Global Beer Trade Dynamics: Factors Affecting Beer Export Volume and Value

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Abstract

This study investigates the determinants of beer export performance among the world's major beer-exporting countries by analyzing both export volume and export value. The analysis applies multiple regression and panel regression models using secondary data collected from international sources, including Trade Map, Statista, and Numbeo, covering the period 2020–2023. Key explanatory variables include trade balance, unit value, number of breweries, beer price, import taxes, barley import volume, barley production volume, and per capita beer consumption. The results indicate that trade balance, per capita beer consumption, and barley production positively influence beer export volume, while higher unit value, beer prices, import taxes, and dependence on barley imports reduce export competitiveness. The findings also reveal a strong positive relationship between export volume and export value. In addition, a mean comparison test confirms that countries producing barley domestically export significantly larger volumes of beer than those relying on imported barley. Overall, the study provides cross-country empirical evidence highlighting the importance of production capacity, trade costs, and raw material availability in shaping global beer export competitiveness.

Keywords: Beer Exports, Export Volume, Export Value, Barley Production

Introduction

Beer is one of the oldest alcoholic beverages in the world, with historical evidence suggesting that humans began brewing it over 7,000 years ago. Early beer production was a simple process that developed from the fermentation of barley or other grains using natural yeast. Today, beer brewing has evolved significantly through the application of modern technology and scientific knowledge, resulting in a diverse range of flavors and styles that cater to consumer preferences worldwide (Bamforth,

2009). Beer is an alcoholic beverage produced through the fermentation of key ingredients, including malt (germinated barley), water, hops, and yeast. During fermentation, sugars in the malt are converted into alcohol and carbon dioxide. Beer comes in various types—most notably lager and ale—which differ in their brewing process, flavor, and aroma. Beer has a long historical tradition and is widely consumed on various occasions, both for social gatherings and relaxation. Moreover, it represents an important cultural element in many countries around the world (Papazian, 2017).

Beer holds importance not only as a beverage but also as a key contributor to both the economy and culture. The beer industry provides employment opportunities and generates income for many countries. Moreover, beer exports add considerable value to the global economy. However, beer production in each country is influenced by several factors such as climatic conditions suitable for growing raw materials like barley and hops, the quality of water used in production, technological innovation, and legal regulations concerning production and distribution. Additionally, cultural consumption habits in different regions shape the popularity and types of beer available in the market (Oliver, 2014).

Global beer export sales reached USD 17.2 billion in 2022–2023, with Europe holding the largest market share (52.8%). The top five exporters—Mexico, the Netherlands, Belgium, Germany, and the UK—accounted for 68.3% of the market. The industry is projected to reach USD 269.92 billion by 2028 (5.1% CAGR). This growth is primarily driven by the rising demand for ready-to-drink (RTD) beverages, non-alcoholic and functional beers, e-commerce expansion, and AI integration. According to statistics and export growth estimates, the beer market is projected to grow at a compound annual growth rate (CAGR) of 5.5%, increasing from USD 821.39 billion in 2023 to USD 851.15 billion in 2024. Beer is the most popular alcoholic beverage in the world and the second most consumed beverage overall, after tea. In 2023, global beer exports totaled USD 17.13 billion, marking an increase of USD 62 million from the previous year. It is expected that in 2024, the global beer export market will reach USD 221.25 billion. Mexico remains the world's largest beer exporter, with an export value of USD 5.82 billion, while beer ranks as the 235th most traded product globally. Furthermore, Anheuser-Busch InBev, a Belgian company, is recognized as the largest beer exporter, with an export market value of USD 123.15 billion (TradeImeX, 2024). This study is therefore conducted to address the lack of cross-country empirical evidence on the key factors influencing beer export performance across major exporting nations.

Objectives

1. To examine the factors influencing the volume and value of beer exports among major exporting countries in 2023.
2. To analyze the factors affecting the volume of beer exports among major exporting countries during the period 2020–2023.
3. To compare the volume of beer exports between countries that import barley and those that do not.

Literature Review

Previous studies on beer trade and export performance have largely applied international trade frameworks, particularly gravity and competitiveness models, to explain cross-border beer flows. For instance, Bieleková and Pokrivčák (2020) confirm that beer exports are positively influenced by the economic size of importing countries and cultural proximity, while trade barriers such as geographical distance and landlocked conditions significantly increase transportation costs and reduce export volumes. Similarly, Dreyer and Fedoseeva (2016) extend gravity-based analysis by demonstrating that exchange rate movements affect German beer exports asymmetrically, implying that currency appreciation and depreciation may not generate equal trade responses. These findings suggest that beer exports are shaped not only by market demand but also by structural trade frictions and macroeconomic volatility.

In addition to trade determinants, research has emphasized the high concentration and competitiveness of the global beer market. Török et al. (2020) highlight that Europe and Mexico dominate beer exports, and that comparative advantage is strongly linked to production scale, domestic consumption intensity, and privileged access to European markets. This indicates that export success is not purely driven by price competitiveness, but also by industrial capacity and regional integration. However, while competitiveness studies provide valuable insights into market structure, they often rely on descriptive indicators and may not fully capture how multiple determinants interact simultaneously across exporting countries.

Logistics and supply chain constraints have also been identified as key but underexplored factors affecting beer exports. Gusso (2023) stresses the importance of containerized transport in maintaining efficient international distribution and illustrates how customs disruptions, such as Heineken's 2022 issues in France, can create significant bottlenecks. This perspective reinforces the argument that export performance depends not only on production and demand factors, but also on the resilience of trade facilitation systems. Nevertheless, such studies tend to focus on firm-level cases, limiting their ability to generalize across countries.

Another stream of literature examines exporter behavior and market power. Glauben and Loy (2014) analyze German beer exporters using pricing-to-market (PTM) and residual demand elasticity (RDE) models, but their contradictory results indicate methodological sensitivity and suggest that exporter market power remains uncertain. This inconsistency implies that further empirical refinement is needed, especially in cross-country settings where competitive structures may differ substantially.

Meanwhile, Thai-based studies have mainly concentrated on craft beer potential, consumer preferences, and domestic demand conditions rather than export performance at the macro level. Pinatha and Asawataweeboon (2021) identify promising opportunities for Thai craft beer exports to Russia, while Iemthanon, K. (2024) specify consumer-preferred product attributes such as moderate bitterness, fruity aroma, and higher alcohol content. Other studies (Phukcharoen, 2015; Rojniruttikul, 2015) emphasize the influence of peers, advertising, and marketing mix factors on purchasing decisions, and Keeratwiboon (2015) highlights the role of macroeconomic conditions and production changes in shaping beer sales volume. Although these studies provide valuable insights into demand-side behavior and product positioning, their findings are largely market-specific and may not explain broader international export dynamics.

Overall, the existing literature demonstrates that beer export performance is influenced by economic size, trade costs, exchange rates, market concentration, logistics efficiency, and firm-level strategic behavior. However, most studies remain limited to single-country evidence, firm case studies, or descriptive competitiveness assessments. As a result, cross-country empirical evidence that integrates these determinants into a unified analytical framework remains insufficient, supporting the need for broader comparative research on the factors influencing beer exports across nations.

Concepts and Theories Related to the Study

The study of factors influencing the volume of beer exports across countries can be grounded in theories and concepts from international trade economics, as well as factors related to industrial structure and macroeconomic conditions. These frameworks help explain how elements such as production capacity, comparative advantage, trade barriers, and market accessibility influence export performance in the global beer industry.

General Information about Beer

Beer is an alcoholic beverage produced through the fermentation of key ingredients, including malt (germinated barley), water, hops, and yeast. During fermentation, sugars in the malt are converted into alcohol and carbon dioxide. Beer comes in various types—most notably lager and ale—which differ in their brewing process, flavor, and aroma. Beer has a long historical tradition and is widely consumed

on various occasions, both for social gatherings and relaxation. Moreover, it represents an important cultural element in many countries around the world (Papazian, 2017).

Types of Beer

Beer comprises many distinct types, each with unique flavor, aroma, and texture characteristics. These types can be broadly classified based on their brewing methods and characteristics, as shown in the table below (Pires & Brányik, 2015). Information about different types of beer is shown in Table 1.

Table 1: Types of beer

Types of Beer	Characteristics of Beer
Lager	Beer brewed with yeast and malt, featuring a blonde golden color, clear appearance, and a refreshing, clean taste.
Pilsner	A light-bodied, easy-to-drink beer with a clean, crisp flavor, and a subtle sweetness and aroma derived from malt and hops.
Witbier	A light-colored beer brewed from wheat, easy to drink, not bitter, with a sparkling texture and aromas of malt, orange peel, and coriander seeds.
Hefeweizen	A popular German-style beer, easy to drink, often characterized by a fruity aroma resulting from the hops.
Pale ale	A golden-colored beer with a light, smooth taste, easy to drink, thin-bodied, and a subtle orange aroma from hops and yeast.
IPA	Beer brewed with yeast and malt, featuring a blonde golden color, clear appearance, and a refreshing, clean taste.
Double IPA	A light-bodied, easy-to-drink beer with a clean, crisp flavor, and a subtle sweetness and aroma derived from malt and hops.
Stout	A light-colored beer brewed from wheat, easy to drink, not bitter, with a sparkling texture and aromas of malt, orange peel, and coriander seeds.

Trends in Beer Exports

Global beer export sales reached USD 17.2 billion in 2022–2023, with Europe holding the largest market share (52.8%). The top five exporters—Mexico, the Netherlands, Belgium, Germany, and the UK—accounted for 68.3% of the market. The industry is projected to reach USD 269.92 billion by 2028 (5.1% CAGR). This growth is primarily driven by the rising demand for ready-to-drink (RTD) beverages, non-alcoholic and functional beers, e-commerce expansion, and AI integration.

Demand and Supply Theory

Prices and trading volumes are determined by the equilibrium point where consumer demand meets producer supply. External factors affecting production or pricing directly influence this market balance (Mankiw, 2020).

Theory of Comparative Advantage

Countries export beer efficiently when they possess a lower opportunity cost. This competitive edge often stems from unique resource endowments (e.g., premium hops), specialized brewing cultures, and technological advancements (Head & Mayer, 2014).

Gravity Model of Trade

Trade volume depends heavily on the economic size (GDP) of the trading partners and the geographic distance between them. Shorter distances reduce costs, while higher-income nations drive the demand for premium imported beers. (Melitz & Redding, 2014)

Market Structure Theory

In highly competitive international markets, exporters must differentiate their products. Success relies on developing strong brand identities, maintaining consistent quality, and innovating to meet diverse consumer preferences. (Bernard et al., 2018)

Linder Hypothesis

International trade thrives between countries with similar per capita incomes. Their consumers tend to share comparable tastes, lifestyles, and quality expectations, making market expansion more feasible. (Smith & Johnson, 2012)

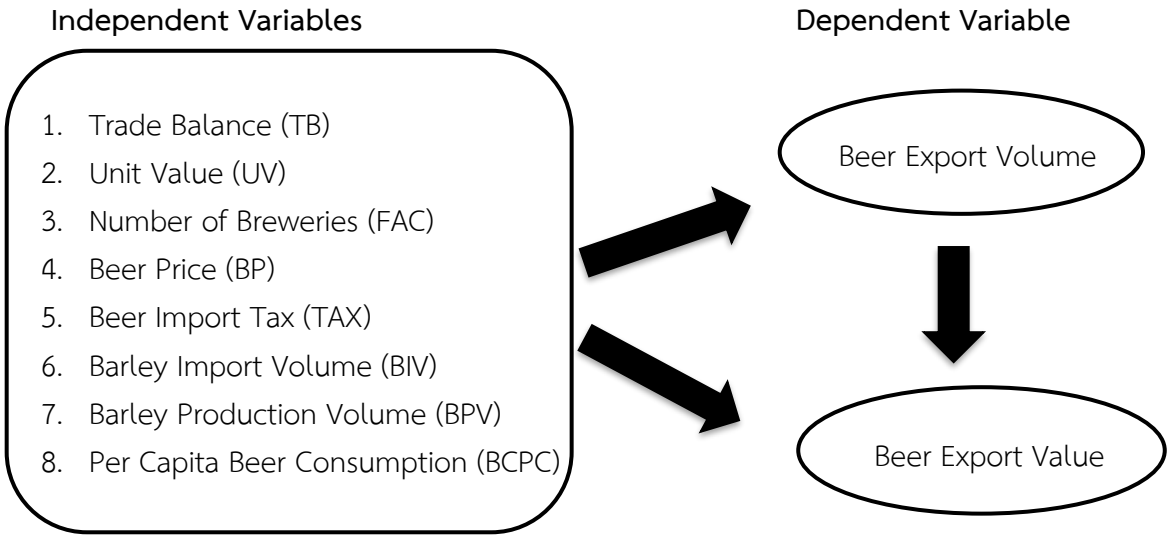

Figure 2: The Conceptual Framework of the Study

Materials and Methods

To analyze the factors affecting beer exports in each country, multiple regression analysis was employed, along with a t-test to compare beer export volumes between countries that import barley and those that do not. Three models for data analysis include:

Model 1 (Linear Model)

$$QEX = \beta_0 + \beta_1 TB + \beta_2 UV + \beta_3 FAC + \beta_4 BP + \beta_5 TAX + \beta_6 BIV + \beta_7 BPV + \beta_8 BCPC + \mu$$

Model 2 (Linear Model)

$$VEX = \beta_0 + \beta_1 QEX + \beta_2 UV + \beta_3 FAC + \beta_4 BP + \beta_5 TAX + \beta_6 BIV + \beta_7 BPV + \beta_8 BCPC + \beta_9 TB + \mu$$

Model 3 (Panel Regression Model)

$$QEX_{it} = \beta_0 + \beta_1 TB_{it} + \beta_2 UV_{it} + \beta_3 FAC_{it} + \beta_4 BP_{it} + \beta_5 TAX_{it} + \beta_6 BIV_{it} + \beta_7 BPV_{it} + \beta_8 BCPC_{it} \beta_9 VEX_{it} + \mu_t + \omega_i + \varepsilon_{it}$$

The data used in this study were obtained from the Trade Map database in 2023. The models above illustrate the relationship between independent variables and dependent variables, with details and data sources provided in Table 2.

Table 2: Variables Used in the Study and Data Sources

Independent Variables	Definitions of Variables	Variable Relationships and Hypotheses	Data Sources
TB	Trade Balance	$\beta_1 > 0$	Trade map
UV	Unit Value	$\beta_2 < 0$	Trade map
FAC	Number of Breweries	$\beta_3 > 0$	Statista
BP	Beer Price	$\beta_4 < 0$	Numbeo
TAX	Beer Import Tax	$\beta_5 < 0$	Statista
BIV	Barley Import Volume	$\beta_6 > 0$	Statista
BPV	Barley Production Volume	$\beta_7 > 0$	Statista
BCPC	Per Capita Beer Consumption	$\beta_8 < 0$	Statista
Dependent Variable			
QEX	Beer Export Volume	-	Trade map
VEX	Beer Export Value	-	Trade map

The sample used in this study consists of the top 24 beer-exporting countries in the world, as shown in Table 2.

Table 3: Top 24 beer-exporting countries in the world

Continent	Country
America	Brazil, Canada, Mexico, United States of America
Europe	Belgium, Czech Republic, Denmark, France, Germany, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Serbia, Spain, United Kingdom
Asia	China, Japan, South Korea, Thailand, Vietnam
Africa	South Africa

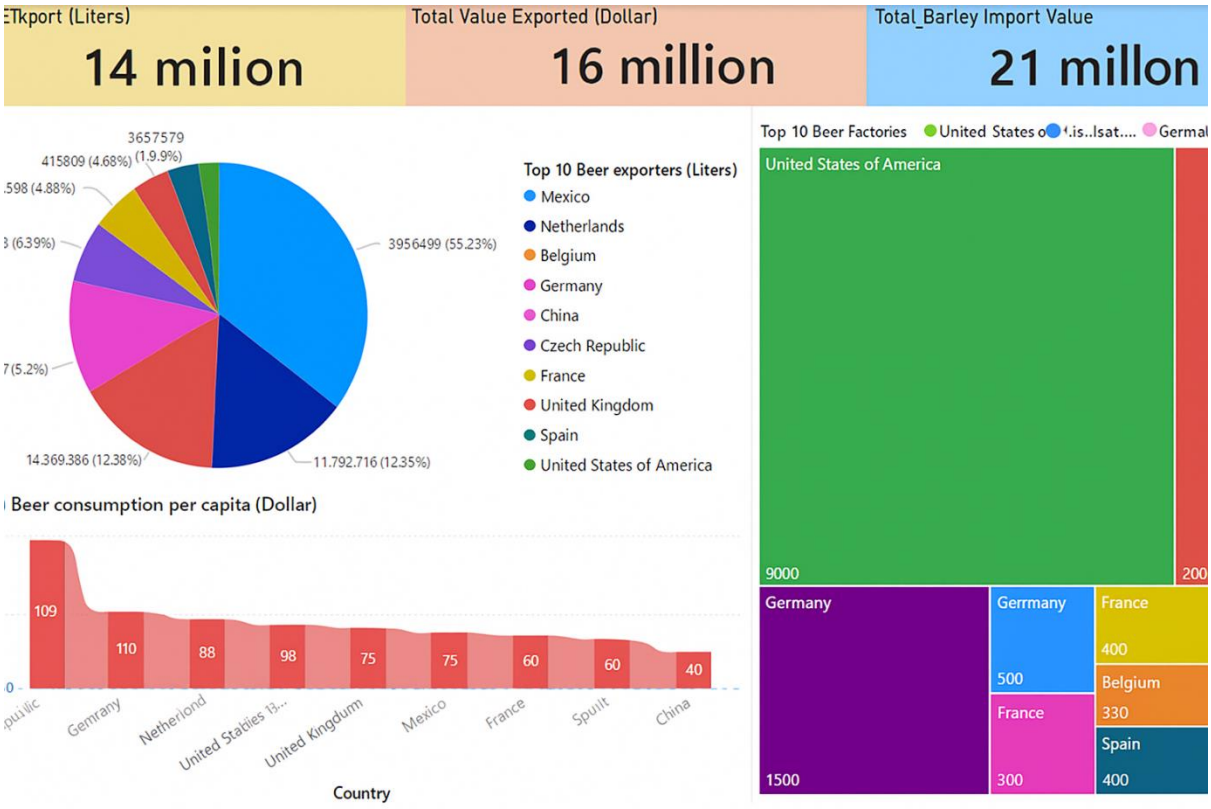

Figure 2: General information of the world's top 10 beer-exporting countries

From Figure 2, it can be seen that the countries with the highest beer exports are Mexico, the Netherlands, and Belgium, respectively. Meanwhile, the countries that import the most barley are China, the Netherlands, and Belgium. The per capita beer consumption among the ten countries is relatively similar, except for the Czech Republic, which has a significantly higher consumption rate. Regarding beer production, the United States has the largest number of beer factories among the ten countries, but its export ranking is relatively low. This indicates that the United States primarily produces beer for domestic consumption rather than for export.

Table 4: Correlation matrix

	TB	UV	POP	FAC	BP	TAX	BIV	BPV	BCPC
TB	1.00								
UV	-0.58	1.00							
POP	0.39	-0.068	1.00						
FAC	-0.80	0.6	0.17	1.00					
BP	0.00	0.04	-0.01	0.05	1.00				
TAX	-0.47	0.29	-0.32	0.34	-0.04	1.00			
BIV	0.22	0.07	0.97	0.35	-0.03	-0.26	1.00		
BPV	0.34	-0.07	0.83	0.20	-0.10	-0.23	0.86	1.00	
BCPC	-0.24	0.05	-0.40	0.12	0.07	0.32	-0.29	-0.15	1.00

From the correlation analysis presented in Table 4, it was found that some pairs of variables show a strong positive correlation, such as POP and BIV (0.9719) and BPV and BIV (0.8697), indicating that they tend to move in the same direction. In contrast, some pairs exhibit a strong negative correlation, such as TB and FAC (-0.8095), suggesting an opposite relationship. Meanwhile, certain variables, such as BP and TAX (-0.0441), show a weak or insignificant correlation. This information helps to understand the interrelationships among the variables and can be utilized for further analysis.

Table 5: Correlation matrix

	TB	UV	POP	FAC	BP	TAX	BIV	BPV	BCPC
TB	1.00								
UV	-0.09	1.00							
POP	0.38	-0.06	1.00						
FAC	-0.81	0.07	0.17	1.00					
BP	-0.01	-0.01	-0.00	0.05	1.00				
TAX	-0.45	0.10	-0.31	0.33	-0.06	1.00			
BIV	0.21	-0.04	0.97	0.35	-0.02	-0.25	1.00		
BPV	0.33	-0.09	0.83	0.20	-0.07	-0.24	0.87	1.00	
BCPC	-0.23	0.11	-0.39	0.12	0.08	0.31	-0.29	-0.15	1.00

From Table 5, the data revealed that that some pairs of variables have strong correlations, such as POP and BIV (0.9719) and TB and FAC (-0.8095), indicating that the variables tend to change in the same or opposite directions. In contrast, some variables,

such as BP and TAX (-0.0441), show weak correlations, suggesting no significant relationship between them. This information can be used to analyze trends and related factors, supporting research and statistical decision-making.

Results

Table 6: Results of the Analysis of Factors Affecting Beer Export Volume

Variables	Linear Model (QEX)		Linear Model (VEX)		Panel Regression (QEX)	
	β (t)	Robust S.E.	β (t)	Robust S.E.	β (z)	S.E.
TB	771.6601*** (1.88)	410.9103	81.5015 (1.04)	78.57982	51.04 (0.35)	147.8871
UV	1274.56** (2.26)	563.0313	367.21*** (3.07)	119.634	-51.40*** (-2.95)	17.404
BP	-265722 (-1.64)	162305.5	49506.38 (1.64)	30263.4	-125427.6* (-1.92)	65301.92
TAX	-24274.82* (-1.78)	13638.51	1500.96 (0.43)	3507.512	-4950.019 (-0.90)	5499.803
BIV	-0.110056* (-1.97)	0.05599	0.0066 (0.26)	0.02526	-0.0340813 (-1.21)	0.02811
BCPC	5665.134* (2.08)	2724.704	-0.01435 (-0.71)	460.2595	1.74* (0.082)	1024.056
BPV	0.0608 (1.73)	0.03525	-327.9793 (-0.95)	0.01515	0.02422* (1.70)	0.0142
VEX	-	-	-	-	0.7391*** (28.26)	0.0261
QEX	-	-	1.1604*** (16.17)	0.0717	-	-
FAC	-	-	-	-	-	-
ς_u	-		-		67357.208	
ς_e	-		-		99364.873	
ρ	-		-		0.314842	
R-squared	0.9863		0.9867		-	
within	-		-		0.0027	

Variables	Linear Model (QEX)	Linear Model (VEX)	Panel Regression (QEX)
between	-	-	0.9926
overall	-	-	0.9651
F	457.27	69.13	-
Prob >F	0.0000	0.0000	0.0000
Obs	24	24	96

Note: * Significant at the 0.1 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level

Table 6 reports the regression results from three models examining the determinants of beer export volume (QEX) and export value (VEX). Overall, all models are statistically significant (Prob > F = 0.0000) and show high explanatory power.

In Model 1 (Linear Regression: QEX), beer export volume is positively and significantly influenced by trade balance (TB), unit value (UV), and per capita beer consumption (BCPC). In contrast, import tax (TAX) and barley import volume (BIV) have significant negative effects, indicating that higher trade barriers and reliance on imported barley reduce export volume.

In Model 2 (Linear Regression: VEX), beer export value is mainly explained by export volume (QEX) and unit value (UV), both of which have strong positive and significant effects.

In Model 3 (Panel Regression: QEX), beer export volume is positively associated with export value (VEX), while unit value (UV) and beer price (BP) negatively affect export volume. Additionally, barley production volume (BPV) and per capita beer consumption (BCPC) show weak but positive significance.

In summary, beer exports are strengthened by trade capacity, domestic production potential, and consumption scale, while higher prices, tariffs, and dependence on imported barley reduce export competitiveness.

Table 7: Comparison of Beer Export Volumes Between Countries That Import and Do Not Import Barley

Group	Mean	Std. Err.	Std. Dev.	t	p
Countries That Do Not Import Barley	1,129,935	70,7946.3	1,583,016	1.6749	0.0541*
Countries That Import Barley	438,816.2	118,515.5	51,659.1		

Note: *Significant at the 0.1 level

Table 7 presents the comparison of beer export volumes between countries that import barley and those that do not import barley. The results show that countries which do not import barley have a significantly higher average beer export volume than countries that rely on barley imports.

Specifically, the mean beer export volume for countries that do not import barley is 1,129,935 liters, while the mean export volume for barley-importing countries is only 438,816.2 liters. The t-test result ($t = 1.6749$) indicates that this difference is statistically significant at the 10% level ($p = 0.0541$).

Overall, the findings suggest that countries with domestic barley supply tend to export more beer than countries dependent on imported barley, implying that local raw material availability may strengthen export competitiveness.

Conclusions and Discussion

This study examined the determinants of beer export performance among major exporting countries using multiple regression and panel regression models. Overall, the findings confirm that beer export volume and value are driven by trade capacity, production conditions, and cost-related factors, which is consistent with international trade theories and prior empirical studies.

First, the results show that trade balance (TB) positively affects beer export volume, implying that countries with stronger export capacity tend to export more beer. This supports the trade cost framework of Anderson and Van Wincoop (2014) and the gravity model of trade (Melitz & Redding, 2014), which emphasize that stronger trade performance and lower frictions enhance export flows.

Second, unit value (UV) is significant in explaining beer exports, but its effect differs across models. While the linear regression suggests a positive relationship with export volume, the panel model indicates a negative effect over time. This reflects a trade-off between premium pricing and export competitiveness, consistent with demand and supply theory (Mankiw, 2020) and the findings of Bieleková and Pokrivčák (2020) that export outcomes depend on affordability and cost conditions.

Third, import taxes (TAX) negatively affect beer export volume, confirming that trade barriers reduce competitiveness. This aligns with the gravity framework (Head & Mayer, 2014) and the empirical evidence of Dreyer and Fedoseeva (2016), which highlights the role of trade costs in limiting beer exports.

Fourth, the study finds that barley import dependence reduces export volume, while barley production supports exports. This supports the comparative advantage theory (Head & Mayer, 2014), suggesting that countries with domestic access to key raw materials gain a cost advantage. This result is also consistent with Gusso (2023), who

emphasized that supply chain structure and logistics strongly affect beer export performance.

Fifth, per capita beer consumption (BCPC) positively influences beer export volume, indicating that countries with strong domestic demand tend to develop larger and more competitive brewing industries. This supports the market structure view of Bernard et al. (2018) and is consistent with Török et al. (2020), who found that production scale and domestic consumption are major drivers of beer export competitiveness.

Finally, the results confirm that beer export value (VEX) is strongly and positively related to export volume (QEX), reflecting that higher export quantities lead to higher export earnings. In addition, the mean comparison test shows that countries producing their own barley export significantly more beer than those relying on barley imports, reinforcing the importance of domestic raw material availability.

In conclusion, this study contributes to the beer trade literature by providing new cross-country empirical evidence on the determinants of beer export performance using both multiple regression and panel regression approaches. Unlike previous studies that often focus on gravity variables, single-country cases, or descriptive competitiveness indicators, this research integrates trade capacity, pricing factors, taxation, domestic consumption, and raw material availability (barley production versus import dependence) into a unified framework. The findings highlight the importance of supply-side production structure and input security in explaining export competitiveness, thereby extending traditional international trade theories with industry-specific evidence from the global beer market.

Recommendations

Recommendations for Policymakers

Governments in beer-exporting countries should strengthen export competitiveness by supporting domestic barley production through agricultural R&D, farmer subsidies, and investment in supply chain infrastructure to reduce reliance on imported raw materials. Policymakers should also promote trade liberalization by negotiating FTAs and reducing tariff barriers in key destination markets. In addition, improving logistics efficiency, customs procedures, and export facilitation systems would help reduce trade costs and enhance international market access.

Recommendations for Industry and Exporters

Beer producers should focus on improving cost efficiency and production scale, particularly by securing stable raw material sources and developing partnerships with domestic barley suppliers. Exporters should adopt competitive pricing strategies and

product differentiation to balance unit value with export volume. Firms are also encouraged to expand into premium, non-alcoholic, and RTD beer segments, while utilizing e-commerce and digital marketing to access wider international consumers and strengthen brand reputation.

Recommendations for Future Studies

Future research should incorporate a longer time period and include more countries, especially emerging beer-exporting markets in Asia and Africa, to improve generalizability. Additional qualitative and structural factors such as brand reputation, innovation, product quality, marketing strategies, and logistics performance indices should be included to better explain export competitiveness. Further studies may also apply alternative econometric methods, such as fixed-effects models or gravity-based panel estimations, to provide robust cross-country evidence on global beer export dynamics.

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