Market Diversification and Competitiveness of Fresh Grape Exports in Peru

Jose Carlos Montes Ninaquispe 1,*, Kelly Cristina Vasquez Huatay 1, Diego Alejandro Ludeña Jugo 1, Alberto Luis Pantaleón Santa María 1, Juan César Farias Rodríguez 1, Fernando Suárez Santa Cruz 1, Erik Omar Escalona Aguilar 2 and Marco Agustín Arbulú-Ballesteros 3,*

1 Programa de Administración y Administración de Negocios Internacionales Filial Norte, Universidad de San Martín de Porres, Lima 15011, Peru; kvasquez@usmp.pe (K.C.V.H.); dldudeny@usmp.pe (D.A.L.J.); apantaleon@usmp.pe (A.L.P.S.M.); jfarias@usmp.pe (J.C.F.R.); fernando_suarez2@usmp.pe (F.S.S.C.)
2 Escuela de Ingeniería, Ciencia y Tecnología, Universidad Bernardo O’Higgins, Santiago 8370993, Chile
3 Escuela de Administración, Universidad Tecnológica del Perú, Lima 15046, Peru
* Correspondence: jmontes@usmp.pe (J.C.M.N.); c14089@utp.edu.pe (M.A.A.B.); Tel.: +51-979985261 (J.C.M.N.)

Abstract: Global trade and globalization have driven growth and diversification in the horticultural industry. Fresh grapes, a key product, face challenges of market volatility, trade barriers, and logistics. Market diversification is essential for stability and competitiveness in international trade. This research focused on analyzing market diversification in Peru’s fresh grape exports during the 2013–2022 period, exploring its implications for international trade. A quantitative methodology was used, along with the analysis of publicly recorded data on the website of the National Superintendence of Customs and Tax Administration, specifically exports from companies shipping under the national subheading for Grapes (0806.10.00.00). Diversification was analyzed using the Herfindahl–Hirschman index (HHI), and competitiveness through the Balassa index. The main findings were that between 2013 and 2022, Peruvian grape exports grew in value (CAGR of 12.02%) and volume (CAGR of 12.13%). The sector expanded with an average of 151.2 companies and 59.1 destination markets. Diversification varied: the USA (12.4%), the Netherlands (1.6%), Hong Kong (4.2%), and Mexico (63.2%). The Herfindahl–Hirschman index showed concentration in the USA (4533 in 2020, 4519 in 2022) and stability in companies (2318 in 2014, 2450 in 2022). Finally, it is recommended to strengthen the Peruvian viticultural sector by maintaining geographic diversification through policies seeking new markets, monitoring global trends, constantly analyzing market concentration, and promoting fair competition among participating companies, allowing new ones to enter this sector.

Keywords: international trade; exports; HHI; Peruvian exports; grapes

1. Introduction

The proliferation of international trade and globalization has fostered exponential growth in the interconnection of markets, promoting the diversification of products and expansion opportunities [1]. Globally, challenges associated with the production and marketing of horticultural products are influenced by multifaceted and heterogeneous factors [2], shaping the dynamics of trade and competitiveness on the international stage [3]. International trade, with its complex network of agreements, regulations, and market fluctuations, represents a significant arena for the agricultural sector, particularly for the export dynamics of fruits [4]. The latter is a vital component of the economy of many countries, whose competitiveness is influenced by multiple factors, including product quality, innovation in production and marketing processes, and the ability to adapt to global market standards and demands [5]. Competitiveness in this sector is strengthened through
the implementation of advanced technologies and sustainable practices that enhance resource use efficiency, productivity, and product traceability [6], essential elements to meet the expectations of international consumers.

The marketing of fruits in the international sphere demands a deep understanding of market dynamics; moreover, investment in research and development for the genetic improvement of fruits is crucial, which not only increases productivity but also enhances crop resistance to diseases and adaptability to different climatic conditions, thus expanding their export potential [7]. Logistics also plays a determining role, where efficiency in the cold chain and international transport are fundamental to maintaining the quality and integrity of the product until its destination [8].

In this framework, government policies and institutional support are indispensable to facilitate access to international markets, through the negotiation of trade treaties, the establishment of phytosanitary norms compatible with international standards, and the promotion of cooperation among producers to improve their negotiation capacity and penetration in foreign markets [9]. The synergy between these elements contributes to building a robust agricultural sector, capable of competing on the global stage and driving sustainable economic development, highlighting the relevance of an integrated strategy that encompasses everything from production to the marketing of fruits in international trade. In this context, market diversification in fruit trade emerges as a critical prerogative for the stability and sustained growth of producing and exporting countries. This premise is particularly significant in the case of fresh grapes, an emblematic and high-value product in the global agro-industrial sector [10]. Market diversification is achieved through the penetration of new markets, the development of derivative products, and the promotion of innovative [11] and sustainable practices in viticulture and processing. However, effective and resilient diversification faces intricate challenges such as the volatility of the international market, tariff and non-tariff barriers, growing environmental awareness, and demands for quality and food safety standards [12], as well as logistical issues in product conservation [13]. Therefore, a scientific and rigorous approach is required to analyze the complex reality of fruit, specifically fresh grapes, and contribute to the design and implementation of holistic and context-sensitive strategies to strengthen market diversification and consolidate competitiveness in international trade.

The current global context, characterized by rigorous competition and high demands in quality, sustainability, and traceability, demands that the international trade of grapes goes beyond simply complying with international regulations to achieve outstanding competitiveness [14]. This goal requires constant innovation in production processes and agile adaptability to the changing tastes of consumers and various regulations worldwide [15]. Being competitive in this sector promotes the adoption of agricultural practices that are not only advanced and efficient but also environmentally friendly [16]. This significantly contributes to the economic development of producing regions and facilitates their integration into global value chains. Hence, improving competitiveness in grape exports not only offers immediate benefits to participants in international trade but also plays a crucial role in fostering economic growth and promoting sustainable environmental management practices globally. This approach demonstrates the broad and diverse impact that competitiveness in this field has on the global economy. Likewise, a country’s ability to increase the volume of its exports and become the main supplier to strategic importing markets is a clear manifestation of its competitiveness in the international arena [17]. This preeminence, achieved not only by meeting global demands for quality, sustainability, and traceability but also by expanding production beyond the capacity of other exporters, provides a significant competitive advantage in agricultural products, such as grapes. Such leadership in volume reflects efficiency in agricultural and administrative practices [18], as well as the robustness of logistical infrastructure and supply chains [19], which are fundamental for managing extensive quantities of exports. Being the main supplier to a particular importer not only enhances commercial influence but also promotes long-lasting and stable trade relationships. This dominant position improves the perception of
reliability and consistency among importers, essential factors for sustaining and expanding presence in competitive international markets. Therefore, leading in export volume emerges as a key indicator of competitiveness, driving economic development and consolidating a country’s status in the global grape trade [20].

The importance of fresh grapes in international trade must be elucidated. This fruit, cultivated and consumed in numerous countries, has undeniable significance in the agro-industrial sphere [21] and, consequently, in the global economy [22]. The intrinsic value propositions of fresh grapes lie in their multiple applications and nutritional relevance, which have solidified their importance in human consumption and well-being despite issues in the post-harvest supply chain [23]. The versatility of this fruit is evident in the production of derived products of significant economic and cultural importance, such as wine, must, grape juice, vinegar, raisins, and various liquors, experiencing exponential market growth [24–26]. Moreover, fresh grapes are valued for their bioactive compounds such as polyphenols, flavonoids, resveratrol, and antioxidants, offering health benefits and preventive properties against cardiovascular, neurodegenerative, and metabolic diseases [27]. Their contribution in vitamins, minerals, and dietary fiber positions fresh grapes as an essential component to promote a balanced and healthy diet [28]. Thus, the importance of consuming fresh grapes [29] and their derivatives is founded on their contribution to human well-being [30], the sustainability of agri-food systems, and the consolidation of an interdependent and resilient global economy, demanding constant reflection and scientific analysis from a holistic and multidisciplinary perspective.

The complex reality of fresh grapes in international trade lies in the concentration of production and export in a limited number of countries, leading to excessive dependence on specific markets and vulnerability to economic fluctuations and changes in trade policies. In this context, market diversification emerges as a primary strategy to mitigate risks and improve the competitiveness of producing and exporting countries of fresh grapes [31].

Examining the diversification of fresh grapes at a global level reveals a trend towards the expansion of destination markets and diversification of grape-derived products [32], as well as the strengthening of the production chain and the adoption of sustainable and innovative agricultural practices. These efforts have allowed producing and exporting countries to increase resilience against the vicissitudes of international trade and strengthen their economies [33].

In Latin America, the reality of market diversification in fresh grape exports is heterogeneous. While some countries have established diversified and stable markets, others have faced challenges in penetrating new markets and diversifying derived products for a long time [34]. This disparity underscores the need for specific strategies tailored to the conditions and particularities of each country.

Peruvian agriculture stands out for its diversity and competitiveness in the global market, with Peruvian agricultural products gaining a considerable market share due to their quality and variety. Factors such as favorable climate, rich biodiversity, and improved cultivation practices have contributed to this success. In addition, the national strategy to promote agricultural exports has encouraged producers to adopt international standards ensuring product quality and sustainability.

Peruvian grapes have emerged as a star product. Peru has become one of the leading exporters of grapes in the world, particularly table grapes, thanks to climatic conditions that allow multiple harvest cycles per year and the adoption of advanced technologies [35]. Peruvian grapes are appreciated in international markets for their sweetness, size, and consistency, results of rigorous quality and traceability processes [36].

The evolution of grape production and export in Peru from 2010 to the present highlights sustained growth and significant positioning in the international market. In 2015, Peru’s grape exports reached USD 700 million, and by 2020, this figure increased to over USD 1 billion. A notable milestone occurred in 2021 when Peru became the world’s largest exporter of fresh grapes, surpassing Chile, China, and the United States, with exports
totaling USD 1.26 billion, a 22% increase from 2020. By the end of 2022, Peru was projected to maintain its title as the leading exporter of fresh grapes, with sales exceeding USD 1.4 billion. However, despite climatic challenges such as El Niño Costero affecting export agriculture, Peru has maintained its global leadership in fruit supply in the first half of 2023. According to [37], in June 2023, there was a 5.6% increase in national grape production compared to the same month last year. In the first half of the year, production reached 543,000 tons, 9% more than in 2022, and exports grew 14.34% in volume and 15.60% in value. Between 2014 and 2022, the value of fresh grape exports grew at an average annual rate of 8.9%, doubling the value obtained in 2014 and positioning fresh grapes as the second largest agricultural export product of Peru [38]. However, production is expected to decrease in the coming months due to the impact of El Niño Costero, especially in the main cultivation regions of Ica and Piura. This reduction in supply, coupled with solid demand from the United States, could increase export prices in European and American markets [39].

The success of Peruvian grapes in exports is also due to the implementation of phytosanitary regulations and certifications ensuring clean and responsible production practices. The Peruvian grape industry has positioned its product not only for its quality but also for its commitment to sustainable agricultural practices, increasingly valued in a globally environmentally and socially conscious market [40]. Finally, fresh grapes have experienced sustained growth in production and export in recent years [41]; however, market diversification has been a constant challenge [42], especially in a context marked by economic and political uncertainty.

The theoretical contribution is based on a deep analysis of how diversification can be effectively used to face challenges imposed by globalization and promote sustainable development in the agro-industrial sector, especially in a sensitive product for Peru like grapes [43]. This theoretical approach offers an integral perspective that encompasses factors from the dynamics of globalization and its influence on international competition to the importance of sustainability in agricultural practices [44]. Initially, the study highlights the critical importance of globalization in the context of agroindustry, underlining how this phenomenon has intensified competition worldwide and generated the need to adopt more sophisticated strategies to maintain competitiveness. In this sense, market diversification emerges as a key strategy that allows producing countries like Peru to mitigate the risks associated with dependence on single markets and economic volatility. This theoretical approach not only underscores the relevance of accessing new markets but also the need to adapt to their specific requirements, such as quality and sustainability standards [45]. Delving into the theory of market diversification, the study argues how this strategy fosters economic resilience and sustainable growth. By diversifying export destinations, risks associated with demand fluctuations are diluted, ensuring more stable revenues, which is fundamental for long-term planning and sustained development of the agro-industrial sector. This theoretical perspective highlights the ability of market diversification to promote effective adaptation to changes in the global economic environment, reinforcing the economic stability and socioeconomic progress of producing countries. On the other hand, the theory of competitiveness in the context of exports emphasizes the importance of establishing and maintaining a strong export presence in international markets with high demand. This theory highlights the need to adapt to the needs and preferences of target markets, emphasizing that competitiveness goes beyond low-cost production or traditional comparative advantages [4]. Instead, it focuses on product differentiation, innovation, and added value as key elements to stand out in a global market [46]. The sustainability of the export presence in demanding countries indicates a country’s ability to adjust its offer to the dynamics of the global market, which includes adapting to emerging technologies, environmental and sanitary regulations, and changing consumer preferences. This perspective also underscores the importance of trade and diplomatic relationships in facilitating access to foreign markets, through trade agreement negotiations, participation in international fairs, and the establishment of efficient distribution
networks [47]. Therefore, a successful export strategy requires a continuous commitment to innovation, process and product improvement, and a deep understanding of consumer expectations and trade barriers. In essence, the theory suggests that to be competitive on the international stage, a country must focus on building and maintaining solid relationships, constantly adapting to market trends, and committing to excellence and differentiation of its products [48].

The research can theoretically be enriched and extended by incorporating findings from recent studies examining the impact of product modularity and supply chain visibility on sustainability and operational performance. For instance, the study of manufacturing in small and medium-sized enterprises in Pakistan [49] offers a valuable framework. This framework can analogously be applied to argue that, in the Peruvian vitivinicultural industry, greater supply chain visibility and adaptability in production practices could positively moderate the relationship between market pressures, technological innovation, and market diversification in the competitiveness of exports. Therefore, the present research could suggest that, in addition to market forces and technological pressure, modularity in grape production processes and greater transparency in the supply chain are key factors that could contribute to a more robust and competitive market diversification strategy for Peru’s fresh grape exports.

On the other hand, a study conducted [50] shows a conceptual bridge between the analysis of competitiveness specific to product and country and the application of these principles on a broader regional scale, as is the case with the European Union and the cereal sector. This was all described in terms of competitiveness dimensions: factor endowments and resource autonomy, agricultural chain performance, and national strategies and policies for the agricultural chain, giving this study more macro-dimensions, where trade between two countries can be explained through the RCA.

Finally, to understand how companies can thrive in international trade, it is crucial to study how various market aspects relate [51]. If a company seeks to sell its products in different countries, it must deal with economic fluctuations, trade barriers, and challenges in efficiently shipping its products [52]. All these factors are interconnected and play a significant role in a company’s success in reaching more customers in different locations. By better understanding these relationships, companies can develop more effective strategies for selling their products abroad and maintaining their strength against competition [53].

The central objective is to describe the market diversification and competitiveness of Peru’s fresh grape exports during the period 2013–2022, focusing particularly on the evolution of destination markets and the exporting companies involved in this process, given that, despite the remarkable growth of the sector, there is a scarcity of studies on the diversity of markets and companies, which in turn derives the following hypotheses: (1) the diversification of Peru’s grape exports from 2013 to 2022 was increasing, making exports follow this pattern, and (2) the competitiveness of Peru’s grape exports is more developed in its main trading partners.

With this, the study stands out for its detailed examination of the evolution and behavior of the fresh grape export sector in Peru. It highlights constant growth and a well-implemented market diversification strategy, which has significantly improved its international presence. By using specific economic indicators, such as the FOB value, net weight exported, the index of revealed comparative advantage, and the Herfindahl–Hirschman index, a detailed understanding of how geographical diversification and proper market concentration management have contributed not only to increasing the volume and value of exports but also to reducing risks linked to dependence on certain markets is achieved. This comprehensive approach provides valuable empirical data for the design of future policies and strategies, seeking to improve competitiveness and the sector’s adaptability to global trade challenges. This contribution is significant for knowledge about the Peruvian industry and its influence on international markets. This study offers an innovative perspective not only for its detailed analysis of Peru’s fresh
grape export sector but also for its applicability to other agricultural export products of the country, highlighting Perú’s relevance in the agro-export arena. The methodology used provides a rigorous approach to evaluate critical aspects such as growth, market diversification, and market concentration. This methodological approach is particularly valuable for understanding and improving the competitive position of a variety of agricultural export products in Peru.

The structure of the present empirical research is articulated around an exhaustive exploration of Peruvian grape exports, organized in meticulously defined sections to facilitate a comprehensive understanding of the topic. It starts with the presentation of descriptive results. This section is complemented by deeper analyses of the geographical distribution of exports and the performance of specific companies. Subsequently, market concentration indexes and the revealed comparative advantage are addressed to identify Perú’s competitiveness in key markets. The discussion synthesizes the findings, relating them to the existing literature and highlighting the importance of geographical diversification and competitiveness. Finally, the conclusions summarize the crucial aspects of the analysis, highlighting trends, implications, and strategic recommendations to strengthen the Peruvian vitivinicultural sector internationally. This structure not only provides a detailed and sequenced analysis of the data but also offers strategic information for future research directions and sectoral development.

2. Material and Methods

In accordance with the objectives outlined, the applied methodology is based on a quantitative approach. This involves the systematization and examination of numerical data, specifically the free on board (FOB) value of exports as evidenced in the study conducted by [54]. The descriptive scope of the research enables meticulous identification and elucidation of variables and phenomena related to market diversification in the exports of fresh grapes, without attempting to establish causal relationships or intervene in the subject of study, like the study proposed by [55]. This non-experimental design ensures the observation and analysis of data within its intrinsic context, avoiding direct manipulation by the researcher [56].

The population of interest includes the records listed in the customs declarations of goods, provided by the fresh grape-exporting companies under the national subheading 0806.10.00.00 [57], during the period 2013–2022. The primary technique used was documentary review. The implementation of a rigorous data extraction protocol, designed specifically for the study, was key to ensuring the reliability of the collected data. By relying on official documents, which are mandatory according to current regulations regardless of the commercial volume, this methodological approach offered a precise and reliable perspective on the analysis of the same period.

To ensure a representative analysis, all available data were used, allowing for a rigorous and truthful approach to market diversification in Perú’s fresh grape exports. The Herfindahl–Hirschman index (HHI) was employed to measure diversification in exports. This analytical tool is widely used in economics and business studies to assess concentration and diversification in various contexts, such as trade, market competition, and industrial structure [1,58–62]. The HHI is calculated by summing the squares of the market shares of each entity (in this case, countries receiving the exports) [63,64]. The resulting index value ranges from 0 to 10,000, where a value close to 0 indicates high diversification and a value close to 10,000 reflects greater concentration in a reduced number of entities; similarly, when the value is 1800, there exists moderate diversification [65–67]. In the context of export diversification, a low HHI indicates the dispersion of exports to a larger number of markets, reducing a country’s dependency on specific markets and decreasing the associated risks due to fluctuations and changes in these markets [68].

The Balassa index, also known as the revealed comparative advantage (RCA), is an economic measure used to evaluate a country’s relative specialization in a specific product [69]. This index is calculated as the ratio of a country’s specific product exports to its total
exports, divided by the ratio of global exports of the same product to total global exports, as used in some studies aiming to measure the competitiveness of an exported product [70–74]. A value greater than one indicates that the country has a comparative advantage in exporting the product. The interpretation of the Balassa index is simplified by using three distinct scales: if the index is between +0.33 and +1, it is interpreted that the country has a comparative advantage in exporting the product, suggesting specialization and competitiveness in that sector. An index between −0.33 and −1 indicates a comparative disadvantage, implying that the country is less competitive in exporting that product compared to others worldwide. Finally, an index value ranging between −0.33 and +0.33 suggests a trend towards intra-industry trade, meaning that the country imports and exports similar products, indicating the possibility of integration or complementarity with international markets in that specific sector. In the research, the Balassa index was used to analyze Peru’s competitive position in the fresh grape export market. The methodology consisted of calculating the RCA for Peruvian fresh grapes during the study period, comparing the share of grapes in Peru’s total exports with the share of grapes in global trade.

The use of the Herfindahl–Hirschman index and the revealed comparative advantage to analyze Peru’s grape exports presents certain limitations. One of the significant gaps lies in the assumption of market and product homogeneity within the HHI calculation, which may not adequately reflect the diversity and specialization of Peruvian grapes in different market segments. This homogenization may lead to underestimating the real competition and market dynamics in the sector. On the other hand, the RCA, by focusing on the relationship between a country’s exports and global trade, may not fully capture the internal factors driving competitiveness, such as technological innovations, variations in product quality, or specific business strategies. Additionally, the RCA assumes that productivity and competitive advantages are static, ignoring the possibility of dynamic changes in productive capacities and market conditions.

To ensure data integrity, a rigorous protocol was implemented based on a specific documentary review guide for the storage and analysis of customs declarations of goods. These official documents, which must be mandatorily registered by exporting companies as part of regulatory compliance regardless of the commercial level [75] and involved in fresh grape exportation, served as the primary source to validate the veracity of international commercial operations conducted.

3. Results

The evolution of the grape export industry in Peru has marked a significant change over the last ten years, reflecting an increase in both the economic value and the volume of exports. This sector, essential to the country’s agricultural economy, has recorded continuous growth in exports and the net weight of grapes sent abroad, demonstrating the industry’s expansion on the international stage. Changes in the average price per kilogram over time indicate a response to global market fluctuations, as well as adjustments in marketing strategies and the offer of diversified products. The increase in the number of participating companies and expansion into new target markets reflect the sector’s adaptability and dynamism in the face of international trade opportunities and challenges.

This analysis (Table 1), illustrates the dynamics of Peruvian grape exports between 2013 and 2022, revealing significant growth in both economic value and export volume, underlying the sector’s vital contribution to Peru’s agricultural economy and its expanding footprint in the global market. The compound annual growth rate of 12.02% for the FOB value highlights an increasing trend in the economic gains from international transactions, while a similar CAGR for net weight volume at 12.13% mirrors the growth in the number of grapes exported, showcasing the sector’s robust performance.
Table 1. Peruvian grape exports.

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<tbody>
<tr>
<td>FOB value USD Millions</td>
<td>446</td>
<td>647</td>
<td>695</td>
<td>661</td>
<td>667</td>
<td>828</td>
<td>1019</td>
<td>1221</td>
<td>1263</td>
<td>1381</td>
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<tr>
<td>Net Weight Thousand Tons</td>
<td>180</td>
<td>272</td>
<td>312</td>
<td>295</td>
<td>276</td>
<td>354</td>
<td>432</td>
<td>514</td>
<td>518</td>
<td>560</td>
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<tr>
<td>Avg. Price USD/kg</td>
<td>2.06</td>
<td>1.53</td>
<td>1.64</td>
<td>1.90</td>
<td>1.04</td>
<td>1.38</td>
<td>2.53</td>
<td>2.13</td>
<td>2.99</td>
<td>1.10</td>
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<tr>
<td>Number of Companies</td>
<td>119</td>
<td>155</td>
<td>179</td>
<td>169</td>
<td>145</td>
<td>153</td>
<td>160</td>
<td>138</td>
<td>147</td>
<td>127</td>
</tr>
<tr>
<td>Number of Markets</td>
<td>58</td>
<td>66</td>
<td>64</td>
<td>60</td>
<td>60</td>
<td>56</td>
<td>59</td>
<td>57</td>
<td>58</td>
<td>53</td>
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Note. Data taken from the DAM registered in SUNAT (2022).

The average FOB value of exports standing at USD 882.8 million reflects the gross earnings from exports over the years, with a standard deviation of USD 317.3 million pointing to significant yearly fluctuations in export value. These variations are attributable to Peru’s production capabilities and its growth within the sector. A coefficient of variation at 0.36 underscores this variability relative to the mean, and a skewness of 0.42 indicates a slight inclination towards years with values below the average. The kurtosis at −1.3 signals a distribution with a lesser frequency of extreme values, while the Jarque–Bera test with a p-value of 0.64 suggests no significant deviations from a normal distribution, implying a relative stability in FOB value over time.

The net weight, with an average of 371.3 thousand tons, represents the physical quantity of goods exported. A standard deviation of 127.5 thousand tons reflects fluctuations in export volume, with a coefficient of variation of 0.34 highlighting moderate variability compared to the mean, and a skewness of 0.23 indicating a slight tendency towards smaller volumes. The kurtosis at −1.27 suggests a lesser presence of outliers, and the Jarque–Bera test result with a p-value of 0.69 supports the notion of no evidence of an abnormal distribution of net weight in exports.

The average price per kilogram at USD 1.83 showcases the unit value of exports. A standard deviation of USD 0.62 illustrates the variation in prices achieved per kilogram over time, a result of market condition changes. A coefficient of variation of 0.34 and skewness of 0.54 reveal a distribution slightly skewed towards lower prices, while the kurtosis at −0.25 indicates a flatter distribution compared to the norm. The Jarque–Bera test, with a p-value of 0.76, indicates no significant deviations from normality, suggesting that average prices per kilogram have been relatively stable without the presence of extreme shocks.

An average of 149.2 companies involved in exports reflects the participating business ecosystem. A standard deviation of 18.25 companies shows relatively low variability, corroborated by a coefficient of variation of 0.12, indicating stability in the number of exporting companies over time. A skewness at −0.10 and kurtosis at −0.31 suggest a symmetric and flat distribution, respectively. The Jarque–Bera test yields a p-value of 0.89, not supporting the presence of anomalies in the distribution of the number of companies, indicating an exporting industry with stable business participation.

The average number of markets to which exports are sent stands at 59.1, showing the geographical reach of exports. A standard deviation of 3.75 reflects low variability in the number of markets reached, as evidenced by a coefficient of variation of 0.06. This indicates consistency in market diversification over time. A skewness of 0.47 shows a slight inclination towards a higher number of markets, and a kurtosis of 0.43 suggests a distribution mildly prone to extreme values. However, the Jarque–Bera test, with a p-value of 0.86, indicates that there is insufficient evidence to assert significant deviations from a normal distribution, reflecting stability in the diversification of export markets.
Upon evaluating Table 2, a distinct growth pattern in each market is highlighted. The United States, the undisputed leader, experienced a robust average annual growth of 23.08%, with 2015 marking a significant peak in growth at 64.59%. However, the year 2021 showed an unexpected contraction, reducing exports by 3.88%, which could be attributed to specific market factors or logistical challenges of that year. The standard deviation is 192.85, reflecting high variability in the value of exports, with a coefficient of variation of 0.55, indicating considerable variability in relation to the mean. The skewness is 0.28, suggesting a slight inclination towards lower values, and the kurtosis is −1.38, indicating a distribution with fewer extreme values. The Jarque–Bera test shows a $p$-value of 0.66, which does not suggest deviations from normality.

Table 2. Peruvian grape exports by destination in FOB (millions of USD).

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<tbody>
<tr>
<td>USA</td>
<td>100.58</td>
<td>129.78</td>
<td>213.61</td>
<td>253.12</td>
<td>285.97</td>
<td>313.09</td>
<td>464.37</td>
<td>568.42</td>
<td>546.36</td>
<td>652.12</td>
</tr>
<tr>
<td>Netherlands</td>
<td>73.00</td>
<td>91.36</td>
<td>84.97</td>
<td>70.89</td>
<td>77.83</td>
<td>138.59</td>
<td>125.96</td>
<td>149.96</td>
<td>170.36</td>
<td>151.36</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>34.80</td>
<td>90.23</td>
<td>75.67</td>
<td>65.76</td>
<td>61.77</td>
<td>85.46</td>
<td>83.20</td>
<td>132.39</td>
<td>119.56</td>
<td>84.66</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.05</td>
<td>0.77</td>
<td>5.03</td>
<td>18.58</td>
<td>16.82</td>
<td>20.05</td>
<td>34.65</td>
<td>51.00</td>
<td>53.02</td>
<td>80.32</td>
</tr>
<tr>
<td>China</td>
<td>46.01</td>
<td>87.27</td>
<td>82.74</td>
<td>54.28</td>
<td>30.92</td>
<td>44.47</td>
<td>47.07</td>
<td>44.53</td>
<td>43.38</td>
<td>69.07</td>
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<tr>
<td>G. Britain</td>
<td>36.51</td>
<td>52.33</td>
<td>43.64</td>
<td>35.07</td>
<td>37.31</td>
<td>53.60</td>
<td>53.81</td>
<td>48.84</td>
<td>64.69</td>
<td>52.36</td>
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<td>150.72</td>
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</table>

Note. Data taken from the DAM registered in SUNAT (2022).

The Netherlands, with an average annual growth of 8.44%, had its most successful year in 2018, when exports increased by an impressive 78.07%. This growth may indicate an effective market strategy or an increasing demand in that particular year. Conversely, the year 2016 was less fruitful, with a decrease of 16.57%, suggesting possible trade barriers or changes in demand that negatively impacted exports. Additionally, a standard deviation of 37.73 is observed, with a coefficient of variation of 0.33, revealing moderate variability in exports. A skewness of 0.22 and a kurtosis of −1.84 suggest a distribution slightly inclined towards lower values and with less frequency of extreme values. The Jarque–Bera test with a $p$-value of 0.58 does not indicate significant deviations from normality.

Hong Kong, while showing a healthy average annual growth of 10.38%, had its highest increase in 2014 at 159.28%, which might reflect a successful entry into that market or the capitalization of a temporary business opportunity. Nevertheless, the year 2022 revealed a notable slowdown, with a decrease of 29.19%, highlighting market volatility and the importance of adaptable market diversification. It also presents a standard deviation of 27.81 and a coefficient of variation of 0.33, indicating moderate variability in exports. Its skewness of 0.23 and a kurtosis of 0.54 suggest a distribution slightly inclined towards higher values and a slight tendency towards extreme values. The Jarque–Bera test shows a $p$-value of 0.96, indicating that exports to Hong Kong fit well into a normal distribution.

In the case of Mexico, the analysis reveals the highest annual growth rate among the top six countries at 127.09%. The year 2014 was particularly outstanding for Mexico, as exports grew by 1440%. This exceptional growth could be the result of a strategic shift or emerging market preferences at that time. Despite this surge, the year 2017 showed a decrease of 9.47%, underscoring the need for resilient market strategies. Mexico also shows a standard deviation of 26.38, indicating high variability in the value of exports. The coefficient of variation is 0.94, reflecting extremely high variability in relation to the mean, and suggests that exports to Mexico have been very volatile. The skewness is 0.86, indicating an inclination towards higher values in exports, while a kurtosis close to zero (−0.005)
suggests an export distribution like normal in terms of the presence of extreme values. The Jarque-Bera test offers a p-value of 0.60, indicating that there is not enough evidence to reject the hypothesis of normality in the distribution of exports to Mexico.

China, with an average annual growth of 4.62%, saw its greatest increase in 2014 at 89.68%, which may indicate the effectiveness of market initiatives or alignment with consumer preferences of that year. However, 2017 represented the year of lowest growth for China, with a decline of 43.04%, possibly due to competitive challenges or trade barriers. In addition, the standard deviation is 18.52, with a coefficient of variation of 0.34, which indicates moderate variability in exports. The skewness of 0.85 suggests a slight inclination towards higher exports, and a kurtosis of −0.43 implies a distribution slightly flatter than normal, with fewer extreme values. The Jarque–Bera test shows a p-value of 0.57, which does not suggest significant deviations from normality in exports to China.

Finally, Great Britain exhibited an average annual growth of 4.09%, with 2018 recording the highest increase at 43.66%. This surge could be associated with adapting to market preferences or overcoming previous trade barriers. The year of least growth was 2016, with a decrease of 19.64%, highlighting the influence of external factors that can affect the export of agricultural products. Likewise, the standard deviation is 9.51, showing the least variability among these countries, with a coefficient of variation of 0.20, indicating relative stability in the value of exports. The skewness is 0.11, indicating an almost symmetrical distribution of exports, and a kurtosis of −0.62 suggests a distribution slightly flatter compared to normal, with fewer extreme values. The p-value of the Jarque–Bera test is 0.84, which indicates that exports to Great Britain do not show significant deviations from a normal distribution (see table 3).

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<tbody>
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<td>41.4</td>
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<td>11.5</td>
<td>18.3</td>
<td>7.2</td>
<td>17.1</td>
<td>20.1</td>
<td>25.6</td>
<td>37.9</td>
<td>55.4</td>
</tr>
<tr>
<td>Complejo Agroindustrial Beta</td>
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<td>36.3</td>
<td>24.6</td>
<td>27.3</td>
<td>37.1</td>
<td>53.3</td>
<td>50.8</td>
<td>59.2</td>
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<td>Agricola Andrea</td>
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<td>16.4</td>
<td>9.6</td>
<td>16.8</td>
<td>18.0</td>
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<td>82.5</td>
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<td>Pura Fruit Company</td>
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<td>27.1</td>
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<td>30.9</td>
<td>33.0</td>
<td>26.1</td>
<td>28.3</td>
<td>42.1</td>
<td>44.1</td>
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<td>0.0</td>
<td>11.7</td>
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<td>572</td>
<td>536</td>
<td>518</td>
<td>585</td>
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<td>Total</td>
<td>446</td>
<td>647</td>
<td>695</td>
<td>661</td>
<td>667</td>
<td>828</td>
<td>1019</td>
<td>1221</td>
<td>1263</td>
<td>1381</td>
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</tbody>
</table>

*Note.* Data taken from the DAM registered in SUNAT (2022).

During the period 2013–2023, Peruvian grape-exporting companies demonstrated diverse evolution, with differing compound annual growth rates and coefficients of variation. Sociedad Agrícola Rapel and Ecosac Agrícola experienced significant growth, with maximum increases in 2022 and CAGRs of 33.2% and 72.3%, respectively. Additionally, Ecosac Agrícola shows a standard deviation of 32.66 and a coefficient of variation of 0.64, with a skewness of 0.83 and a kurtosis of 1.56, indicating a distribution with a slight inclination towards higher values and a greater propensity for extreme values. The Jarque–Bera test with a p-value of 0.65 does not suggest significant deviations from normality. Meanwhile, El Pedregal stood out for its rapid ascent from 2017, with a CAGR of 116.6%. It is also notable for its standard deviation of 53.49, with a coefficient of variation of 0.96, indicating high variability relative to its average exports, understood by its growth
throughout the period, with a skewness close to zero and a kurtosis of \(-2.34\), suggesting a distribution with less frequency of extreme values. The Jarque–Bera test shows a \(p\)-value of 0.48, indicating a relatively normal distribution. On the other hand, Corporación Agrícola Andrea showed fluctuations yet maintained overall growth, with CAGRs of 22.9% and 25.7%, respectively. The group comprising other companies accounted for a substantial share in exports, with a CAGR of 15.3%, suggesting a competitive and expanding sector (see Table 4).

Table 4. HHI by destination market of grape exports.

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</thead>
<tbody>
<tr>
<td>HHI</td>
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<td>3465</td>
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<td>3943</td>
<td>4411</td>
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<td>4257</td>
<td>4519</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

The HHI shows a general upward trend in market concentration during the period 2013–2022, peaking in 2020 (4533) and slightly lowering in 2022 (4519). This trend suggests that Peru’s grape exports have increasingly concentrated in the United States, which has been the dominant destination for Peruvian grape exports throughout the period. Although this may generate short-term gains, it is important for companies to diversify their export destinations to minimize risks associated with reliance on a limited number of markets and ensure sustainable growth in the future (see Table 5).

Table 5. HHI by grape-exporting companies.

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<tbody>
<tr>
<td>HHI</td>
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<td>2318</td>
<td>2335</td>
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<td>2423</td>
<td>2429</td>
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<td>2450</td>
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</tbody>
</table>

Note. Own elaboration.

The HHI remains within a relatively stable range, oscillating between 2318 in 2014 and 2450 in 2022. This suggests moderate market concentration in the grape export sector, indicating relatively balanced competition among exporting companies and a more homogeneous market distribution. Moreover, this allows for healthy competition, fosters innovation, and provides opportunities for new companies to enter the market. The stability in the HHI indicates that the sector has achieved a balance between larger and smaller companies, creating a diversified and competitive market environment (see Table 6).

Table 6. Revealed comparative advantage of Peru—United States.

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</thead>
<tbody>
<tr>
<td>RCA</td>
<td>0.09</td>
<td>0.10</td>
<td>0.34</td>
<td>0.37</td>
<td>0.45</td>
<td>0.38</td>
<td>0.55</td>
<td>0.50</td>
<td>0.56</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

In 2013 and 2014, values of 0.09 and 0.10 indicate a trend towards intra-industry trade, implying that Peru neither specialized in nor had a marked disadvantage in this product relative to the United States. From 2015 onward, the RCA exceeds the threshold of 0.33, starting at 0.34 and progressively increasing to 0.55 in 2022. This reflects a continuous and significant improvement in Peru’s comparative advantage in exporting the product, suggesting an increase in specialization and competitiveness of the country in this market against the United States during the analyzed period. The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test for the revealed comparative advantage indicator are, respectively, 0.174, 0.448, −0.800, −0.672, and a Jarque–Bera statistic of 1.254 with a \(p\)-value of 0.534. The standard deviation suggests moderate variability in the RCA values around its mean. The coefficient of variance, being less than 1, indicates that the standard deviation is proportionally lower than the mean, denoting a relative homogeneity in the magnitude of the RCA. The negative
skewness implies a distribution slightly skewed towards lower RCA values, suggesting that there are more years with values below the mean. The negative kurtosis indicates that the distribution of the RCA values is relatively flat, with fewer extreme values than expected in a normal distribution. Finally, the result of the Jarque–Bera test, with a p-value higher than 0.05, does not allow us to reject the null hypothesis of normality in the distribution of RCA values, suggesting that these could follow a normal distribution.

In Table 7, it is observed that Peru has maintained a comparative disadvantage in the specified product throughout the entire period. In 2013, with an RCA of −0.38, there is a clear disadvantage, which slightly attenuates in the following years, approaching −0.23 by 2022, but without crossing the threshold of −0.33, which would indicate a trend towards intra-industry trade. The consistently negative values suggest that Peru has not been particularly competitive in exporting this product to the Netherlands, remaining in a relatively less favorable position compared to other countries in the global market for this sector.

**Table 7.** Revealed comparative advantage of Peru—Netherlands.

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</tr>
</thead>
<tbody>
<tr>
<td>RCA</td>
<td>−0.38</td>
<td>−0.24</td>
<td>−0.21</td>
<td>−0.41</td>
<td>−0.39</td>
<td>−0.25</td>
<td>−0.23</td>
<td>−0.23</td>
<td>−0.14</td>
<td>−0.23</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test for the revealed comparative advantage indicator are, respectively, 0.090, −0.332, −0.475, −1.045, and a Jarque–Bera statistic of 0.831 with a p-value of 0.660. The standard deviation shows low variability in the RCA values, indicating little dispersion around the mean. The coefficient of variance, being negative due to the negative mean, suggests caution in its direct interpretation; however, its relative magnitude indicates moderate variability in proportion to the mean. The negative skewness suggests a distribution slightly inclined towards more negative RCA values, indicating a tendency towards lower values within the dataset. The negative kurtosis indicates a distribution flatter than normal, with a lesser presence of extreme values. Finally, the p-value of the Jarque–Bera test, higher than 0.05, does not allow us to reject the null hypothesis of normality in the distribution of RCA values, indicating that these could follow an approximately normal distribution.

Table 8 shows that Peru has consistently had a comparative advantage in the export of the analyzed product. The RCA has remained above 0.33 throughout the decade, starting with 0.38 in 2013 and reaching its highest point in 2019 with 0.60, indicating strong specialization and competitiveness of Peru in that sector against the Hong Kong market. Despite some fluctuations, such as the decrease to 0.41 in 2022, the values suggest that Peru has maintained a favorable position in this specific market over the ten years evaluated.

**Table 8.** Revealed comparative advantage of Peru—Hong Kong.

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</thead>
<tbody>
<tr>
<td>RCA</td>
<td>0.38</td>
<td>0.56</td>
<td>0.58</td>
<td>0.50</td>
<td>0.44</td>
<td>0.48</td>
<td>0.60</td>
<td>0.53</td>
<td>0.51</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test are, respectively, 0.073, 0.146, −0.239, −1.061, and a Jarque–Bera statistic of 0.564 with a p-value of 0.754. The standard deviation indicates low variability in the RCA values, which signals consistency in Peru’s comparative advantage with respect to Hong Kong. The low magnitude of the coefficient of variance reflects reduced relative variability compared to the mean, highlighting the stability of the comparative advantage over time. The negative skewness, although slight, suggests a mild concentration of values
below the mean. The negative kurtosis indicates a distribution flatter than normal, which suggests a lesser presence of extreme values in the distribution of the RCA. Finally, the result of the Jarque–Bera test, with a p-value higher than 0.05, does not allow us to reject the null hypothesis that the data follow a normal distribution. This suggests that the distribution of RCA values between Peru and Hong Kong could be considered normal for the period studied, which underscores a relatively stable and balanced foreign trade dynamic between these two territories.

Table 9 shows that the RCA between Peru and Mexico reveals a notable comparative disadvantage of Peru in exporting the product in question throughout the decade from 2013 to 2022. Starting with an RCA of −0.99 in 2013 and returning to that same level in 2022, most of the values remain below −0.33, indicating that Peru has not been competitive against Mexico in this sector. Despite gradual improvement between 2017 and 2020, where the RCA approached the threshold of −0.33, suggesting a movement towards intra-industry trade, the overall trend shows that Peru has struggled to compete with Mexico in the international market for this specific product.

Table 9. Revealed comparative advantage of Peru—Mexico.

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<tbody>
<tr>
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<td>−0.99</td>
<td>−0.94</td>
<td>−0.79</td>
<td>−0.81</td>
<td>−0.77</td>
<td>−0.58</td>
<td>−0.56</td>
<td>−0.46</td>
<td>−0.53</td>
<td>−0.99</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test for the revealed comparative advantage indicator are, respectively, 0.198, −0.267, 0.053, −1.461, and a Jarque–Bera statistic of 0.894 with a p-value of 0.640. The standard deviation reflects moderate variability in the RCA values, indicating fluctuations in Peru’s comparative disadvantage against Mexico. The coefficient of variance, negative due to the negative mean, suggests significant variability in relation to the magnitude of the comparative disadvantage. The skewness near zero suggests a symmetric distribution of values around the mean, implying a balanced distribution of RCA values over the period analyzed. The negative kurtosis indicates a distribution flatter than normal, suggesting a lesser frequency of extreme values in the distribution of the RCA. Finally, the p-value of the Jarque–Bera test, higher than 0.05, does not allow us to reject the null hypothesis of normality in the distribution of RCA values, suggesting that these could follow an approximately normal distribution. This analysis evidences a consistent dynamic of comparative disadvantage for Peru against Mexico, with moderate changes over time and a distribution of values that does not significantly deviate from normality.

In Table 10, the consistently negative values near −1 throughout the series indicate a strong comparative disadvantage for Peru in exporting the specific product to China. No significant improvement is recorded in any of the years; rather, there is consistency in the lack of competitiveness of the Peruvian product in the Chinese market. The values, deeply rooted in the zone of comparative disadvantage, reflect that Peru has not managed to position itself favorably against China in this sector over the observed decade.

Table 10. Revealed comparative advantage of Peru—China.

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</thead>
<tbody>
<tr>
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<td>−0.86</td>
<td>−0.93</td>
<td>−0.97</td>
<td>−0.96</td>
<td>−0.95</td>
<td>−0.96</td>
<td>−0.97</td>
<td>−0.95</td>
</tr>
</tbody>
</table>

Note. Own elaboration.

The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test for the RCA indicator are, respectively, 0.041, −0.044, 1.111, −0.300, and a Jarque–Bera statistic of 2.094 with a p-value of 0.351. The relatively low standard deviation indicates that the RCA values present minimal variability, suggesting a consistent comparative disadvantage of Peru against China over time. The coefficient of
variance, close to zero, reflects this low variability in relation to the mean. The positive skewness indicates that the distribution of RCA values has a longer tail towards the right side, suggesting the presence of slightly higher values that deviate from the general trend of disadvantage. The negative kurtosis suggests that the distribution is slightly flatter than a normal distribution, indicating a lesser presence of extreme values. Finally, the $p$-value of the Jarque–Bera test, higher than 0.05, does not allow us to reject the null hypothesis of normality in the distribution of RCA values, indicating that these could be considered approximately normal. This analysis highlights a persistent and stable comparative disadvantage for Peru in its trade with China, with slight fluctuations that do not significantly alter this pattern over the studied period.

In Table 11, the RCA shows a trend from a moderate disadvantage towards intra-industry trade, with a value of −0.33 in 2015. However, in 2016 and 2017, the disadvantage intensifies again, with values exceeding −0.50. A notable improvement was observed in 2018 and especially in 2019, when the RCA approached zero, suggesting that Peru was about to reach intra-industry trade with Great Britain or even a potential comparative advantage. Unfortunately, this trend does not hold, and by 2022, the RCA fell to −0.70, indicating that Peru faces a considerable comparative disadvantage in exporting the specific product to Great Britain, ending the period in a less competitive position than it started.

Table 11. Revealed comparative advantage of Peru—Great Britain.

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<tbody>
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<td>−0.31</td>
<td>−0.33</td>
<td>−0.53</td>
<td>−0.52</td>
<td>−0.37</td>
<td>−0.09</td>
<td>−0.09</td>
<td>−0.43</td>
<td>−0.70</td>
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</tbody>
</table>

Note. Own elaboration.

The values of the standard deviation, coefficient of variance, skewness, kurtosis, and the Jarque–Bera test for the RCA indicator are, respectively, 0.194, −0.500, 0.259, −0.717, and a Jarque–Bera statistic of 0.326 with a $p$-value of 0.850. The standard deviation indicates moderate variability in the RCA values, reflecting fluctuations in Peru’s comparative disadvantage against Great Britain. The coefficient of variance, being negative due to the negative mean, reflects a significant proportion of variability relative to the magnitude of the comparative disadvantage. The positive skewness suggests a slight inclination towards more negative RCA values, though the distribution approaches symmetry. The negative kurtosis indicates a distribution flatter than normal, suggesting a lesser presence of extreme values. Finally, the $p$-value of the Jarque–Bera test, higher than 0.05, does not allow us to reject the null hypothesis of normality in the distribution of RCA values, indicating that these could be considered approximately normal. This analysis evidences a comparative disadvantage for Peru in its trade with Great Britain, with some variations over time but maintaining a general trend towards disadvantage.

4. Discussion

The trajectory of the Peruvian grape export sector, according to the findings of [1], demonstrates a pattern of sustained growth throughout the study period, with an increase that triples the value of exports from 2013 to 2022. This development reflects the consolidation of Peruvian grapes as a product of increasing importance on the global stage. In parallel, and in line with [11], the expansion of target markets underscores the importance of geographical diversification in the export strategy. However, instability in the variation of markets over time is observed, with initial growth followed by a contraction in 2022, the year with the lowest number of target markets. Furthermore, the postulates of [24] and [25] are corroborated by the behavior of exporting companies that have adopted diversification as a fundamental principle in the search for new markets. The evidence suggests a positive correlation between the number of companies and the expansion of target markets, indicating that as more companies integrate into the export arena, the greater the global market penetration. This phenomenon highlights the importance of
entrepreneurship and innovation as key drivers in promoting the competitiveness and international reach of Peru’s grape exports.

Compared with the studies of [20], a notable volatility in the exportation of grapes from Afghanistan and India is identified, highlighting the dependency on specific markets, like the fluctuation in the average price observed in the Peruvian study, although in the context of Peru, more emphasis is placed on market diversification as a mitigation strategy. On the other hand, ref. [31] underlines the importance of diversifying grape varieties in the efficiency of wine exports, resonating with the Peruvian strategy of geographical diversification and competitive specialization, especially in the U.S. market. Ref. [76] discusses the complement between grape production and wine exportation as a new phase of globalization, a phenomenon distinct from the specialization and market adaptation reflected in the Peruvian study, where specialization translates into a growing competitive advantage in key markets like the United States, demonstrated through an increased RCA.

In seeking to expand the reach of Peruvian grape exports, strategically targeting markets with high growth potential and low current penetration would be wise. For example, countries in the Association of Southeast Asian Nations (ASEAN), such as Vietnam and Malaysia, could be promising destinations given their growing middle class and openness to new agri-food products. Conversely, markets with strict phytosanitary restrictions, like Japan, though attractive, may not be a priority due to the complexity of access. Similarly, cautious expansion should be considered in markets with strong local competitive production, such as South Africa, where Peruvian grapes might face competition in price and local preferences. In terms of new markets, economically developing areas like certain countries in East and Central Africa present opportunities due to the lower presence of competitors and the possibility of establishing early brand preference.

5. Conclusions

The results reflect a positive trend in terms of FOB value and net weight, with compound annual growth rates of 12.02% and 12.13%, respectively, indicating sustained increases in both the value and volume of exports. However, the observed volatility in the average price (USD/kg), with a standard deviation of 0.64, suggests significant fluctuations in profitability, possibly due to global supply and demand, as well as changing macroeconomic conditions.

The diversification of markets, as reflected in the relatively stable number of export destinations, indicates an average of 39.1 markets with a standard deviation of 3.37. This suggests ongoing efforts by Peruvian companies to expand their geographical reach and explore new market niches. This geographical diversification strategy is reinforced by the constant and growing presence in key markets such as the United States, which has shown significant average annual growth and has been the main destination for Peruvian grape exports during the study period.

The RCA index reinforces these conclusions, with the United States showing an increase from intra-industry trade values to a robust comparative advantage, reflected in an RCA increasing to 0.55 in 2022. This indicator demonstrates Peru’s growing specialization and competitiveness in the U.S. market. Conversely, the trade relationship with markets like the Netherlands and Mexico, with negative RCAs throughout the study, indicates a comparative disadvantage, suggesting that Peru has not achieved the same level of competitiveness in these markets.

Finally, the trend of the Herfindahl–Hirschman index (HHI) for the target market shows an increase in market concentration, particularly in the United States, which could pose risks of dependence on a limited market. The stability of the HHI among exporting companies suggests balanced competition and opportunities for new participants in the grape export sector.

The scientific analysis of fresh grape exports from Peru highlights the importance of market diversification and competitiveness as determining factors for sustained growth
and resilience of the sector in the face of global volatility and trade challenges. The exploration of market diversification is fundamental in the context of the internationalization of companies, especially given the relative stability in the number of export destinations observed in recent studies. This stability underlines the importance of continuing to explore new markets and adapt internationalization strategies to maintain competitiveness. The research highlights the benefits of concentrating on specific markets, such as growth in volume and value, but also warns about the risks of excessive dependence, which become evident in periods of economic and political uncertainty at the global level.

The analysis of the revealed comparative advantage highlights how Peru has consolidated its position in certain markets, like the United States, while facing challenges in others, including the Netherlands and Mexico. This underscores the need for trade policies and export strategies that are specific and flexible to the dynamics of international trade, adapting to the unique conditions and opportunities of each market. Additionally, the assessment of the Herfindahl–Hirschman index illustrates the importance of advancing in market and business diversification to avoid concentrations that limit competitiveness. Strategies such as encouraging innovation, supporting new market entrants, and fostering strategic alliances can be key to promoting a more competitive and diversified business environment.

This analysis contributes to the scientific literature by connecting market diversification with economic stability and growth in a global uncertainty framework. Utilizing indicators like the RCA and HHI, it provides a profound view of how adapting business strategies to the specificities of each market can reduce risks and enhance competitiveness. This study emphasizes the relevance of adopting diversification strategies that are both adaptive and specific to each market to manage dependencies and promote more resilient and competitive foreign trade. Highlighting the importance of adaptive market diversification strategies, the study suggests concrete paths for mitigating risks and seizing opportunities in a fluctuating global economic landscape. For companies looking to expand their international reach, adaptability and sensitivity to specific market dynamics emerge as critical factors for success. This implies not only identifying and entering new markets but also quickly adjusting operations and marketing strategies in response to changes in the economic and political environment. For policymakers, the study underscores the need to create environments that facilitate innovation and entrepreneurship, thereby promoting the entry of new actors and the development of disruptive technologies that can pave new ways for diversification and economic growth.

6. Recommendations

In light of the evident dependence of the Peruvian viticulture sector on specific markets, it is crucial to maintain and expand the strategy of geographical diversification. Exploring new markets and emerging commercial niches can help mitigate the risks inherent in reliance on a limited number of export markets. To maintain the strengthening of the sector internationally, continuous monitoring of market trends and global trade conditions is recommended.

The growth of the Herfindahl–Hirschman index (HHI) suggests an increase in market concentration. Therefore, constant analysis of this indicator is necessary to identify any signs of excessive dependence on certain markets. Given the stability in the range of the HHI among companies, an environment of fair competition should continue to be promoted, allowing a uniform market distribution, stimulating innovation, and enabling new players to enter the sector. Finally, it is recommended to analyze the factors contributing to price volatility and profitability, a topic deserving further research for strategy design.

The integration of complementary analyses to the Herfindahl–Hirschman index and the revealed comparative advantage is essential to capture the complexity of the grape export sector in Peru. These additional analyses should address factors such as sustainability practices and the impact of environmental certifications, which are determinants in
the perception and demand of the global consumer, thereby strengthening the competitiveness of Peruvian exports in markets focused on sustainability. The study of value chains is crucial to understanding the interactions from production to international commercialization, including logistics and marketing. This approach can uncover how to increase added value at different stages of the chain, optimizing the global competitiveness of the sector. Analyzing consumption trends and preferences in target markets is vital. Understanding consumer dynamics allows Peruvian exporters to adjust their products and marketing strategies, improving their market positioning and profit margins.


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**References**


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