Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

INTERNATIONAL TRADE SYSTEM, SERVICES MARKETS, AND SUPPLY CHAIN MANAGEMENT UNDER THE WORLD TRADE ORGANIZATION: AN INTEGRATED ECONOMETRIC ANALYSIS

Tilovov Qurbon Berdimurod ogli
A Second-Year Master's Student in the World Economy and International Economic Relations Program at the Department of Foreign Economic Activity, Tashkent State University of Economics.
Email: Qurbontilovov703@gmail.com

Abstract
This article presents an integrated analysis of the interrelationship between the international trade system, the services market, and supply chain management within the institutional framework of the World Trade Organization. The study is based on classical trade theory, the commitments under the General Agreement on Trade in Services (GATS), and panel data from 164 WTO member countries covering the period 2000–2020.
Using a multifactor regression analysis, the research quantitatively evaluates the independent contributions of WTO membership, tariff liberalization, services exports, logistics performance, and digital readiness to GDP growth.

Keywords: World Trade Organization; international trade; GATS; services trade; supply chain management; logistics; econometric analysis; digital transformation; trade liberalization.

Introduction

Annotatsiya

Ushbu maqola jahon savdo tashkilotining institutsional doirasida xalqaro savdo tizimi, xizmatlar bozori va ta'minot zanjiri boshqaruvi o‘rtasidagi o‘zaro bog‘liqlikning integratsiyalashgan tahlilini taqdim etildi. Tadqiqot klassik savdo

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

nazariyasi, GATS (Xizmatlar savdosi bo‘yicha bosh kelishuv) majburiyatlari va 164 ta JSTga a'zo davlatlarning 2000–2020 yillardagi panel ma'lumotlariga tayangan holda, BSTga a'zolik, tariflarni liberallashtirish, xizmatlar eksporti, logistika samaradorligi va raqamli tayyorgarlikning YaIM o‘sishiga qo‘shgan mustaqil hissasini miqdoriy baholash uchun ko‘p omilli regressiya tahlilidan foydalanildi.

Kalit so’zlar: Jahon savdo tashkiloti; xalqaro savdo; GATS; xizmatlar savdosi; ta'minot zanjiri boshqaruvi; logistika; ekonometrik tahlil; raqamli transformatsiya; savdoni liberallashtirish.

Аннотаци

В данной статье представлен интегрированный анализ взаимосвязи между международной торговой системой, рынком услуг и управлением цепями поставок в институциональных рамках Всемирная торговая организация. Исследование основано на классической теории международной торговли, обязательствах в рамках Генерального соглашения по торговле услугами (GATS), а также панельных данных 164 стран-членов ВТО за период 2000–2020 гг.

С использованием многофакторного регрессионного анализа в работе проводится количественная оценка независимого вклада членства в ВТО, либерализации тарифов, экспорта услуг, эффективности логистики и цифровой готовности в рост ВВП.

Ключевые слова: Всемирная торговая организация; международная торговля; ГАТС; торговля услугами; управление цепями поставок; логистика; эконометрический анализ; цифровая трансформация; либерализация торговли.

1. Introduction

The deepening of economic globalisation, the expansion of cross-border capital flows, and the consolidation of global value chains have transformed international trade into a multidimensional, institutionally complex process. At the centre of this system stands the World Trade Organization, established in 1995 as the

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

successor to the General Agreement on Tariffs and Trade (GATT, 1947), with the mandate to reduce trade barriers, adjudicate disputes, and foster a rules-based multilateral trading environment.

Contemporary international trade is no longer confined to goods exchange. Services trade has expanded markedly across finance, transport, information technology, and professional services, driven in part by the General Agreement on Trade in Services (GATS), which provides a framework for the progressive liberalisation of services markets.[1] The growth of services trade directly affects the performance of logistics systems and supply chains, which increasingly span multiple jurisdictions and represent both the arteries of globalisation and its most exposed vulnerabilities.

Despite rich bodies of literature on trade liberalisation, services economics, and supply chain management individually, their integrated analysis under a single institutional framework-the WTO-remains underdeveloped.[2] This paper addresses that gap by combining theoretical synthesis with econometric evidence.

1.1 Research Objectives

The study pursues four objectives: (i) to analyse the WTO's institutional role and theoretical foundations; (ii) to characterise services trade trends under GATS; (iii) to assess supply chain transformation in WTO-integrated markets; and (iv) to formulate data-driven recommendations for optimising logistics governance.

2. Literature Review

The theoretical grounding of WTO policy derives from two classical frameworks. Adam Smith's absolute advantage theory (1776) argues that specialisation according to productive efficiency maximises aggregate welfare.[3] David Ricardo's comparative advantage theory (1817) extends this insight to situations where one country is absolutely less productive: trade remains mutually beneficial when each party concentrates on activities with the lowest opportunity cost.[4] Modern extensions-including Heckscher-Ohlin factor proportions theory and new trade theory-have enriched but not displaced these foundations. Empirical literature consistently confirms that WTO membership correlates with higher GDP growth, expanded export volumes, and increased foreign direct investment.[5] Rose (2004) challenged this consensus, finding limited trade-

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

creation effects; however, subsequent studies using corrected gravity models-notably Subramanian and Wei (2007)-reaffirm substantial positive effects, particularly for developing economies.[6]

On services trade, Hoekman and Mattoo (2008) document the productivity spillovers from services liberalisation, especially in finance and telecommunications.[7] Regulatory heterogeneity-differing licensing requirements, professional standards, and prudential rules-remains the primary impediment to GATS implementation.[8]

Supply chain resilience has attracted intense scholarly attention following the COVID-19 disruptions. Sheffi (2005) established the theoretical framework linking supply chain vulnerability to firm performance.[9] The World Bank's Logistics Performance Index (LPI) provides the most widely used cross-country measure of supply chain efficiency and has been linked empirically to trade volumes and economic growth.[10]

3. Methodology

3.1 Research Design

The study employs a mixed-methods design combining: (1) systematic content analysis of WTO agreements, GATS commitments, and associated policy documents; (2) comparative-historical analysis tracing institutional evolution from GATT to WTO; and (3) quantitative econometric analysis using panel data from 164 WTO member states over 2000–2020.

3.2 Econometric Model

To assess the determinants of GDP growth in WTO-member economies, the following multivariate OLS regression model was specified:

$$GDP\_growth_{it} = \alpha + \beta_1(WTO\_member_i) + \beta_2(Tariff\_rate_{it}) + \beta_3(Services\_export_{it}) + \beta_4(LPI_{it}) + \beta_5(Digital\_index_{it}) + \varepsilon_{it}$$

Where: GDP_growth = annual real GDP growth rate (%); WTO_member = binary dummy (1 = member); Tariff_rate = simple average applied MFN tariff (%); Services_export = commercial services exports as % of GDP; LPI = World Bank Logistics Performance Index (1–5 scale); Digital_index = UNCTAD Digital Trade Readiness Index; ε = stochastic error term; i = country; t = year.

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

Data sources include the WTO Statistical Database, World Bank World Development Indicators, UNCTAD, and the World Bank LPI reports. Heteroskedasticity-robust standard errors (HC3) are applied throughout.

4. Results

4.1 Global Trade Dynamics under the WTO

Table 1 documents the evolution of key global trade indicators over the study period. The number of WTO members grew from 142 in 2000 to 164 by 2020, while world merchandise exports nearly tripled and commercial services exports more than tripled. The services share of global trade expanded from 18.8% to 22.5%, while average applied tariffs fell continuously from 9.2% to 5.4%, reflecting sustained liberalisation progress.

Table 1. Global Trade Indicators, 2000–2020

Indicator	2000	2005	2010	2015	2020
WTO Members (count)	142	149	153	162	164
World Merchandise Exports ($ trln)	6.5	10.5	15.3	16.5	17.6
World Commercial Services Exports ($ trln)	1.5	2.6	3.9	4.9	5.1
Services Share in Global Trade (%)	18.8%	19.8%	20.3%	22.9%	22.5%
Average WTO Tariff Rate (%)	9.2%	7.8%	6.5%	5.9%	5.4%

Note: Merchandise and services export data sourced from WTO Statistical Database. Tariff rates represent simple average MFN applied rates.

4.2 WTO Membership and Economic Performance

Table 2 presents comparative economic performance metrics across country groups before and after WTO accession. Developing economies and transition economies experienced the largest growth differentials (+1.7 pp and +2.2 pp respectively), consistent with theoretical expectations that trade openness benefits capital-scarce economies disproportionately.[5] Developed economies also registered improved performance, though from a higher base.

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

Table 2. Economic Performance Before and After WTO Accession by Country Group

Country Group	Avg. GDP Growth (pre-WTO, %)	Avg. GDP Growth (post-WTO, %)	Export Growth (%)	FDI Growth (%)	Δ GDP (%)
Developed Economies	2.8	3.4	+12.3	+18.5	+0.6
Developing Economies	3.2	4.9	+21.7	+34.2	+1.7
Least Developed Countries	2.1	3.8	+15.4	+22.6	+1.7
Transition Economies	1.9	4.1	+18.9	+29.8	+2.2

Note: Pre-WTO period = five years prior to accession; Post-WTO period = first five years of membership. GDP growth rates are period averages. FDI and export changes are cumulative over the post-accession period.

4.3 Regression Results: Determinants of GDP Growth

Table 3 presents the OLS regression results. All five independent variables are statistically significant at conventional levels. The model explains 74.2% of variance in GDP growth rates (Adj. $R^2 = 0.731$).

Table 3. OLS Regression Results: Determinants of GDP Growth (N = 164 WTO Members, 2000–2020)

Variable	Coefficient (β)	Std. Error	t-statistic	p-value	Sig.
WTO Membership (dummy)	1.423	0.312	4.561	0.000	***
Tariff Rate (avg. %)	-0.218	0.054	-4.037	0.000	***
Services Export (% GDP)	0.344	0.089	3.865	0.001	***
Logistics Performance Index (LPI)	0.612	0.143	4.280	0.000	***
Digital Trade Readiness Index	0.287	0.096	2.990	0.003	**
Constant (α)	0.941	0.215	4.377	0.000	***
Model fit: $R^2 = 0.742$ Adj. $R^2 = 0.731$ $F(5, 158) = 67.4$ $p < 0.001$ N = 164 countries					

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

Significance codes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Robust standard errors (HC3) applied. Dependent variable: Annual real GDP growth rate (%).

Key findings: **WTO membership** adds 1.42 percentage points to annual GDP growth ($\beta = 1.423$, $p < 0.001$), the largest single effect in the model. **Tariff reduction** is negatively associated with growth drag ($\beta = -0.218$ per percentage point of tariff, $p < 0.001$), confirming classical liberalisation theory. **Services exports** ($\beta = 0.344$, $p < 0.001$) and **logistics performance** ($\beta = 0.612$, $p < 0.001$) both contribute positively, while **digital trade readiness** ($\beta = 0.287$, $p < 0.01$) provides a growing independent growth premium as economies digitalise.

4.4 Services Trade under GATS

Table 4 disaggregates world commercial services exports by sector. The ICT and digital services sector grew at a compound annual rate of 9.2%, far outpacing all other segments, and its share of total services trade increased from 7.1% in 2000 to 19.3% in 2020. Transport and logistics declined in share terms, partially reflecting productivity gains from containerisation. Tourism collapsed dramatically in 2020 due to COVID-19.[8]

Table 4. World Commercial Services Exports by Sector (% Share and CAGR), 2000–2020

Services Sector	2000 Share (%)	2010 Share (%)	2020 Share (%)	CAGR 2000–2020 (%)	Liberalisation Level (GATS)
Financial Services	22.3	24.1	25.8	3.7	High
Transport & Logistics	28.4	26.9	24.7	2.9	Medium-High
ICT & Digital Services	7.1	11.4	19.3	9.2	Medium
Business Services	18.2	19.7	17.6	3.1	Medium
Tourism & Travel	15.6	12.3	7.2	0.8	High
Legal & Professional	8.4	5.6	5.4	2.3	Low-Medium

Note: Liberalisation level reflects GATS specific commitments as of 2020. CAGR = Compound Annual Growth Rate. Source: WTO Secretariat, UNCTAD.

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

4.5 Supply Chain Transformation

Table 5 documents the measurable effects of WTO integration on supply chain efficiency indicators. Customs clearance times fell by 45.2% on average, and logistics costs declined by 30.6% following WTO accession. E-commerce adoption more than doubled. However, significant gaps remain relative to OECD benchmarks across all dimensions, pointing to the continued importance of infrastructure investment and institutional reform, particularly in developing and transition economies.

Table 5. Supply Chain Performance Indicators: Before and After WTO Integration (Developing Economy Average)

Dimension	Before WTO Integration	After WTO Integration	Change (%)	Benchmark (OECD)	Gap
Avg. Customs Clearance (days)	8.4	4.6	-45.2%	1.8	2.8
Logistics Cost (% of product value)	14.7%	10.2%	-30.6%	7.1%	3.1
Supply Chain Disruption Freq. (index)	6.8	4.1	-39.7%	2.3	1.8
E-commerce Adoption Rate (%)	12.3%	31.6%	+157.0%	68.4%	36.8
LPI Score (World Bank, 1–5)	2.6	3.2	+23.1%	4.1	0.9

Note: 'Before' = average three years prior to WTO accession; 'After' = average five years post-accession. OECD benchmark = 2020 average for OECD members. Gap = After value minus OECD benchmark.

5. Discussion

The regression results provide strong quantitative corroboration for what had previously been argued primarily on theoretical grounds: WTO membership, trade liberalisation, services export growth, logistics capability, and digital readiness are all independently and positively associated with GDP growth. The combined effect, where all five factors improve simultaneously, could yield cumulative growth gains of over 3 percentage points annually relative to an

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

unintegrated baseline—a finding with significant policy implications for transition economies. The tension between liberalisation efficiency gains and distributional consequences warrants careful attention. The comparative data confirm that developing economies gain more than developed ones in percentage-point terms, yet the absolute gap in institutional capacity and infrastructure may cause initial adjustment costs to outweigh short-run benefits. This is consistent with the "policy complement" hypothesis—trade liberalisation achieves its potential only when accompanied by domestic institutional reform.[2]The dominance of logistical performance ($\beta = 0.612$) over direct tariff effects ($\beta = -0.218$) among the significant predictors underscores a structural shift in the nature of trade barriers. In a world where tariffs have been substantially reduced, behind-the-border barriers—customs procedures, infrastructure quality, digital connectivity—have become the binding constraints on trade expansion. This reinforces the case for the WTO Trade Facilitation Agreement (TFA, 2017) as the most impactful contemporary multilateral instrument.

The COVID-19 episode demonstrated that supply chain resilience is not merely an operational concern but a strategic governance imperative. Economies that had invested in supply chain diversification, digital logistics, and robust trade facilitation recovered more rapidly.[9] The finding that digital trade readiness carries an independent GDP growth premium ($\beta = 0.287$, $p < 0.01$) even after controlling for other factors suggests that the digital transformation of trade is not merely a complement to physical logistics but an independent growth driver in its own right.

6. Conclusion

This study has demonstrated that the relationships among WTO institutional governance, services trade liberalisation, and supply chain management constitute a tightly integrated system whose components are mutually reinforcing. Econometric analysis across 164 WTO members confirms statistically significant, independent growth contributions from each of the five dimensions examined: membership, tariff reduction, services exports, logistics performance, and digital readiness. The most important policy implication is that trade liberalisation is a necessary but not sufficient condition for growth. Countries must simultaneously invest in the complementary

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

institutional and physical infrastructure that converts trade openness into sustainable economic development. For Uzbekistan and similar transition economies in the midst of WTO accession, this study provides a prioritised roadmap: focus on logistics infrastructure (highest regression coefficient), services sector harmonisation, digital trade readiness, and supply chain resilience—in that order of demonstrated economic impact.Future research should extend this analysis to sector-level panel data, incorporate natural experiment designs exploiting the staggered timing of WTO accessions, and investigate the mechanisms through which digital trade readiness transmits to growth outcomes.

References

[1] WTO Secretariat. (2019). An Introduction to the GATS. World Trade Organization, Geneva.
[2] Hoekman, B., & Nicita, A. (2011). Trade Policy, Trade Costs, and Developing Country Trade. World Development, 39(12), 2069–2079.
[3] Smith, A. (1776). An Inquiry into the Nature and Causes of the Wealth of Nations. W. Strahan and T. Cadell, London.
[4] Ricardo, D. (1817). On the Principles of Political Economy and Taxation. John Murray, London.
[5] Subramanian, A., & Wei, S.-J. (2007). The WTO Promotes Trade, Strongly but Unevenly. Journal of International Economics, 72(1), 151–175.
[6] Rose, A. K. (2004). Do We Really Know That the WTO Increases Trade? American Economic Review, 94(1), 98–114.
[7] Hoekman, B., & Mattoo, A. (2008). Services Trade and Growth. World Bank Policy Research Working Paper No. 4461. Washington, D.C.
[8] Francois, J., & Hoekman, B. (2010). Services Trade and Policy. Journal of Economic Literature, 48(3), 642–692.
[9] Sheffi, Y. (2005). The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage. MIT Press, Cambridge, MA.
[10] Arvis, J.-F., Ojala, L., Wiederer, C., Shepherd, B., Raj, A., Dairabayeva, K., & Kiiski, T. (2018). Connecting to Compete 2018: Trade Logistics in the Global Economy. World Bank, Washington, D.C.

Ideal Journal of Multidisciplinary Research
ISSN (E): 3054-3339
Volume 01, Issue 04, April, 2026
Website: https://researchiapress.com

[11] WTO. (2017). Agreement on Trade Facilitation. WT/L/931, World Trade Organization, Geneva.
[12] UNCTAD. (2021). Digital Economy Report 2021. United Nations Conference on Trade and Development, Geneva.
[13] World Bank. (2022). World Development Indicators Database. https://databank.worldbank.org/source/world-development-indicators
[14] OECD. (2020). Trade in Value Added (TiVA) Database. Organisation for Economic Co-operation and Development, Paris.
[15] Christopher, M. (2016). Logistics and Supply Chain Management (5th ed.). Pearson Education, London.