

Impact of European Union Generalized Scheme of Preferences Plus (GSP+) on Fruit and Vegetable Exports of Pakistan

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<https://doi.org/10.62345/jads.2025.14.2.86>

Abstract

This study examines the impact of the European Union's Generalised Scheme of Preferences Plus (GSP+) on Pakistan's fruit and vegetable exports, utilising the Poisson Pseudo Maximum Likelihood (PPML) estimation technique with data spanning the period from 2004 to 2023. PPML is particularly suited for gravity models, as it effectively addresses common trade data issues such as zero trade flows and heteroskedasticity. To ensure robustness, Negative Binomial Regression (NBR) is also employed, which accounts for over-dispersion in the data. The analysis begins with a standard gravity model and is then extended to an augmented model by incorporating additional variables. The findings reveal that the GSP+ scheme has a significant impact on Pakistan's fruit and vegetable exports, with consistently positive and statistically significant coefficients across both estimation techniques. Economic size and population also positively influence trade flows, while distance has a negative impact, aligning with predictions from the gravity model. The study underscores the transformative potential of GSP+ in enhancing export performance, as demonstrated by the exceptional growth rates observed in partner countries such as Portugal, Ireland, Malta, Romania, and Bulgaria following their GSP+ status. Policy recommendations include maximizing GSP+ benefits, diversifying export markets, and ensuring adherence to international quality standards.

Keywords: GSP+ and Pakistan, Fruit-Vegetable Exports, Gravity Model, Binomial Regression.

Introduction

The European Union's Generalised Scheme of Preferences Plus (GSP+) is a vital trade mechanism introduced in 2014 to promote sustainable development and poverty reduction in developing countries, granting preferential access to the EU market. This special incentive scheme allows duty-free access to over 6,000 product categories, contingent on the implementation of 27 international conventions on human rights, labour standards, environmental protection, and good governance (Gruber et al., 2019; Mahon, 2020; European Commission, 2015). The GSP+ is designed to enhance the export competitiveness of beneficiary countries by reducing tariff barriers and facilitating their integration into global trade networks (Fernandes et al., 2018; Borchert et al., 2016). According to Mahon (2020) and Larch and Wanner (2021), the scheme has made a significant contribution to export diversification and economic growth in participating economies. Pakistan was granted GSP+ status in 2014, which significantly enhanced its trade opportunities with the EU (Soomro & Ansari, 2022; Malik, 2020). Empirical studies indicate that the scheme

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positively impacted Pakistan's export volumes and improved its trade balance with EU member states (Gruber et al., 2019; Fernandes et al., 2018). By facilitating access to one of the world's largest consumer markets, GSP+ encouraged Pakistani exporters to enhance compliance with international standards (Larch & Wanner, 2021; European Commission, 2015). Compliance with the EU's regulatory requirements has also spurred improvements in governance and environmental practices (Gruber et al., 2019; Chartier, 2021). Despite these benefits, the implementation of GSP+ in Pakistan has faced challenges, including difficulties in maintaining compliance and limited diversification of export sectors (Soomro & Ansari, 2022; Sultana & Zehra, 2023).

Although extensive research has highlighted the economic benefits of GSP+, significant gaps remain in the literature. Soomro and Ansari (2022) conducted a comparative study on the export performance of beneficiary countries, including Pakistan, Sri Lanka, and the Philippines; however, their analysis lacked sector-specific insights, particularly in the agricultural sector. Awan *et al.* (2015) examined the impact of GSP+ status on Pakistan's textile industry, utilising both primary and secondary data; however, their focus on textiles overlooked other vital sectors, such as agriculture. Wagan (2015) similarly highlighted the rapid growth in textiles but failed to explore the nuanced effects on agricultural exports. Malik (2020) and Chartier (2021) addressed environmental and economic challenges but did not differentiate sectoral impacts or investigate specific product categories, particularly agricultural exports. Shad (2021) and Sultana & Zehra (2023) emphasised the importance of export diversification and compliance with EU standards; however, their recommendations lacked empirical backing regarding promising sectors for growth. Ali et al. (2024) analysed exports of plastics, leather, textiles, and footwear from Pakistan to 28 EU member countries but did not examine agricultural exports, especially fruit and vegetables. Given the critical importance of agricultural trade and the inclusion of fruit and vegetables under the GSP+ scheme, a focused investigation on this sector is warranted.

In light of the identified research gaps, this study aims to investigate the impact of the EU's GSP+ scheme on Pakistan's exports of fruits and vegetables. The research seeks to address the following question: (1) Does the EU's GSP+ scheme impact the exports of fruit and vegetables from Pakistan? (2) Which EU member countries are the top trading partners for Pakistan's fruit and vegetable exports? (3) How can Pakistan leverage GSP+ further to enhance its fruit and vegetable exports to the EU?

The GSP+ scheme was initiated for Pakistan in 2014, and to date, no empirical analysis using the gravity model has been conducted for fruits and vegetables. This study employs the gravity model to assess the impact of the scheme on the exports of fruits and vegetables. The objective of the study is to develop export indices for fruits and vegetables and determine the effectiveness of GSP+ in stimulating exports of these products from 2014 to 2023. Additionally, the study aims to evaluate the overall effectiveness of the GSP-Plus scheme. This study makes a novel contribution by addressing the under-researched area of agricultural exports, specifically fruits and vegetables, under the GSP+ scheme. Unlike previous studies that predominantly focused on the textile sector, this research provides a comprehensive analysis of agricultural trade, highlighting the opportunities and challenges faced by Pakistan in the EU market. The study also offers actionable policy recommendations based on empirical evidence, making it a valuable resource for policymakers, exporters, and researchers.

The findings reveal that GSP+ has a significant and positive impact on Pakistan's fruit and vegetable exports, although challenges related to compliance with EU standards and market access persist. The study identifies key trading partners within the EU, including Portugal (1594.26%), Ireland (1055.45%), Malta (297.84%), Romania (251.84%), and Bulgaria (230.06%), which

showed the highest growth rates in exports after obtaining GSP+ status. Furthermore, it highlights the potential for diversification and value addition to strengthen Pakistan's position in the EU market.

The structure of this paper is as follows: The next section provides a comprehensive review of the relevant literature, identifying key trends and gaps. This is followed by the methodology section, which outlines the research design and data collection methods. The subsequent section presents the findings and analysis, highlighting the impact of GSP+ on fruit and vegetable exports. The final section presents conclusions and policy recommendations, highlighting strategies to maximise Pakistan's agricultural exports to the EU under the GSP+ scheme.

Literature Review

The European Union's Generalized Scheme of Preferences Plus (GSP+) has been a focal point of research concerning its impact on the export performance of beneficiary countries. Numerous authors have evaluated the effects of the EU GSP using the gravity model (Oguledo & Macphee, 1994; Verdeja, 2006; Subramanian & Wei, 2007; Cardamone, 2009; Aiello et al., 2010; Aiello & Cardamone, 2011). These studies consistently demonstrate a positive effect of the GSP scheme, which contrasts with findings from other preferential trade arrangements. Borchert et al. (2016) explored the relationship between trade preferences and export performance, providing evidence that GSP+ has enhanced the competitiveness of developing countries' exports in the EU market. Their study emphasizes the importance of compliance with international conventions as a prerequisite for maintaining GSP+ status. Fernandes et al. (2018) analysed the impact of tariff preferences on the export performance of developing countries under the Generalised System of Preferences (GSP+). Their research indicates that the scheme has contributed to export diversification and economic growth in participating economies.

Marx, (2018) examine the role of Voluntary Sustainability Standards (VSS) in the EU's GSP to enhance sustainability. It proposes mandatory and voluntary models for integrating VSS and identifies challenges in aligning private and public policy goals. (Berggren, 2019) assessed the impact of the EU's GSP+ on trade and sustainable development. Using a Gravity Equation, it finds no significant trade creation effects compared to standard GSP. Interviews with stakeholders in Sri Lanka highlight the positive influence of GSP+ on human and labour rights, although challenges such as strict Rules of Origin and access uncertainty remain. (Wolf, 2020) examine the impact of the China-Pakistan Economic Corridor (CPEC) on Pakistan's GSP+ status with the EU. It argues that CPEC-related developments threaten Pakistan's compliance with GSP+ requirements by exacerbating issues like state-sponsored terrorism, human rights violations, and weakening governance. These dynamics raise concerns about Pakistan's continued eligibility for the EU's preferential trade benefits.

Chartier (2021) analysed the environmental and economic challenges faced by developing economies under the GSP+ framework, highlighting the need for continuous improvement in governance and ecological practices to maintain preferential access to the EU market. In the context of Pakistan, several studies have assessed the impact of the GSP+ status granted in 2014. Soomro and Ansari (2022) conducted a comparative analysis of export performance under the GSP+ scheme, focusing on Pakistan, Sri Lanka, and the Philippines. Their findings indicated that Pakistan has benefited from increased exports to the EU, particularly in the textile sector. Malik (2020) examined the economic implications of GSP+ compliance for Pakistan, noting that while the scheme has provided significant trade opportunities, challenges remain in maintaining compliance with international conventions. Awan *et al.* (2015) evaluated the impact of GSP+

status on Pakistan's textile industry, finding that the scheme has led to increased exports and improved competitiveness in the EU market. Wagan (2015) assessed the rapid growth in Pakistan's textile sector under the GSP+ scheme, highlighting the need for diversification into other sectors to fully capitalise on the scheme's benefits. Shad (2021) discussed export diversification and GSP+ compliance, emphasizing the importance of expanding beyond traditional sectors to ensure sustainable economic growth. Sultana and Zehra (2023) examined the role of export diversification and compliance under the GSP+ scheme in South Asian economies, offering insights into the challenges and opportunities faced by countries such as Pakistan. Choudhary (2024) examines the impact of Pakistan's textile sector's GSP+ status on corporate tax payments and its implications for fiscal policy and corporate strategy. Ali et al. (2024) conducted a sectoral analysis of Pakistan's exports to the EU under the GSP+ scheme, focusing on the plastic, leather, textile, and footwear industries. Their study underscores the need for further diversification to enhance export performance. Beyond these studies, recent data indicates that Pakistan's exports to the EU have risen by 82% since the implementation of GSP+, demonstrating the positive impact of the scheme on the country's trade performance (Associated Press of Pakistan, 2024). The European Commission (2023) reports that Pakistan is the largest beneficiary of the EU's GSP+ arrangement, with more than 78% of its exports entering the EU at preferential rates. This preferential access has been instrumental in boosting Pakistan's textile and clothing exports, which account for a significant portion of its trade with the EU. Despite these positive trends, challenges persist. A blog post by the International Growth Centre (2017) notes that while Pakistan's garment exports to the EU grew by 10% between 2013 and 2015, other countries, such as Bangladesh and India, experienced even higher growth rates during the same period. The blog highlights issues such as energy shortages, an adverse business climate, and complex tax and customs procedures as factors hindering Pakistan's ability to fully benefit from the GSP+ scheme.

Limited studies have examined the impact of GSP+ on agricultural exports, particularly fruits and vegetables. The literature review reveals a significant gap in the analysis of GSP+ impacts on Pakistan's agricultural exports, particularly fruits and vegetables. While extensive research has been conducted on textiles and other industrial products, the agricultural sector remains underexplored. Given the inclusion of fruits and vegetables under the GSP+ scheme, a focused investigation is essential to understand the opportunities and challenges faced by Pakistani exporters.

Methodology

The gravity model, widely regarded as the workhorse of international trade analysis, was employed in this study due to its robustness and simplicity in explaining bilateral trade flows (de Jong et al., 2002; Shahid et al., 2024). Unlike simulation models, which analyze trade impacts, econometric models like the gravity model predict future trade flows based on historical patterns, making it particularly suitable for this research (Demaria, 2010a). The gravity model posits that trade flows are positively influenced by the economic mass (GDP) of trading partners and negatively influenced by the geographical distance between them, reflecting the natural pattern of trade in the absence of trade resistance (Anderson & Van Wincoop, 2003). Anderson & Van Wincoop, (2003) enhanced the traditional gravity equation by incorporating multilateral resistance variables. They contended that the traditional model is biased due to its failure to account for the influence of these multilateral resistance terms. Building on the conceptual framework proposed by Anderson and Van Wincoop, (2003), we utilized the augmented gravity model for this study, structured as follows:

$$\ln Exp_{it} = \beta_0 + \beta_1 \ln(GDP_{it} \times GDP_{jt}) + \beta_2 \ln(POP_{it} \times POP_{jt}) + \beta_3 \ln(Dist_{ijt}) + \beta_4(GSP +_{ijt}) + \beta_5(Comcol_{ijt}) + \mu_{it} \dots \dots \dots (1)$$

Equation (1) represents a gravity model used to analyze the determinants of fruit and vegetable exports. The dependent variable, $\ln Exp_{it}$, is the natural logarithm of exports of fruit and vegetables from Pakistan to EU countries. The model incorporates several explanatory variables. The economic size of trading partners is captured by $\ln(GDP_{it} \times GDP_{jt})$, while market size is represented by $\ln(POP_{it} \times POP_{jt})$, both measured as the product of GDPs and populations of the respective countries. Distance between the trading partners, $\ln(Dist_{ijt})$, serves as a proxy for transportation costs. The model also includes a dummy variable GSP+, to account for the effect of the GSP+ trade scheme. Additionally, comcol captures the effect of a shared colonial history. The error term, μ_{it} , accounts for unobserved factors affecting trade flows. The coefficients of the model estimate the impact of these factors on fruit and vegetable export volumes. This research study employed quantitative approach and secondary data is use for empirical analysis. Exports of fruit and vegetables commodities is the dependent variable and GSP+ is the independent variable along with some other control variables including GDP, population of both countries, distance from trading country to partner country and historical common colony. Data pertaining to economic size of a country such as Gross Domestic Production (GDP), GDP per capita, and Population are sourced from the World Development Indicator (WDI). Distances are measured using data obtained from CEPII. The data of fruit (HS-07) and vegetables (HS-08) exports is collected from and Un-COMTRADE for the period of 2004 to 2023. For the existing composition of European Union, a total of ten countries joined and became the member of EU in year 2004, consequently, the study used data from 2004 up to the available data as of 2023. The Generalized Scheme of Preferences plus (GSP+) is incorporated as dummy variable, with a value of 0 assigned for before the GSP+ status and 1 for after the GSP+ status.

Estimation Technique

Estimating gravity equations in trade studies faces challenges due to zero trade flows and heteroscedasticity. Traditional OLS methods produce biased results because they cannot handle zeros or heteroscedasticity effectively (Silva & Tenreyro, 2006a). While alternatives like NLS, FGLS, Gamma PML, Negative Binomial Regression, Tobit, and Heckman models exist, they suffer from inefficiency, scale sensitivity, or fixed effects issues (Shepherd, 2016; Bacchetta et al., 2012b). The Poisson Pseudo Maximum Likelihood (PPML) estimator addresses these problems by accommodating zero trade values without exclusion, remaining robust under heteroscedasticity, and handling fixed effects efficiently (Silva & Tenreyro, 2006a, Shepherd, 2016). Comparative studies confirm PPML's superiority, making it the preferred method for analyzing the impact of GSP+ on Pakistan's exports to the EU (Westerlund & Wilhelmsson, 2011; Yotov et al., 2016). Unlike log-linearized models, PPML avoids biases in elasticity estimates and error structure (Cardamone, 2009; Demaria, 2010b).

Results and Discussion

Descriptive Analysis

Yearly Fruit and Vegetables Exports to European Union before and after GSP + status

To assess the impact of the European Union's Generalized Scheme of Preferences Plus (GSP+) on Pakistan's fruit and vegetable exports, it is essential to first examine the overall trade trends before and after the implementation of the GSP+ status. Analyzing these trends provides a foundational

understanding of how Pakistan's export performance to the EU has evolved over time, allowing for the identification of potential patterns or shifts attributable to the GSP+ scheme. By comparing the total yearly fruit and vegetable's exports during the pre-GSP+ period (2004–2013) and the post-GSP+ period (2014–2023), this study aims to predict trends and evaluate the broader implications of trade preferences on Pakistan's export sector. The detailed yearly exports before and after GSP+ status is presented in Table 1, offering a comprehensive overview of Pakistan's trade dynamics with the EU.

Table 1: Total yearly Fruit and Vegetables Exports to European Union before and after GSP+ status

Before GSP+ status		After GSP+ Status	
Year	Total Agri exports to EU (1000 US\$)	Year	Total Agri exports to EU (1000 US\$)
2004	204752.127	2014	227779.966
2005	204812.664	2015	228218.987
2006	204845.325	2016	228907.719
2007	205042.264	2017	229363.119
2008	205212.465	2018	230137.624
2009	205429.187	2019	231062.033
2010	205547.674	2020	231951.714
2011	206191.874	2021	233321.153
2012	206571.731	2022	234332.246
2013	207560.993	2023	235615.564
Total	2055966.304	Total	2310690.125

Source: Author's calculations based on the data sourced from World Integrated Trade Solution (WITS)

Table 1 presents the total yearly exports of fruits and vegetables from Pakistan to the European Union (EU) for two distinct periods: before and after the granting of the Generalized Scheme of Preferences Plus (GSP+) status. The data is divided into two columns, with the years 2004 to 2013 representing the pre-GSP+ period and the years 2014 to 2023 representing the post-GSP+ period. The table reveals significant trends in the export performance of Pakistan's fruit and vegetable sector, providing valuable insights into the impact of GSP+ on this critical agricultural sub-sector. During the pre-GSP+ period (2004–2013), Pakistan's total fruit and vegetable exports to the EU showed modest growth, increasing from approximately 204.75 million USD in 2004 to 207.56 million USD in 2013. Over this decade, the cumulative exports amounted to 2,055.97 million USD, reflecting an average annual export value of around 205.60 million USD. The year-on-year growth during this period was relatively stagnant, with only marginal increases observed in most years. This suggests that, in the absence of preferential market access, Pakistan's fruit and vegetable exports faced challenges in penetrating the EU market, likely due to high tariffs, non-tariff barriers, and intense competition from other exporting countries. In contrast, the post-GSP+ period (2014–2023) demonstrates a notable improvement in export performance. Following the granting of GSP+ status in 2014, Pakistan's fruit and vegetable exports to the EU increased steadily, rising from 227.78 million USD in 2014 to 235.62 million USD in 2023. The cumulative exports during this period totaled 2,310.69 million USD, representing an average annual export value of approximately 231.07 million USD. This marks a significant increase compared to the pre-GSP+ period, both in terms of total exports and average annual performance. The consistent upward trend

in export values highlights the positive impact of GSP+ in enhancing market access and reducing trade barriers for Pakistani fruits and vegetables in the EU. The data also reveals that the growth in exports was not abrupt but rather gradual, indicating that the benefits of GSP+ took time to materialize. This could be attributed to factors such as the time required for exporters to adapt to new market conditions, comply with EU standards, and establish stronger trade relationships. Additionally, the steady increase in exports suggests that GSP+ has provided a stable and predictable trade environment, enabling Pakistani exporters to plan and invest in the long term. A comparison of the two periods shows that the total exports of fruits and vegetables to the EU increased by approximately 12.4% in the post-GSP+ period compared to the pre-GSP+ period. This growth underscores the importance of preferential trade agreements like GSP+ in boosting export performance, particularly for developing countries like Pakistan. However, it is also important to note that while GSP+ has facilitated growth, the overall increase remains moderate, indicating that there is still untapped potential for further expansion. Factors such as product diversification, improved quality standards, and enhanced value addition could play a crucial role in unlocking this potential.

Country-wise fruit and vegetable exports of Pakistan to EU before and after GSP+ status

Analyzing Pakistan's country-wise fruit and vegetable exports to the EU before and after the GSP+ status provides valuable insights into trade dynamics with individual member states. This analysis highlights significant variations, revealing new market opportunities, strengthened trade relations, and areas of decline. Understanding these shifts allows policymakers and exporters to develop targeted strategies to maximize growth and address challenges. Detailed country-wise export data is presented in Table 2 for a comprehensive overview.

Table 2: Country-wise fruit and vegetable exports of Pakistan to EU before and after GSP+

S#	Country Name	Exports of Vegetables (1000 US\$)	Fruit and After GSP+ (2014-2023)	Total Fruit and Vegetables exports	Absolute Change (After GSP+ status)	% Change (After GSP+ status)
		Before GSP+ (2004-2013)				
1	Portugal	11.038	187.012	198.05	175.974	1594.26%
2	Ireland	231.408	2673.795	2905.203	2442.387	1055.45%
3	Malta	37.444	148.967	186.411	111.523	297.84%
4	Romania	561.92	1977.077	2538.997	1415.157	251.84%
5	Bulgaria	94.638	312.364	407.002	217.726	230.06%
6	Greece	2008.18	5703.644	7711.824	3695.464	184.02%
7	Latvia	491.833	1247.869	1739.702	756.036	153.72%
8	Sweden	3585.238	8559.457	12144.7	4974.219	138.74%
9	Finland	638.913	1478.777	2117.69	839.864	131.45%
10	Lithuania	3161.904	6360.444	9522.348	3198.54	101.16%
11	Poland	930.04	1789.444	2719.484	859.404	92.41%
12	Denmark	4676.612	8915.554	13592.17	4238.942	90.64%
13	Italy	14668.615	24494.209	39162.82	9825.594	66.98%
14	Spain	2587.351	3374.478	5961.829	787.127	30.42%

15	Hungary	3.82	4.462	8.282	0.642	16.81%
16	France	28128.86	32654.451	60783.31	4525.591	16.09%
17	Germany	125242.203	120743.812	245986	-4498.39	-3.59%
18	Netherlands	15418.357	11685.923	27104.28	-3732.43	-24.21%
19	Cyprus	100.247	72.642	172.889	-27.605	-27.54%
20	Belgium	4543.638	3185.001	7728.639	-1358.64	-29.90%
21	Croatia	74.083	20.112	94.195	-53.971	-72.85%
22	Austria	666.22	162.155	828.375	-504.065	-75.66%
23	Slovenia	145.696	26.07	171.766	-119.626	-82.11%
24	Czechia	2.353	0	2.353	-2.353	-100.00%
25	Estonia	121.432	0	121.432	-121.432	-100.00%
26	Luxembourg	18.369	0	18.369	-18.369	-100.00%
	Slovak					
27	Republic	5.196	0	5.196	-5.196	-100.00%

Source: Author's calculations based on the data sourced from World Integrated Trade Solution (WITS)

The implementation of GSP+ has significantly impacted Pakistan's fruit and vegetable exports to the EU, yielding mixed results. Substantial growth was recorded in countries like Portugal (1594.26%), Ireland (1055.45%), and Malta (297.84%), highlighting expanded market access. Major trading partners such as Italy (66.98%) and Spain (30.42%) also saw moderate gains, reinforcing Pakistan's position in established markets. However, exports declined in key destinations like Germany (-3.59%) and the Netherlands (-24.21%), with severe drops in Austria (-75.66%) and Croatia (-72.85%). Notably, trade with Czechia, Estonia, Luxembourg, and the Slovak Republic ceased entirely. These disparities indicate that while GSP+ has opened new opportunities, strategic efforts are required to address persistent challenges and maximize its benefits across all EU markets.

Empirical Analysis

Multicollinearity Diagnostics

performing regression analysis, it is essential to check for the issue of multicollinearity, as it can lead to unreliable and inflated coefficient estimates. To address this, Variance Inflation Factor (VIF) diagnostics were conducted, and the results are reported in Table 3.

Table 3: Results of VIF

Variable	VIF	1/VIF
GSP+	2.87	0.348901
$\ln(\text{GDP}_{(i)} \times \text{GDP}_{(j)})$	2.62	0.382289
$\ln(\text{Distance}_{(ij)})$	1.48	0.673927
$\ln(\text{POP}_{(i)} \times \text{POP}_{(j)})$	1.22	0.819378
Comcol	1.16	0.860674
Mean VIF	1.87	

The VIF values for all variables are well below the threshold of 5, with GSP+ having a VIF of 2.87, $\ln(\text{GDP}_{(i)} \times \text{GDP}_{(j)})$ at 2.62, $\ln(\text{Distance}_{(ij)})$ at 1.48, $\ln(\text{POP}_{(i)} \times \text{POP}_{(j)})$ at 1.22, and Comcol at 1.16. The mean VIF for the model is 1.87, indicating that multicollinearity is not a

significant concern. These results confirm that the independent variables are not highly correlated, ensuring the reliability of the regression estimates.

PPML Estimation Results and the Gravity Model Framework

The gravity model, widely used in international trade analysis, serves as the foundation for this study. It posits that trade flows between two countries are positively influenced by their economic sizes (e.g., GDP) and negatively influenced by the distance between them. To analyze the impact of the EU's Generalized Scheme of Preferences (GSP+) on Pakistan's fruit and vegetable exports, this study employs the Poisson Pseudo Maximum Likelihood (PPML) estimator, which is particularly effective in handling zero trade flows and heteroskedasticity. The analysis begins with a simple gravity model, incorporating core variables such as GDPs of both countries and distance. Subsequently, the model is extended to an augmented gravity model by including additional variables like GSP+, population and colonial ties (Comcol) to capture more nuanced effects. The results of these estimations are reported in Table 4, providing insights into the impact of GSP+ and other determinants on Pakistan's export performance.

Table 4: Results of PPML Regression analysis with gravity and augmented gravity

VARIABLES	Standard Gravity Model	Augmented Gravity Model
GSP+		0.620*** (0.158)
Ln (GDP _(i) ×GDP _(j))	0.0357*** (0.0130)	0.133*** (0.0202)
Ln (POP _(i) ×POP _(j))		0.107*** (0.0295)
Ln (Distance _(ij))	-0.174*** (0.00989)	-0.296*** (0.0190)
Comcol		-0.562*** (0.0319)
Constant	18.92*** (2.039)	6.788*** (0.623)
Observations	620	620
R-squared	0.417	0.853

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The results of the PPML regression analysis, as reported in Table 4, provide valuable insights into the determinants of Pakistan's fruit and vegetable exports under the EU's Generalized Scheme of Preferences (GSP+). The analysis is conducted using the standard gravity model and the augmented gravity model. In the standard gravity model, the combined GDP of trading partners (Ln (GDP_(i)×GDP_(j))) also shows a positive and significant coefficient (0.0357, p < 0.01), suggesting that larger economies tend to engage in higher trade volumes. Distance (Ln (Distance_(ij))) has a negative and significant coefficient (-0.174, p < 0.01), consistent with the gravity model's prediction that trade decreases with greater geographical distance. The constant term is significant (18.92, p < 0.01), representing the baseline level of trade when all other variables are held constant. The model explains 41.7% of the variance in trade flows, as indicated by the R-squared value of 0.417.

The augmented gravity model extends the standard model by incorporating additional variables, including GSP+, population and colonial ties (Comcol). The coefficient for GSP+ is positive and statistically significant (0.620, $p < 0.01$), indicating that the GSP+ scheme has a positive and substantial impact on Pakistan's exports of fruits and vegetables. The combined GDP of trading partners remains positive and significant, with a larger coefficient (0.133, $p < 0.01$), emphasizing the importance of economic size in trade flows. The population variable ($\ln(\text{POP}(i) \times \text{POP}(j))$) is also positive and significant (0.107, $p < 0.01$), indicating that larger populations in trading partners are associated with higher trade volumes. Distance continues to have a negative and significant impact (-0.296, $p < 0.01$), while the coefficient for colonial ties (Comcol) is negative and significant (-0.562, $p < 0.01$), which is an unexpected finding. The model fit improves significantly, with an R-squared value of 0.853, indicating that the augmented model explains a larger proportion of the variance in trade flows. The PPML regression results consistently demonstrate the positive and significant impact of the EU's GSP+ scheme on Pakistan's fruit and vegetable exports. The augmented gravity model further validates these findings, highlighting the stability and reliability of the results.

Robustness Check through alternative estimation technique Negative Binomial Regression

To further ensure the robustness of our findings, we employed an alternative estimation technique Negative Binomial Regression on standard and augmented gravity model. This method is often considered a strong alternative to PPML, particularly in cases where over-dispersion in the data is a concern. Unlike PPML, which assumes equal mean and variance, Negative Binomial Regression relaxes this assumption, making it more flexible and suitable for datasets with high variability. The results of this alternative estimation technique are reported in Table 5, and they align closely with our PPML findings, reinforcing the reliability of our conclusions. This consistency across different methodologies not only strengthens the credibility of our analysis but also provides readers with greater confidence in the reported impact of the EU's GSP+ scheme on Pakistan's fruit and vegetable exports.

Table 5: Results of Negative Binomial Regression

Variables	Standard Gravity Model	Augmented Gravity Model
GSP+		0.0800*** (0.0265)
$\ln(\text{GDP}(i) \times \text{GDP}(j))$	0.234*** (0.0107)	0.424*** (0.0799)
$\ln(\text{POP}(i) \times \text{POP}(j))$		0.183*** (0.0213)
$\ln(\text{Distance}_{(ij)})$	-0.200*** (0.00582)	-0.137*** (0.00812)
Comcol		-4.911*** (0.365)
$\ln\alpha$	1.630*** (0.0542)	1.852*** (0.0528)
Constant	-16.41*** (1.308)	12.59*** (0.284)
Observations	620	620

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The results of the Negative Binomial Regression (NBR), reported in Table 5, provide further validation of the findings obtained through PPML estimation. The NBR analysis was conducted using two specifications, the Standard Gravity Model and the Augmented Gravity Model, both of which align closely with the earlier PPML results, reinforcing the robustness of the study's conclusions. In the Standard Gravity Model, the combined GDP of trading partners ($\ln(\text{GDP}(i) \times \text{GDP}(j))$) also shows a positive and significant coefficient (0.234, $p < 0.01$), indicating that larger economies are associated with higher trade volumes. Distance ($\ln(\text{Distance}(ij))$), as expected, has a negative and significant coefficient (-0.200, $p < 0.01$), consistent with the gravity model's prediction that trade decreases with greater geographical distance. The constant term is significant (-16.41, $p < 0.01$), representing the baseline level of trade when all other variables are held constant. The dispersion parameter (alpha) is significant (1.630, $p < 0.01$), confirming the suitability of the Negative Binomial Regression for addressing over-dispersion in the data.

The Augmented Gravity Model indicates that the coefficient for GSP+ is positive and statistically significant (0.0800, $p < 0.01$), confirming that the EU's Generalised Scheme of Preferences (GSP+) has a positive impact on Pakistan's fruit and vegetable exports. The combined GDP of trading partners exhibits a larger coefficient (0.424, $p < 0.01$), underscoring the significance of economic size in trade flows. The population variable ($\ln(\text{POP}(i) \times \text{POP}(j))$) is also positive and significant (0.183, $p < 0.01$), indicating that larger populations in trading partners are associated with higher trade volumes. Distance continues to have a negative and significant impact (-0.137, $p < 0.01$), though the magnitude of the coefficient is smaller compared to the standard model. The coefficient for colonial ties (Comcol) is negative and significant (-4.911, $p < 0.01$), which is consistent with the PPML results and warrants further investigation. The dispersion parameter (alpha) increases slightly to 1.852 ($p < 0.01$), indicating that the augmented model accounts for additional variability in the data. The NBR results are consistent with the PPML findings, demonstrating the robustness of the study's conclusions. These results provide strong evidence supporting the reliability of the analysis and offer valuable insights for policymakers and stakeholders in Pakistan's agricultural sector.

Discussion

The findings of this study provide significant insights into the impact of the EU's Generalized Scheme of Preferences (GSP+) on Pakistan's fruit and vegetable exports, using both PPML and Negative Binomial Regression (NBR) estimation techniques. The results consistently demonstrate that the GSP+ scheme has a positive and statistically significant effect on Pakistan's exports, aligning with the findings of previous studies that highlight the role of trade preferences in enhancing export performance (Anderson & Van Wincoop, 2003; Persson, 2012). The positive coefficient for GSP+ in both the standard and augmented gravity models underscores the importance of preferential trade agreements in reducing trade barriers and fostering export growth, particularly for developing countries like Pakistan (Bouët & Laborde, 2017; Ornelas, 2016). The combined GDP of trading partners ($\ln(\text{GDP}(i) \times \text{GDP}(j))$) consistently shows a positive and significant impact on trade flows, which is consistent with the foundational principles of the gravity model (Tinbergen, 1962; Anderson, 1979). This finding is supported by numerous studies that emphasize the role of economic size in determining trade volumes (Head & Mayer, 2014; Bergstrand, 1985). Similarly, the population variable ($\ln(\text{POP}(i) \times \text{POP}(j))$) is also positive and significant, suggesting that larger populations in trading partners are associated with higher demand for imported goods, including fruits and vegetables (Linders & De Groot, 2006). Distance ($\ln(\text{Distance}(ij))$), as expected, has a negative and significant impact on trade flows, which is

consistent with the gravity model's prediction that geographical proximity reduces trade costs and facilitates trade (Disdier & Head, 2008; Carrere, 2006). This finding is supported by a large body of literature that highlights the role of distance as a key determinant of trade patterns (Frankel et al., 1995; Limao & Venables, 2001). However, the magnitude of the distance coefficient varies across models, suggesting that the inclusion of additional variables, such as GSP+ and colonial ties, may influence the relative importance of distance in trade decisions. The negative and significant coefficient for colonial ties (Comcol) is an interesting finding that warrants further investigation. While colonial ties are often expected to facilitate trade due to shared language, legal systems, and cultural ties (Rauch, 1999; Head et al., 2010), the negative coefficient in this study suggests that historical colonial relationships may not necessarily translate into stronger trade ties in the context of Pakistan's fruit and vegetable exports. This finding contrasts with some previous studies (Glick & Rose, 2002) and may reflect unique historical or economic factors specific to Pakistan's trade relationships. The robustness of the results is further confirmed through the use of alternative estimation techniques, including PPML and NBR. The consistency of the findings across these methods underscores the reliability of the analysis. It aligns with the recommendations of Silva and Tenreyro (2006b), who advocate for the use of PPML in gravity model estimations due to its ability to handle zero trade flows and heteroskedasticity. The NBR results, which account for over-dispersion in the data, further validate the PPML findings, providing additional confidence in the study's conclusions (Cameron & Trivedi, 2013).

The study's findings have important implications for policymakers and stakeholders in Pakistan's agricultural sector. The positive impact of GSP+ on fruit and vegetable exports highlights the potential benefits of leveraging preferential trade agreements to enhance export competitiveness (Hoekman & Nicita, 2011). However, the negative impact of distance and colonial ties suggests that Pakistan may need to focus on reducing trade costs and diversifying its export markets to fully capitalize on the opportunities provided by GSP+ (Portugal-Perez & Wilson, 2012). Additionally, the importance of economic size and population in determining trade flows highlights the need for Pakistan to target larger and more populous markets to maximise its export potential (Helpman et al., 2008). This study contributes to the growing body of literature on the impact of trade preferences on export performance, particularly in developing countries. The findings highlight the significant role of GSP+ in enhancing Pakistan's fruit and vegetable exports while also emphasizing the importance of economic size, population, and geographical proximity in shaping trade patterns. The robustness of the results, confirmed through alternative estimation techniques, provides valuable insights for policymakers and stakeholders seeking to strengthen Pakistan's export sector and leverage international trade agreements for economic growth.

From a theoretical perspective, these results reinforce the core assumptions of the gravity model of trade, particularly the role of economic mass, distance, and trade preferences in influencing bilateral trade flows. The positive impact of GSP+ aligns with trade theory that supports the notion of preferential access as a catalyst for export growth, especially for developing economies facing competitive global markets. This suggests that Pakistan should not only maintain compliance with GSP+ conditionalities but also proactively diversify its product base and improve quality standards to sustain and expand its market share in the EU. Furthermore, the findings highlight the strategic need to improve logistics infrastructure and reduce trade-related friction to mitigate the adverse effects of distance. Overall, the study provides both empirical and policy-relevant evidence on how targeted trade agreements, such as GSP+, can serve as instruments of economic uplift through increased agricultural exports.

Conclusion

This study examines the impact of the EU's Generalised Scheme of Preferences (GSP+) on Pakistan's fruit and vegetable exports, employing both the Poisson Pseudo Maximum Likelihood (PPML) and Negative Binomial Regression (NBR) estimation techniques. The findings consistently demonstrate that the GSP+ scheme has a significant positive effect on Pakistan's export performance, aligning with the experiences of other beneficiary countries that have witnessed remarkable growth in their exports after obtaining GSP+ status. For instance, countries such as Portugal (1594.26%), Ireland (1055.45%), Malta (297.84%), Romania (251.84%), and Bulgaria (230.06%) have shown extraordinary growth rates in their export performance following the implementation of GSP+. These examples underscore the transformative potential of trade preferences in enhancing export performance, particularly for developing economies.

The results underscore the significance of economic size, population, and geographical proximity in influencing trade flows, as predicted by the gravity model. The positive and significant coefficients for GSP+ and combined GDP of trading partners emphasize the role of preferential trade agreements and economic scale in driving export growth. The robustness of the findings, confirmed through alternative estimation techniques, further strengthens the credibility of the analysis and provides policymakers with valuable insights.

For Pakistan, the GSP+ scheme represents a critical opportunity to enhance its export performance, particularly in the agricultural sector. By leveraging this preferential access to the EU market, Pakistan can not only increase its export revenues but also stimulate economic growth and create employment opportunities. However, achieving these benefits will require targeted policy interventions, such as improving trade infrastructure, reducing logistical costs, and ensuring compliance with international quality and safety standards. Additionally, Pakistan should focus on diversifying its export basket and exploring new markets to mitigate the risks associated with over-reliance on a single trading partner.

In conclusion, this study contributes to the growing body of literature on the impact of trade preferences on export performance, particularly in developing countries. The findings underscore the transformative potential of GSP+ in enhancing Pakistan's fruit and vegetable exports while also highlighting the need for complementary policies to address trade barriers and maximize the benefits of preferential trade agreements. By adopting a strategic approach to trade policy, Pakistan can unlock its export potential and achieve sustainable economic growth in the years to come.

Policy Recommendations and Future Research

To maximize the benefits of the EU's Generalized Scheme of Preferences (GSP+), Pakistan should focus on leveraging the scheme to enhance its fruit and vegetable exports by ensuring compliance with EU standards and improving product quality. This can be achieved through capacity-building initiatives for farmers and exporters, providing them with the necessary training and resources to meet international quality and safety requirements. Additionally, Pakistan should prioritise diversifying its export markets to reduce its dependency on a single region and mitigate the risks associated with market concentration. Ensuring policy stability and consistency will also be critical to building investor confidence and fostering long-term export growth. By adopting a strategic approach to trade policy, Pakistan can unlock its export potential and achieve sustainable economic development.

Future research should expand on this study by examining the impact of external shocks, such as the COVID-19 pandemic, on trade flows under the GSP+ scheme. The pandemic has disrupted global supply chains and trade patterns, making it essential to understand how such crises affect

preferential trade agreements and export performance. Additionally, researchers could explore the role of digital trade and e-commerce in enhancing export competitiveness, particularly in the agricultural sector. Another promising area of study is the impact of climate change on agricultural exports, as changing environmental conditions may pose significant challenges to Pakistan's export-oriented industries. Ultimately, comparative studies examining the experiences of other GSP+ beneficiary countries could offer valuable insights and lessons for Pakistan's trade strategy. These research directions would contribute to a deeper understanding of the dynamics of trade preferences and their implications for the development of economies.

References

- Aiello, F., & Cardamone, P. (2011). Analysing the Impact of Everything But Arms Initiative Using a Gravity Model. In L. De Benedictis & L. Salvatici (Eds.), *The Trade Impact of European Union Preferential Policies* (pp. 127–150). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-16564-1_7.
- Aiello, F., Cardamone, P., & Agostino, M. R. (2010). Evaluating the impact of nonreciprocal trade preferences using gravity models. *Applied Economics*, 42(29), 3745–3760. <https://doi.org/10.1080/00036840802314614>
- Ali, S., Iqbal, N., & Rehman, A. (2024). Analyzing the Impact of European Generalized System of Preferences (GSP) Plus Scheme on the Exports of Pakistan using a Gravity Model. *The Journal of Research Review*, 1(04), 152–161.
- Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, 69(1), 106–116.
- Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170–192.
- Awan, A. G., Sarwar, G., & Siddique, K. (2015). The impact of Generalized Scheme of Preference (GSP+) on Pakistan's Textile Exports. *Journal International Journal of Economics, Commerce and Management, United Kingdom*, 3(1), 1–27.
- Bacchetta, M., Beverelli, C., Cadot, O., Fugazza, M., Grether, J.-M., Helble, M., Nicita, A., & Piermartini, R. (2012). *A practical guide to trade policy analysis*. Geneva, CH: World Trade Organization.
- Berggren, H. (2019). *Is GSP+ a Plus?-A Mixed Method Review of Trade Preference Scheme GSP+*. <https://lup.lub.lu.se/student-papers/record/8979204/file/8979210.pdf>
- Bergstrand, J. H. (1985). The gravity equation in international trade: Some microeconomic foundations and empirical evidence. *The Review of Economics and Statistics*, 474–481.
- Borchert, I., Larch, M., & Wanner, J. (2016). Trade preferences and export performance: Evidence from the GSP+ scheme. *Review of International Economics*, 24(4), 672–690.
- Borchert, I., Larch, M., & Wanner, J. (2016). Trade preferences and export performance. *The World Economy*, 39(8), 1048–1071. <https://doi.org/10.1111/twec.12307>
- Bouët, A., & Laborde, D. (2017). Assessing the potential cost of a failed Doha Round. *Agriculture, Development*, 155.
- Cameron, A. C., & Trivedi, P. K. (2013). *Regression analysis of count data*. Cambridge university press. [https://books.google.com/books?hl=en&lr=&id=d6BTfLBbxjC&oi=fnd&pg=PR21&dq=Cameron,+A.+C.,+%26+Trivedi,+P.+K.+\(2013\).+Regression+analysis+of+count+data.+Cambridge+University+Press.&ots=Vjrp-lmkIe&sig=iWOJ_ealkM1GILz5xK6gwV-wNcA](https://books.google.com/books?hl=en&lr=&id=d6BTfLBbxjC&oi=fnd&pg=PR21&dq=Cameron,+A.+C.,+%26+Trivedi,+P.+K.+(2013).+Regression+analysis+of+count+data.+Cambridge+University+Press.&ots=Vjrp-lmkIe&sig=iWOJ_ealkM1GILz5xK6gwV-wNcA)
- Cardamone, P. (2009). Preferential trade agreements granted by the European Union: An application of the gravity model using monthly data. *PUE&PIEC WP09*, 6. http://www.ecostat.unical.it/Anania/PUE&PIEC/PrinWP_Cardamone%2009-06.pdf

- Carrere, C. (2006). Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European Economic Review*, 50(2), 223–247.
- Chartier, J. (2021). *Sustainable development through trade—Case study: Pakistan's GSP+ and the red meat market*. <https://fid4sa-repository.ub.uni-heidelberg.de/4482/>
- Choudhary, M. H. (2024). The impact of the EU's generalized system of preferences plus status on companies and fiscal policy of Pakistan: a case of the textile industry. *Financial Internet Quarterly*, 20(4), 72–84.
- De Jong, G., Gunn, H., Walker, W., & Widell, J. (2002). *Study on ideas on a new national freight model system for Sweden*. Rand Santa Monica. https://www.researchgate.net/profile/Warren-Walker-3/publication/277852399_Study_on_Ideas_on_a_New_National_Freight_Model_System_for_Sweden/links/55a7714b08ae92aac77f8940/Study-on-Ideas-on-a-New-National-Freight-Model-System-for-Sweden.pdf
- Demaria, F. A.-F. (2010a). *Do trade preferential agreements enhance the exports of developing countries? Evidence from the EU GSP+*. <http://www.ecostat.unical.it/anania/PUE&PIEC/presentazioni/Aiello%20e%20Demaria,%20LOSANNA,%209.10.pdf>
- Demaria, F. A.-F. (2010b). *Do trade preferential agreements enhance the exports of developing countries? Evidence from the EU GSP+*. <http://www.ecostat.unical.it/anania/PUE&PIEC/presentazioni/Aiello%20e%20Demaria,%20LOSANNA,%209.10.pdf>
- Disdier, A.-C., & Head, K. (2008). The puzzling persistence of the distance effect on bilateral trade. *The Review of Economics and Statistics*, 90(1), 37–48.
- European Commission. (2015). Generalized Scheme of Preferences (GSP+): Guidelines and benefits. European Commission Publications.
- Frankel, J., Stein, E., & Wei, S. (1995). Trading blocs and the Americas: The natural, the unnatural, and the super-natural. *Journal of Development Economics*, 47(1), 61–95.
- Fernandes, A., Kee, H. L., & Swenson, D. L. (2018). Tariff preferences and the export performance of developing countries: Evidence from GSP+. *Journal of Development Economics*, 137, 1–15.
- Glick, R., & Rose, A. K. (2002). Does a currency union affect trade? The time-series evidence. *European Economic Review*, 46(6), 1125–1151.
- Gruber, M., Steininger, R., & Loibl, H. (2019). Sustainability and trade preferences: Analyzing the impact of GSP+ on emerging economies. *Global Economic Review*, 18(2), 234–256.
- Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In *Handbook of international economics* (Vol. 4, pp. 131–195). Elsevier. <https://www.sciencedirect.com/science/article/pii/B9780444543141000033>
- Head, K., Mayer, T., & Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of International Economics*, 81(1), 1–14.
- Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. *The Quarterly Journal of Economics*, 123(2), 441–487.
- Hoekman, B., & Nicita, A. (2011). Trade policy, trade costs, and developing country trade. *World Development*, 39(12), 2069–2079.
- Larch, M., & Wanner, J. (2021). Competitiveness and trade preferences under the EU GSP+ scheme. *Economic Policy Review*, 29(4), 567–589.
- Limao, N., & Venables, A. J. (2001). Infrastructure, geographical disadvantage, transport costs, and trade. *The World Bank Economic Review*, 15(3), 451–479.
- Linders, G.-J., & De Groot, H. L. (2006). *Estimation of the gravity equation in the presence of zero flows*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=924160
- Mahon, J. E. (2020). The evolution of the EU's GSP+ scheme: A political economy perspective. *Journal of Global Policy*, 27(2), 134–151.

- Malik, S. (2020). EU-Pakistan Trade Relations: The Role of GSP Plus Status and Pakistan's Enhanced Access to EU Markets. *Strategic Studies*, 40(1), 20–38.
- Marx, A. (2018). Integrating voluntary sustainability standards in trade policy: The case of the European Union's GSP scheme. *Sustainability*, 10(12), 4364.
- Oguledo, V., & Macphee, C. R. (1994). Gravity models: A reformulation and an application to discriminatory trade arrangements. *Applied Economics*, 26(2), 107–120. <https://doi.org/10.1080/00036849400000066>
- Ornelas, E. (2016). Special and differential treatment for developing countries. In *Handbook of commercial policy* (Vol. 1, pp. 369–432). Elsevier. <https://www.sciencedirect.com/science/article/pii/S2214312216300114>
- Persson, M. (2012). From Trade Preferences to Trade Facilitation: Taking Stock of the Issues. *Economics*, 6(1), 20120017. <https://doi.org/10.5018/economics-ejournal.ja.2012-17>
- Portugal-Perez, A., & Wilson, J. S. (2012). Export performance and trade facilitation reform: Hard and soft infrastructure. *World Development*, 40(7), 1295–1307.
- Rauch, J. E. (1999). Networks versus markets in international trade. *Journal of International Economics*, 48(1), 7–35.
- Shad, M. R. (2021). The GSP+ Status of Pakistan in the European Union: Challenges and Prospects. *Global Political Review*, VI, 1–8.
- Shahid, M. I., Baig, S. A., & Abrar, M. (2024). From Rivals to Champions: Evaluating Pakistan's Denim Industry Competitiveness through the GEM Model. *Journal of Excellence in Management Sciences*, 3(2), 81–98.
- Shepherd, B. (2016). *The gravity model of international trade: A user guide (An updated version)*. <https://repository.unescap.org/handle/20.500.12870/71>
- Silva, J. S., & Tenreyro, S. (2006a). The log of gravity. *The Review of Economics and Statistics*, 88(4), 641–658.
- Silva, J. S., & Tenreyro, S. (2006b). The log of gravity. *The Review of Economics and Statistics*, 641–658.
- Soomro, M. I. A. A., & Ansari, I. A. (2022). The GSP+ and Exports of Pakistan to the European Union. *Journal of European Studies (JES)*, 38(2), 38–54.
- Subramanian, A., & Wei, S.-J. (2007). The WTO promotes trade, strongly but unevenly. *Journal of International Economics*, 72(1), 151–175.
- Sultana, T., & Zehra, A. Z. (2023). European union's generalized scheme of preferences-gsp+ and pakistan: a critical overview. *Bahria University Journal of Humanities & Social Sciences*, 6(2), 20–36.
- Tinbergen, J. (1962). *Shaping the world economy; suggestions for an international economic policy*. <https://repub.eur.nl/pub/16826/Appendices.pdf>
- Verdeja, L. (2006). EU's preferential trade agreements with developing countries revisited. *Unpublished, University of Nottingham, School of Economics*. <http://etsg.org/ETSG2005/papers/verdeja.pdf>
- Wagan, S. M. (2015). Export boost of Textile Industry of Pakistan by availing EU's GSP Plus. *Journal of Economics Library*, 1(1), 18–27.
- Westerlund, J., & Wilhelmsson, F. (2011). Estimating the gravity model without gravity using panel data. *Applied Economics*, 43(6), 641–649. <https://doi.org/10.1080/00036840802599784>
- Wolf, S. O. (2020). The GSP+ Conundrum and the CPEC's Impact on EU-Pakistan Economic and Trade Relations. In S. O. Wolf, *The China-Pakistan Economic Corridor of the Belt and Road Initiative* (pp. 243–260). Springer International Publishing. https://doi.org/10.1007/978-3-030-16198-9_7
- Yotov, Y. V., Piermartini, R., & Larch, M. (2016). *An advanced guide to trade policy analysis: The structural gravity model*. WTO iLibrary. <https://www.wto-ilibrary.org/content/books/9789287043689>.