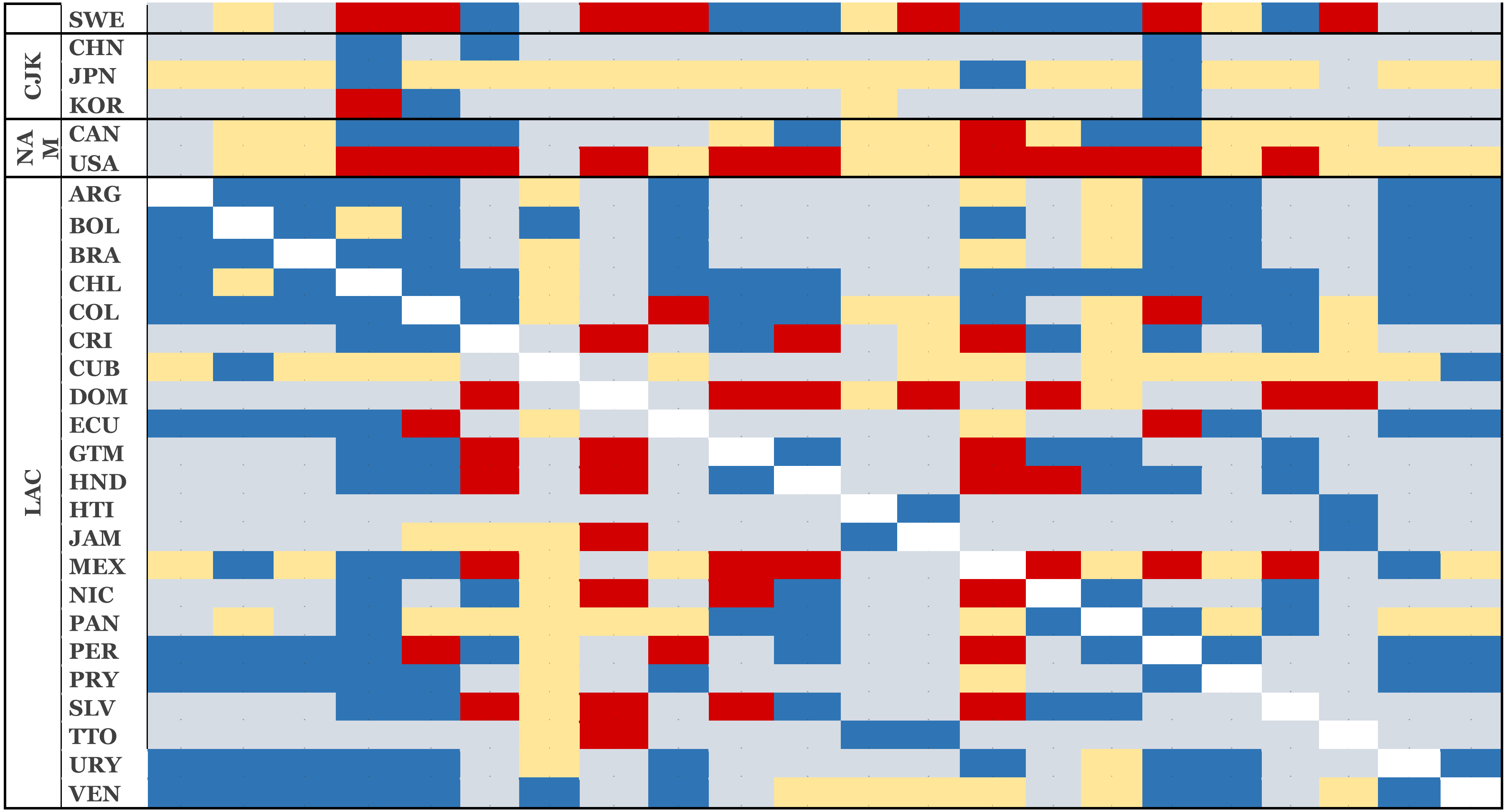
Odd years (1995-2017)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
RTA	0.1157***									
CD_D	1.4802***		1.4517***	1.4389***		1.4577***	1.3945***		1.3862***	1.3468***
DTA		0.2978***	0.2972***	0.2901***	0.1095	0.1088*	0.0569	0.2658***	0.2672***	0.2057***
FTA		0.0613	0.0884**	0.0900**	-0.1123***	-0.0858**	-0.0937***	0.0433	0.0695**	0.0587*
PTA_other		0.0860**	0.0847**	0.0860**	-0.037	-0.0385	-0.0434	0.0634*	0.0626*	0.0424
NRTAei				0			0.0000*			0.0000**
ln_AT					-3.7065***	-3.7277***	-4.0722***			
ln_NMF								-5.3456***	-5.1957***	-5.3402***
NRTAeia										
Observations	148,164	148,164	148,164	148,164	148,164	148,164	148,164	148,164	148,164	148,164
Even years (1996-2016)										
RTA	0.0883**									
CD_D	1.2752***		1.2454***	1.2219***		1.2708***	1.1955***		1.1683***	1.0888***
DTA		0.2386***	0.2319***	0.2194***	0.0157	0.0064	-0.0563	0.1848***	0.1808***	0.1398***
FTA		0.0405	0.0575	0.061	-0.1652***	-0.1505***	-0.1590***	0.0169	0.0332	0.0435
PTA_other		0.0551	0.0551	0.0591	-0.0981**	-0.0999**	-0.1023**	0.0237	0.0241	0.0351
NRTAei				0			0.0001**			0.0001**
ln_AT					-4.3490***	-4.4114***	-4.8647***			
ln_NMF								-6.8571***	-6.6959***	-7.0913***
NRTAeia										
Observations	139,474	139,474	139,474	139,474	139,474	139,474	139,474	139,474	139,474	139,474
All years (1995-2017)										
RTA	0.1035									
CD_D	1.3788		1.3497	1.332		1.3634***	1.2956***		1.2785***	1.2136***
DTA		0.2696***	0.2658	0.2561	0.0679	0.0631	0.0062	0.2288***	0.2275***	0.1927***
FTA		0.0527	0.0747	0.077	-0.1327***	-0.1120***	-0.1205***	0.033	0.0541*	0.0611*
PTA_other		0.0735*	0.0727	0.075	-0.0606	-0.0623	-0.0665*	0.0477	0.0474	0.0538
NRTAei				0			0.0000**			0.0000**
ln_AT					-3.9698***	-4.0088***	-4.3992***			
ln_NMF								-5.9678***	-5.8104***	-6.0930***
NRTAeia										
Observations	287,638	287,638	287,638	287,638	287,638	287,638	287,638	287,638	287,638	287,638

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculation

Table A.10 - Agreements in force by level between LAC countries with counterparts from the three hubs and LAC. They correspond to the base scenario.

Reg	Cty	ARG	BOL	BRA	CHL	COL	CRI	CUB	DOM	ECU	GTM	HND	HTI	JAM	MEX	NIC	PAN	PER	PRY	SLV	TTO	URY	VEN
EU	AUT																						
	BEL																						
	CHE																						
	CYP																						
	CZE																						
	GIVEN																						
	DNK																						
	ESP																						
	EST																						
	FIN																						
	FRA																						
	GBR																						
	GRC																						
	HRV																						
	HUN																						
	IRL																						
	ISL																						
	ITA																						
	LTU																						
	LVA																						
	NLD																						
	NOR																						
	POL																						
	PRT																						
	ROU																						
	SVK																						
	SVN																						



References: Type of Agreement
No agreement Shallow Medium Deep
Source: Author's calculation

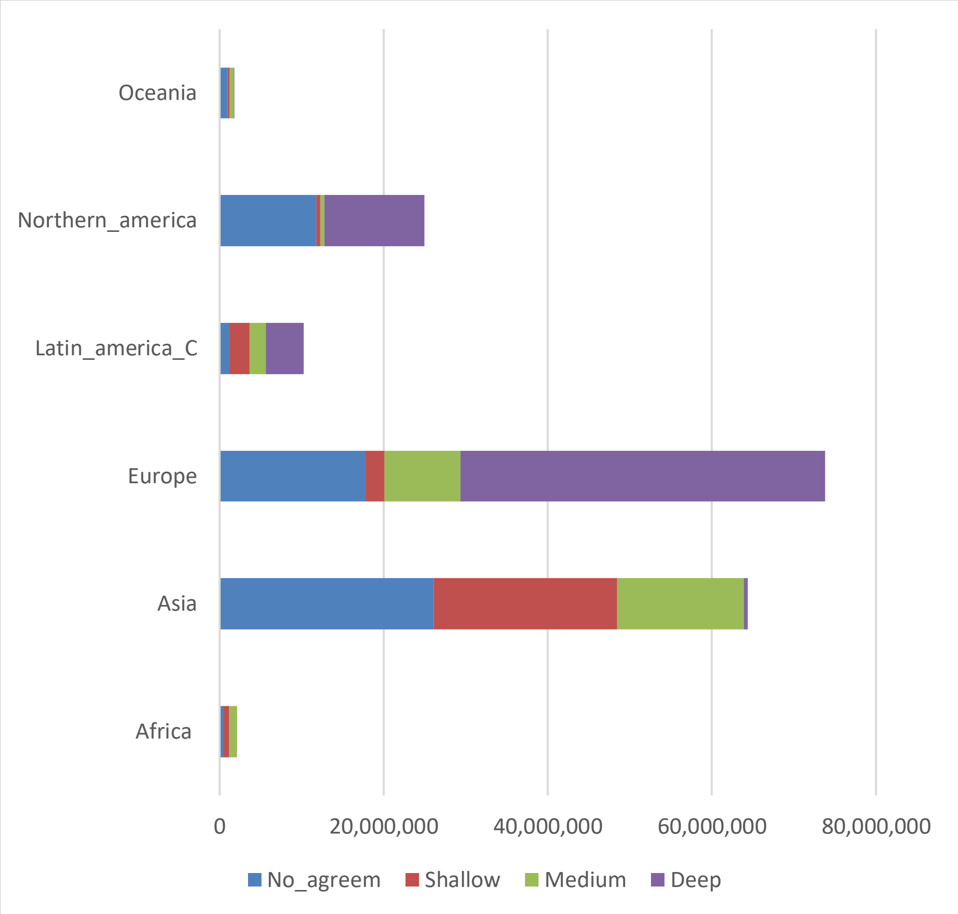
Table A.11- Interquartile range for well-being, under different scenarios

Scenario	Quantil	Treaties	LAC	No treaties	World
EU	**q50**	**0.70**	**0.54**	**0.00**	**0.19**
	q25	0.39	0.39	0.00	0.08
	q75	0.87	0.62	0.01	0.24
CJK	**q50**	**0.30**	**0.41**	**0.02**	**0.11**
	q25	0.20	0.30	0.01	0.07
	q75	0.34	0.46	0.03	0.13
NAM	**q50**	**0.32**	**0.36**	**0.01**	**0.09**
	q25	0.20	0.25	0.00	0.07
	q75	0.37	0.40	0.02	0.11
LAC	**q50**	**0.86**	**0.86**	**0.00**	**0.07**
	q25	0.62	0.62	0.00	0.04
	q75	0.97	0.97	0.01	0.08
LAC&UE	**q50**	**1.21**	**1.47**	**0.00**	**0.32**
	q25	0.80	0.99	-0.01	0.15
	q75	1.40	1.62	0.01	0.37
LAC&NAM	**q50**	**1.51**	**1.63**	**0.30**	**0.62**
	q25	0.95	1.10	0.20	0.41
	q75	1.73	1.89	0.35	0.70
LAC&CJK	**q50**	**0.86**	**1.29**	**0.02**	**0.29**
	q25	0.56	0.87	0.00	0.19
	q75	0.96	1.45	0.04	0.32

Source: Author's calculation

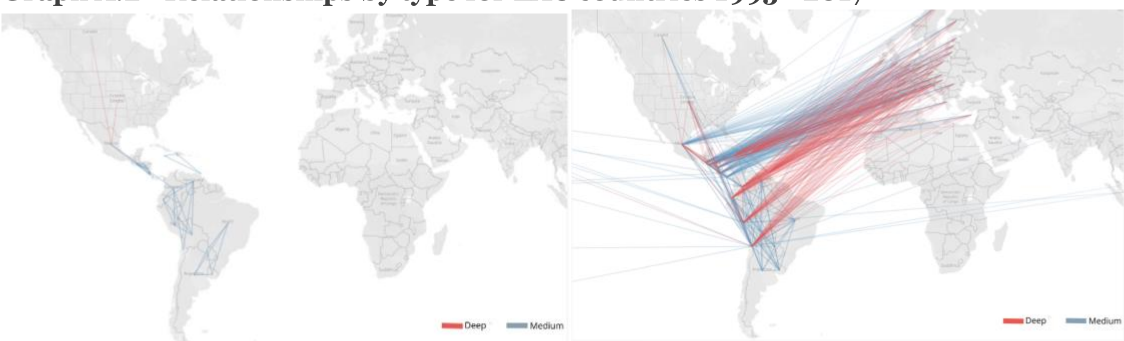
Appendix Charts

Graph A.1 - Trade by region and level of agreement. Regions as exporters. Year 2017.



Source: Author’s calculation

Graph A.2 - Relationships by type for LAC countries 1995 - 2017



Source: Author’s calculation

Annex B – Theoretical framework

B.1- Derivation of dynamic Model Equations

Anderson, Larch and Yotov (2020) expand the MGEC allowing for capital accumulation, deriving a dynamic gravity model (MEDGC). This extension, requires the estimation of two additional equations, one that explains the evolution of income and others that explain the evolution of capital. As shown by Anderson, Larch and Yotov (2020), the specifications of these two additional equations are as follows:

$$\ln Y_{jt} = \kappa_1 \ln L_{jt} + \kappa_2 \ln K_{jt} + \kappa_3 \ln \Pi_{jt}^{\sigma-1} + \nu_t + \vartheta_j + \varepsilon_{jt} \quad \text{(B.1)}$$

$$\ln K_{jt} = \psi_1 \ln E_{jt-1} + \psi_2 \ln K_{jt-1} + \psi_3 \ln P_{jt-1}^{\sigma-1} + \nu_t + \vartheta_j + \varepsilon_{jt} \quad \text{(B.2)}$$

As discussed by Anderson, Larch and Yotov (2020), equation (B.1) provides a theoretical basis for the reduced form equation of Frankel and Romer (1999), allowing us to test whether there is a causal relationship between trade openness and income. Moreover, given the structural nature of the MGECD, it allows us to obtain estimates of the elasticity of trade, as well as of the labor and capital shares of output, parameters that can be recovered from the estimates of the coefficients in equation (B.1), subject to the following structural relationships: $\hat{\sigma} = -1/\hat{\kappa}_3$,$\hat{\alpha} = \hat{\kappa}_2/(1+\hat{\kappa}_3)$, and . $\hat{\kappa}_1 + \hat{\kappa}_2 = 1 + \hat{\kappa}_3$

Again, following Anderson, Larch and Yotov (2020), equation (B.2) captures the effects of trade (liberalization) on capital accumulation, with its estimation providing three results: (i) testing whether there is a causal relationship between trade openness and transitory growth; (ii) providing an estimate of the elasticity of substitution; and (iii) providing an estimate of the rate of capital depreciation. Equation (B.2) imposes the following structural relationships: ;$\psi_1 = \delta \psi_2 = 1 - \delta$; and$\psi_3 = -\delta/(\sigma - 1)$. To the extent that multilateral resistance as an importer is an index of general equilibrium trade costs, a significant estimate ofψ_3 supports a causal relationship of trade on capital accumulation. Finally, the model implies that $\psi_1 = 1 - \psi_2$.

Finally, Anderson, Larch and Yotov (2020) propose the estimation of a reduced form of the income equation, which takes the following form:

$$\ln Y_{jt} = \kappa_1 \ln L_{jt} + \kappa_2 \ln E_{jt-1} + \kappa_3 \ln K_{jt-1} + \kappa_4 \ln \mathrm{P}_{jt-1}^{\sigma-1} + \kappa_5 \ln \Pi_{jt}^{\sigma-1} + \nu_t + \vartheta_j + \varepsilon_{jt} \quad \text{(B.3)}$$

with, $k_1 = (1-\alpha)(\sigma-1)/\sigma \; k_2 = \alpha\delta(\sigma-1)/\sigma \; k_3 = \alpha(1-\delta)(\sigma-1)/\sigma \; k_4 = -\alpha\delta/\sigma$, and $k_5 = -1/\sigma$. Equation (B.3) allows us to identify the direct effect of trade on income, through trade openness (term$\ln \Pi_{jt-1}^{\sigma-1}$), as well as the indirect effect of income via capital accumulation (term$\ln P_{jt-1}^{\sigma-1}$). In addition, it allows us to obtain the values of the elasticity of substitution$\hat{\sigma} = 1/\hat{\kappa}_5$, the capital share$\hat{\alpha} = 1 - \hat{\kappa}_1/(1+\hat{\kappa}_5)$, and the transition rate of the capital stock$\hat{\delta} = \hat{\kappa}_2/(\hat{\kappa}_2 + \hat{\kappa}_3)$, subject to the restrictions$\hat{\kappa}_2 = (1/\hat{\kappa}_5 + 1)\hat{\kappa}_4$ and .$\hat{\kappa}_1 = 1 + \hat{\kappa}_5 - \hat{\kappa}_2 - \hat{\kappa}_3$

The estimation of equations (B.1), (B.2) and (B.3) is very demanding from a methodological point of view due to the potential endogeneity of the explanatory variables. Therefore, for their estimation we follow Anderson, Larch and Yotov (2020), and use different estimator specifications with instrumental variables.

B.2. The model - Dynamic Model Derivation

Anderson and van Wincoop (2003) derive the SGMT in the framework of a monopolistic competition model with products differentiated by origin, for given costs and outputs. The SGMT equations are presented in the system B.1 (NxNxT equations), B.2 (NxT equations), B.3 (NxT equations) and B.4 (NxT equations).

$$X_{ijt} = \frac{Y_{it}E_{jt}}{Y_t}\left(\frac{t_{ijt}}{\Pi_{it}P_{jt}}\right)^{1-\sigma} \quad \text{(B.1)}$$

$$\Pi_{it} = \left[\sum_j \frac{E_{jt}}{Y_t}\left(\frac{t_{ijt}}{P_{jt}}\right)^{1-\sigma}\right]^{1/1-\sigma} \quad \text{(B.2)}$$

$$P_{jt} = \left[\sum_i \frac{Y_{it}}{Y_t}\left(\frac{t_{ijt}}{\Pi_{it}}\right)^{1-\sigma}\right]^{1/1-\sigma} \quad \text{(B.3)}$$

$$p_{jt} = \frac{\left(\frac{Y_{jt}}{Y_t}\right)^{1/1-\sigma}}{\Pi_{jt}\gamma_{jt}}\text{[11]} \quad \text{(B.4)}$$

where: X_{ijt} is the bilateral trade from origin country i to destination country j at time t, Y_{it} is the output of country i at time t, E_{jt} is the expenditure of country j at time t, Y_t is world output (equal to world expenditure) at time t; t_{ijt} are the trade costs between origin i and destination j at time t ,[12] Π_{it} is the outward MR (the aggregate selling price) of country at time t, P_{jt} is the inward MR (the aggregate purchase price) of country j at time t, and σ is the elasticity of substitution between the different varieties produced in the different origins. Equation B.4 determines output prices that depend negatively on supply $\left(\frac{Y_{jt}}{Y_t}\right)$ and the aggregate selling prices (Π_{jt}).

Anderson, Larch and Yotov (2020) propose a dynamic version of the gravity model (SDGMT) in which the level of expenditure and income are endogenous, using a mechanism that links the prices obtained at the first level (equations B.1 to B.4) to the dynamics of capital accumulation[13] . The structure of the economy is given by consumers

---

[11] Note that the factory-gate price for each country arises from the following derivation. First the demand function that arises from the first level of optimization for a given income: $X_{jit} = \frac{Y_{it}}{P_{it}^{1-\sigma}}\left(\gamma_{jt}p_{jt}t_{jit}\right)^{1-\sigma}$. consumption in country j, at time t, Ω_{jt} is investment in country j, at time t, K_{jt} is the stock of capital in country j, at time t, p_{jt} is the Factory-gate Price of country j's production, at time t, A_{jt} is a measure of productivity in country j, at time t, and L_{jt} is the labor endowment of country j, at time t,. In addition to the elasticity of substitution (σ) , another key parameters are the consumer discount rate ,$(\beta)\delta$ the capital depreciation rate (δ) , and the share of capital in total output .(α)

[11] In this equilibrium, physical production (Q_j) is constant, with nominal income given by .$Y_j = p_jQ_j$Then adding up for all destinations: $Y_{jt} = \sum_i X_{jit} = \sum_i Y_{it}\left(\frac{\gamma_{jt}p_{jt}t_{jit}}{P_{it}}\right)^{1-\sigma} = \left(\gamma_{jt}p_{jt}\right)^{1-\sigma}\sum_i Y_{it}\left(\frac{t_{jit}}{P_{it}}\right)^{1-\sigma}$. Finally: $\frac{Y_{jt}}{Y_t} = \left(\gamma_{jt}p_{jt}\right)^{1-\sigma}\sum_i \frac{Y_{it}}{Y_t}\left(\frac{t_{jit}}{P_{it}}\right)^{1-\sigma} = \left(\gamma_{jt}p_{jt}\right)^{1-\sigma}\Pi_{jt}{}^{1-\sigma}$, and the factory-gate price is: .$p_{jt} = \frac{\left(\frac{Y_{jt}}{Y_t}\right)^{1/1-\sigma}}{\Pi_{jt}\gamma_{jt}}$

[12] Trade costs are specified as $t_{ijt} = \tau_{ij}\tau_{ijt}$, where τ_{ij} are the permanent trade costs associated with factors such as physical and cultural distance, etc., and τ_{ijt} are the trade costs that change over time and refer to tariff and non-tariff barriers, basically influenced by trade policy.

[13] As a simplifying assumption, which we keep here, trade is balanced and therefore output is equal to expenditure (.$Y_{it} = E_{it}$)

seeking to maximize an intertemporal utility function with an appropriate discount rate[14] . The solution to the problem generates two new set of equations. Equation B.5 is the value-added function for each country j, while equation (B.6) describes the optimal behavior of capital given the second-level maximization problem, which determines the dynamic adjustment to a new steady state.

$$Y_{jt} = \mathrm{p}_{jt} A_{jt} {L_{jt}}^{1-\alpha} {K_{jt}}^{\alpha} \tag{B.5}$$

$$K_{jt+1} = \left[\frac{\alpha\beta\delta Y_{jt}}{(1-\beta+\beta\delta)P_{jt}}\right]^{\delta} {K_{jt}}^{1-\delta} \tag{B.6}$$

Given a certain trade costst_{ijt} , an initial stock of capitalK_{j0} , and a set of parameter values β, σ , ,δ andα , the system B.2-B.6 allows to obtain for each country j the values for the following set of variables: Π_{j1}, , ,$P_{j1} p_{j1} E_{j1}$ andK_{j1} , after iterating until the system converges to a new steady state. The steady state equilibrium to which the system converges can be easily obtained from equation B.6. With the other 4 equations we can solve for the rest of the endogenous variables in the steady-state equilibrium. The proposed procedure converges to:

$$K_{jS} = \frac{\alpha\beta\delta Y_{jS}}{(1-\beta+\beta\delta)P_{jS}} \tag{B.6'}$$

where the subscript S refers to the steady-state equilibrium.

We simulate changes in trade costs and obtain the effects on the endogenous variables mentioned above in two different equilibrium contexts. One is a short-run equilibrium in which capital accumulation is absent (static model), and the other is a short-run equilibrium in which capital decisions also become endogenous (dynamic model). In the static equilibrium, only equations B.2 to B.4 are required. All changes that occur for a given country j are reflected only through prices$(p_{jt}, \Pi_{it}, P_{jt})$ and in the value of nominal income(Y_{jt})[15] . The dynamic equilibrium is as presented in the beginning with equations B.2 to B.6.

The effects of trade costs changes are evaluated under different scenarios. The baseline scenario is the one observed before the changes (B). Then, different exercises of changes in trade costs are carried out. This is generally referred to as the counterfactual scenario (C).

$$K_{jB} = \frac{\alpha\beta\delta \mathrm{Y}_{jB}}{(1-\beta+\beta\delta)P_{jB}} \qquad K_{jC} = \frac{\alpha\beta\delta \mathrm{Y}_{jC}}{(1-\beta+\beta\delta)P_{jC}}$$

Taking the ratioK_{jC}/K_{jB} we obtain:

$$k_j = \frac{K_{jC}}{K_{jB}} = \frac{P_{jB} Y_{jC}}{Y_{jB} P_{jC}} = \frac{y_j}{P_j} = \frac{p_j}{P_j} {k_j}^{\alpha} \tag{B.7}$$

where:$y_j = \frac{Y_{jC}}{Y_{jB}}$;$P_j = \frac{P_{jC}}{P_{jB}}$;$p_j = p_{jC}$ given that $p_{jB} = 1$ is chosen as normalization.

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[14] The consumer's problem is to solve the following maximization problem: $\max_{C_{jt}, \Omega_{jt}} \sum_{t=0}^{\infty} \beta^t \ln C_{jt}$, subject to the following restrictions: $K_{jt+1} = {\Omega_{jt}}^{\delta} {K_{jt}}^{1-\delta}$, ,$Y_{jt} = \mathrm{p}_{jt} A_{jt} {L_{jt}}^{1-\alpha} {K_{jt}}^{\alpha} Y_{jt} = P_{jt} C_{jt} + P_{jt}\Omega_{jt}$. Where:C_{jt} is consumption in country j, at time t,Ω_{jt} is investment in country j, at time t,K_{jt} is the stock of capital in country j, at time t,p_{jt} is the Factory-gate Price of country j's production, at time t,A_{jt} is a measure of productivity in country j, at time t, andL_{jt} is the labor endowment of country j, at time t,. In addition to the elasticity of substitution(σ) , another key parameters are the consumer discount rate ,$(\beta)\delta$ the capital depreciation rate(δ) , and the share of capital in total output .(α)

[15] In this equilibrium, physical production(Q_j) is constant, with nominal income given by .$Y_j = p_j Q_j$

The change in capital is equal to the change in real income $\left(\frac{Y_j}{P_j}\right)$, which is a way of computing the change in welfare since its change is equal to the change in real consumption. [16]

$$w_j = k_j = \frac{Y_j}{P_j} = c_j = \frac{p_j}{P_j} k_j{}^{\alpha} \tag{B.8}$$

where: ; . $w_j = \frac{W_{jC}}{W_{jB}} c_j = \frac{C_{jC}}{C_{jB}}$

B3. Consumer Problem and Capital Accumulation – Derivation following Anderson Yotov, 2020.

A.1 Environment and Preferences

Consider country $i$in period t. The representative household chooses sequences of consumption and next-period capital, $\{C_{i,t}, K_{i,t+1}\}_{t=0}^{\infty}$, to maximize lifetime utility:

$$\max_{\{C_{i,t}, K_{i,t+1}\}} \sum_{t=0}^{\infty} \beta^t \; U(C_{i,t}),$$

where $\beta \in (0,1)$is the discount factor. Period utility is defined over an aggregate consumption index, which is a CES aggregator of Armington varieties. Using the standard SGMT result, this aggregator can be written as:

$$C_{i,t} = \left(\sum_j c_{ij,t}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}},$$

and the associated CES price index is $P_{i,t}$, which coincides with the importer-side multilateral resistance in the static block. For the dynamic problem it is convenient to take $C_{i,t}$as a scalar and denote period utility as:

$$U(C_{i,t}) = \frac{C_{i,t}^{1-\gamma} - 1}{1-\gamma}, \gamma > 0,$$

[16] Given:$K_{je} = \frac{\alpha\beta\delta Y_{je}}{(1-\beta+\beta\delta)P_{je}} = \frac{\alpha\beta\delta P_{je}(C_{je}+\Omega_{je})}{(1-\beta+\beta\delta)P_{je}} = \frac{\alpha\beta\delta(C_{je}+K_{je})}{(1-\beta+\beta\delta)}$ with e=B,C. In the steady state it is satisfied that:$\Omega_{je} = K_{je}$. Then, consumption is:$C_{je} = K_{je}\left(\frac{(1-\beta+\beta\delta)}{\alpha\beta\delta} - 1\right) = K_{je}\left(\frac{(1-\beta(1-\delta(1-\alpha)))}{\alpha\beta\delta}\right) = \frac{\alpha\beta\delta Y_{jC}}{(1-\beta+\beta\delta)P_{jC}}\left(\frac{(1-\beta(1-\delta(1-\alpha)))}{\alpha\beta\delta}\right) = \frac{Y_{jC}}{P_{jC}}\left(\frac{(1-\beta(1-\delta(1-\alpha)))}{(1-\beta+\beta\delta)}\right)$. The change in consumption is equal to the change in real income and therefore also to the change in capital.

with $\gamma$the coefficient of relative risk aversion (and inverse of the intertemporal elasticity of substitution).

A.2 Budget Constraint and Capital Dynamics

The household owns the aggregate capital stock $K_{i,t}$, rents it to firms at the equilibrium return and receives all income from domestic production. Under the production technology used in the main text,

$$Y_{i,t} = p_{i,t} A_{i,t} L_{i,t}^{1-\eta} K_{i,t}^{\eta},$$

where $A_{i,t}$is productivity, $L_{i,t}$is labor, $\eta \in (0,1)$is the capital share and $p_{i,t}$is the factory-gate price, consistent with the SGMT block.

Let $P_{i,t}$ denote the common price index for the consumption–investment aggregate, given by the importer multilateral resistance. Imposing balanced trade in each period, total nominal income equals the value of domestic production, $Y_{i,t}$, and must be allocated between consumption and investment. The period budget constraint can therefore be written as:

$$P_{i,t} C_{i,t} + I_{i,t} = Y_{i,t},$$

where $I_{i,t}$is nominal investment. Capital evolves according to

$$K_{i,t+1} = (1 - \delta_K) K_{i,t} + \frac{I_{i,t}}{P_{i,t}},$$

with $\delta_K \in (0,1)$the physical depreciation rate and $I_{i,t}/P_{i,t}$the real quantity of new capital goods purchased at the common price $P_{i,t}$.

Combining these two equations and substituting for $I_{i,t}$, the intertemporal budget constraint can be expressed in terms of $(C_{i,t}, K_{i,t}, K_{i,t+1})$:

$$P_{i,t} C_{i,t} + P_{i,t} K_{i,t+1} = P_{i,t}(1 - \delta_K) K_{i,t} + Y_{i,t}.$$

Equivalently,

$$P_{i,t} C_{i,t} = Y_{i,t} - P_{i,t}(K_{i,t+1} - (1 - \delta_K) K_{i,t}).$$

A.3 Dynamic Program and First-Order Conditions

The household's problem can be written in recursive form as:

$$V(K_{i,t}, A_{i,t}) = \max_{C_{i,t}, K_{i,t+1}} \{U(C_{i,t}) + \beta\, \mathbb{E}_t[V(K_{i,t+1}, A_{i,t+1})]\}$$

subject to

$$P_{i,t}C_{i,t} + P_{i,t}K_{i,t+1} = P_{i,t}(1-\delta_K)K_{i,t} + Y_{i,t},$$
$$K_{i,t+1} \geq 0.$$

Let $\lambda_{i,t}$ be the multiplier on the budget constraint. The Lagrangian is:

$$\mathcal{L} = \sum_{t=0}^{\infty} \beta^t \left[U(C_{i,t}) + \lambda_{i,t}(P_{i,t}(1-\delta_K)K_{i,t} + Y_{i,t} - P_{i,t}C_{i,t} - P_{i,t}K_{i,t+1})\right].$$

The first-order conditions with respect to $C_{i,t}$ and $K_{i,t+1}$ are:

(i) Consumption:

$$\frac{\partial \mathcal{L}}{\partial C_{i,t}}: U'(C_{i,t}) - \lambda_{i,t}P_{i,t} = 0 \Rightarrow \lambda_{i,t} = \frac{U'(C_{i,t})}{P_{i,t}}.$$

(ii) Next-period capital:

$$\frac{\partial \mathcal{L}}{\partial K_{i,t+1}}: -\lambda_{i,t}P_{i,t} + \beta\, \mathbb{E}_t \left[\lambda_{i,t+1}\left(P_{i,t+1}(1-\delta_K) + \frac{\partial Y_{i,t+1}}{\partial K_{i,t+1}}\right)\right] = 0.$$

Substituting $\lambda_{i,t} = U'(C_{i,t})/P_{i,t}$ into the second condition yields the Euler equation for optimal savings:

$$U'(C_{i,t}) = \beta\, \mathbb{E}_t \left[U'(C_{i,t+1}) \frac{P_{i,t+1}(1-\delta_K) + \partial Y_{i,t+1}/\, \partial K_{i,t+1}}{P_{i,t+1}}\right].$$

Using the Cobb–Douglas technology, the marginal product of capital is:

$$\frac{\partial Y_{i,t+1}}{\partial K_{i,t+1}} = p_{i,t+1}A_{i,t+1}L_{i,t+1}^{1-\eta}\eta K_{i,t+1}^{\eta-1} = \eta\, \frac{Y_{i,t+1}}{K_{i,t+1}}.$$

Therefore, the Euler condition can be written as:

$$U'(C_{i,t}) = \beta\, \mathbb{E}_t \left[U'(C_{i,t+1})\left(1 - \delta_K + \frac{\eta\, p_{i,t+1}A_{i,t+1}L_{i,t+1}^{1-\eta}K_{i,t+1}^{\eta-1}}{P_{i,t+1}}\right)\right].$$

A.4 Log-Linearization and Policy Function

To obtain a tractable policy function for capital, Anderson, Larch and Yotov (2020) log-linearize the Euler equation around a steady state with balanced trade, constant employment and exogenous productivity process. Under CRRA preferences, $U'(C_{i,t}) = C_{i,t}^{-\gamma}$. Combining the Euler equation with the budget constraint and the production function, and normalizing by the price index $P_{i,t}$, one can express consumption as a function of income and investment, and then rewrite the Euler condition in terms of the state variable $K_{i,t}$ and exogenous processes $(A_{i,t}, L_{i,t})$.

The result is a log-linear law of motion for capital of the form:

$$\ln\ K_{i,t+1} = \delta \left[\ln \left(\frac{\gamma\delta\ \phi_{i,t}\ \eta\ p_{i,t} A_{i,t} L_{i,t}^{1-\eta} K_{i,t}^{\eta-1}}{(1-\gamma+\gamma\delta)\ P_{i,t}} \right) \right] + \ln\ K_{i,t},$$

which can be written equivalently in levels as:

$$K_{(i,t+1)} = \left[\frac{\gamma\delta\phi_{(i,t)}(\eta\ p_{(i,t)} A_{(i,t)} L_{(i,t)}^{1-\eta} K_{(i,t)}^{\eta-1})}{(1-\gamma+\gamma\delta)\ P_{(i,t)}} \right]^{\delta} K_{(i,t)}.$$

Imposing $\phi_{i,t} = 1$(balanced trade) yields the capital accumulation equation (VII) used in the main text. This expression shows explicitly how the optimal investment decision depends on the marginal product of capital—through $p_{i,t} A_{i,t} L_{i,t}^{1-\eta} K_{i,t}^{\eta-1}$—and on the aggregate consumption–investment price index $P_{i,t}$. A higher producer price $p_{i,t}$ raises the marginal value of capital and increases optimal savings, while a higher price index $P_{i,t}$ makes both consumption and investment more expensive, reducing the incentive to accumulate capital.

In summary, the consumer problem together with the Cobb–Douglas technology and the SGMT price indices yields a closed-form, log-linear policy function for capital accumulation. This is the dynamic link that transforms the static SGMT into the Structural Dynamic Gravity Model of Trade (SDGMT) used in the simulations of the main text.

Annex C – Database construction

Our database contains more relationships and details than any other database available for the period 1995-2017 and for the selected sample of countries (113). This database is especially complete for Latin American and Caribbean countries.

Out of a total of 291,088 possible relationships, our database has classified 97,763, representing 33.6% of the total. This is the most complete database for the sample of countries and years selected. Below is a comparative table with some of the most popular databases used in this study:

Table C.1 Number of relationships covered by a preferential trade agreement.

Base	**ACP Coverage**
Fontagne 2023	20%
WB 2023	21%
DG 2021	28%
EIA 2021	32%
Own base 2023	**34%**

Relationship Debugging

These relationships have been refined to exclude those that, although they are current or draft agreements, in practice have no real effect on preferences or other preferential mechanisms. For example, the Global System of Trade Preferences among Developing Countries (GSTP) was excluded from our database, which represents some 17,266 relationships considered in other agreement databases. Not all databases consider these relationships to the same extent.

Inclusion of Additional Relationships

In addition, trade relations not covered in other databases or not covered in sufficient depth have been added to our database. This is the case of most of the trade relations between Latin American countries, which in the WB or WTO database are reported under the 1978 enabling clause as a PSA under the name of the Latin American Integration Association (LAIA). In reality, there are several agreements under this umbrella that in many occasions go beyond a simple agreement of partial preferences. These modifications have been incorporated into the current basis.

Types of Agreements

According to the WTO and the WB, the types of agreements include:

- Custom Unions ("CUs")

- Economic Integration Agreements (Economic Integration Association, "CU & EIA"), which usually add more disciplines to trade in goods, generally services, investments, public procurement, etc.

- Free Trade Areas (FTAs)

- Free Trade and Economic Integration Agreements (FTA & EIA)

- Partial Scope Agreements ("PSA")

Database Considerations

A fundamental aspect in the agreement databases is that in a bilateral relationship there may be more than one preferential agreement in force. In the World Bank's DTA database, relationships with up to 8 agreements in force can be found. Of a total of 188,960 agreements, 27% are agreements that appear at least twice. Since our database is specific to each bilateral relationship by year (ijt), we should be left with only one agreement that covers the bilateral relationship in that year.

Bilateral Relationship Example

An example of the above is the bilateral relationship between Honduras and El Salvador in 2017. In this case, the agreements in force should be considered to determine which is the most relevant and how it is classified in our database.

Hierarchization of Agreements

To resolve the coexistence of multiple agreements in the same bilateral relationship, we rank the agreements in the following order according to their degree of depth: CU+EIA > FTA+EIA > CU > FTA > PSA. We select the last agreement in force of higher or equal category than its preceding one.

Base Creation Process

Use of the Dynamic Gravity database and its updated version 2 (Tamara Gurevich and Peter Herman, (2018): All variables identifying some type of business relationship (pta, ptacu, ptafta, ptaeia, etc.) were used.

Incorporation of applied tariffs (tariff): Using Teti 2020 data, the MFN (maximum applied tariff) and pref (percentage value of applied tariff and MFN tariff) variables were derived.

3. Integration with the Berstrand 2021 database (EIA-Database 2021): Additional relationships not existing in the previous bases were incorporated, controlling that they at least exist in another base or have a preference greater than 20%. Agreement categories were established by crossing the six types of Berstrand agreements, from 1 (Non reciprocal preferences) to 6 (Economic Union).

4. Incorporation of the World Bank's Deep Trade Agreeement Database (Fernandez, Rocha and Ruta, 2023): Agreements were cleaned and selected using the DTA data

source of PTA content and Agreement_id. Both provide complementary information on agreement types, agreement names and number of relationships covered.

5. Aggregation of the DTA WB base (All provisions bilateral): This base provides bilateral information and a degree of depth in number of disciplines through the Depth variable. After corrections and extensions, it was used to generate our classification of depth of agreements.

6. Control and improvement with the Cepii Gravity Database (Conte, M., P. Cotterlaz and T. Mayer (2022)): Several corrections and adjustments were made with their own databases and the database of bilateral relations was completed, eliminating many relations where there were no real agreements (e.g. GSTP). Symmetry was imposed on the agreements and completed with agreement typology, name and degree of depth.

7. Comparison with Fontagné 2021: Finally, the results were compared with the Fontagné 2021 agreement classification.

Classification of Agreements

Three variables were used to classify the agreements:

- Agreement typology: Sourced from WB and Gravity Database databases and own review.

- Preferences: Coming from Teti 2020.

- Depth: From WB base - DTA database - Fernandez, Rocha and Ruta, 2023

The World Bank database categorizes 937 different provisions in 17 discipline areas, organized into border issues (areas 1-7), cross-border issues (areas 8-13 and 16-17), and non-trade objectives (areas 14-15). The plurilateral agreements bring together several bilateral relationships, showing bilateral heterogeneity.

Depth of Agreements (Depth)

The Depth variable measures the depth of the agreements, related to the increase in areas of disciplines and the increase in provisions. Although the accumulation of provisions is a rough indicator, it provides valuable information. For the most part, a higher Depth value responds to newer agreements with a greater number of disciplines, coinciding with those identified by Fontagné et al. 2023.

Categorization of Agreements by level.

Deep

Free trade agreement in goods, services and other disciplines (FTA+EIA or CU+EIA).

2. Incorporates a significant number of provisions (Depth greater than 300).

3. Average tariff preference of at least 90%.

Medium

Free trade agreement in goods, services and other disciplines (FTA+EIA or CU+EIA) or simply a free trade agreement in goods (FTA/CU).

2. Incorporates some provisions (Depth greater than 130).

3. Average tariff preference of at least 70%.

Shallow

1. Partial agreements, with preferences that are not necessarily reciprocal (PSA).

2. Relationships that do not meet the criteria of Deep or Medium.

The categorization and ranking of agreements has been done to ensure an accurate and comprehensive database, allowing for a detailed analysis of bilateral trade relations. Table C.3 summarizes the relationship between agreement typology and agreement group. The relationship between average Depth over time by agreement group is depicted in Table C.4. And the relationship between average preferences and agreement group is shown in Table C.5. This adjustment is not made for partial agreements, since by definition they have a more asymmetric treatment, since a partner may receive preferential access to a market, but not grant reciprocal treatment (e.g. GSP).

Table C.2- Type of Agreement and Agreement group.

Level_agreements	No_agreem	PTA_Other	FTA_CU	FTA_EIA	CU_EIA	Total
No_agreem	193,325					193,325
Shallow		56,219				56,219
Medium			18,262	7,051	530	25,843
Deep				6,203	9,498	15,701
Total	193,325	56,219	18,262	13,254	10,028	291,088

Table C.3- Average Depth by Level of Agreement

Year	Shallow	Medium	Deep
1995	67	134	191
1996	68	130	191
1997	69	128	191
1998	69	103	191
1999	61	111	191
2000	54	120	191
2001	57	123	191
2002	55	126	191
2003	55	128	204
2004	52	132	193
2005	52	133	194
2006	54	134	204

2007	56	136	202
2008	55	140	226
2009	70	140	226
2010	69	145	225
2011	78	147	235
2012	77	145	237
2013	78	185	252
2014	91	194	265
2015	91	196	265
2016	92	196	265
2017	94	196	265
Total	68	157	232

The average level of preferences (in percentage ad valorem) per year. For the case of No agreements the average level of preferences is 0.7%.

Table C.4- Average preference by Agreement group by year.

	Level_agreements		
Year	**Shallow**	**Medium**	**Deep**
1995	52.3	71.2	95.3
1996	50.0	70.9	93.7
1997	51.6	71.9	94.1
1998	50.1	58.7	93.1
1999	48.6	59.6	89.4
2000	49.5	60.6	89.8
2001	48.9	60.8	90.4
2002	54.5	64.3	89.7
2003	55.4	65.5	83.4
2004	59.7	66.4	90.2
2005	60.4	69.7	91.0
2006	61.0	72.5	90.8
2007	61.6	73.5	91.4
2008	63.1	74.4	85.7
2009	61.1	72.1	85.8
2010	60.0	72.7	87.1
2011	61.8	73.6	86.5
2012	60.7	73.4	87.5
2013	58.1	70.3	86.7
2014	58.2	71.2	87.1
2015	58.2	72.6	87.9
2016	57.4	73.6	88.1
2017	61.8	75.4	87.8
Total	56.6	70.5	88.3

Table C.5 – Database Comparison

	1_WB_bilateral	1.1_Agreem_id	2_PTA_content	3_WB_Fontangne	4_own_base	5_Berstrand	Merge_our
n	547,320	203,530	351,618	348,579	293,687	2,572,440	293,687
#countries	213	213	207	140	113	195	113
years	59 (1958-2017)	60 (1958-2017)	65 (1958-2022)	41 (1978 - 2018)	23 (1995-2017)	68 (1950 - 2017)	23(1995-2017)
Dimension	non-square	non-square	non-square	not square or consistent (loses trace of agreements in bilateral relations)	Square , covers non-agreement and domestic trade	Square / covers no agreement ; no internal trade	square
Source	DTA page	Excel_intensive	DTA / updated Alvaro 2023	Paper / folder	Paper CAF + seba thesis update (Dynamic Gravity) + Feodora , applied tariff data	EIA Bergstrand and Page	own
Variable Agreements – Type	Depth - continued	name and type	name and type but with missing in id	Cluesters and rta	Agreements 3 levels	EIA : Agreements in 9 categories	Merge_agreement : 4 levels
Variable Agreements – Rta	pta (0 1) - solo =1 have depth. 184.522 obs	type: 6 categories of type of agreement (cree rta_type)	type2: 7 types of agreem . Identify RTAID and WBID and Aggregate orig // Create the RTA_type2 to make 1 0	rta=1 (n=66,908) (3 cluster) rta=0 (n=280,950)	RTA=1 (n=95.890) and RTA=0(n =197.797)	Cree RTA_ber =1 (n=285 ,033) y =0 (n=2,287,407)	RTA_merge - dummy - RTA=1(114.011) RTA=0(179.676)

	Obs	Pta and Pta_mapped, only relationships that had agreements at some point in time are mapped.	only maps when there is agreement, more than one agreement per ijt relationship.	. Very similar to 1.1, only maps when agreement exists, more than one agreement per ijt relationship. Seems more complete in agreement status, has many not in force. Differ in country coverage	We are waiting for an update from the WB.	It incorporates the latest classification of agreements based on Feodora's applied tariff. I have two sectors for gravity model, but I eliminate one to take out dimension.	Agreements in 9 Categories (-999- no country , 0 No agreement, 1 to 6 Agreement Category)	procedure in "merge procedure" sheet