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EFFECTS OF FOOD EXPORTS ON ECONOMIC GROWTH: FRESH INSIGHTS FROM ITALY

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ABSTRACT

This paper aims to explore the relationship between food exports and economic growth in Italy. To achieve this objective, we utilize annual data spanning from 1990 to 2021, employing cointegration analysis and the ARDL Model. The empirical findings reveal a positive impact of food exports on long-term economic growth. However, despite this positive correlation, our examination of stylized facts uncovers a downward trend in the share of food exports over the analysis period. While acknowledging the role of food exports as a contributor to economic growth, this underscores the need for the Italian authorities to acknowledge the sector's significance and implement new economic policies and trade reforms to fortify this area of economic activity.

Keywords: *Food exports, Economic growth, Cointegration analysis, ARDL Model, Italy*

JEL: F11; F14; O47; O52; Q17; Q18

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Introduction

The eradication of hunger and malnutrition is one of the uttermost defies paving humanity. As the number of people facing life-threatening hunger is set to double globally, solutions that attack every link in the food system are essential. The global problem of hunger is best described as food insecurity. There is an urgent need to tackle the problem of global food security, as recognized by the United Nations in the Sustainable Development Goals (SDGs). SDG 2 calls for ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture by 2030. These are huge challenges for the entire planet, which require cooperation and international reforms. Many agricultural policies are taking part with the declared goal of increasing food production and therefore improving food security. State intervention in agricultural markets in the form of export subsidies or restrictions often leads to higher prices of basic foodstuffs, which affects the food security of poor households.

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On the other hand, the existence of strong and effective systems capable of strengthening resilience and risk management in the agricultural sector are also essential as they contribute to strengthening food security at the national and global levels. Exports are of crucial importance for the Italian economy as they represent an important part of its GDP and allow the creation of many jobs. Italy is one of the world's largest exporters, with exports accounting for about 30% of its GDP. It mainly exports manufactured goods such as machinery, electrical equipment, automobiles, foodstuffs, medicines, and cosmetics. Exports are a vital source of income for many Italian businesses, especially SMEs which make up many businesses in the country.

Italian companies must therefore be competitive in international markets to maintain their position in the global market. Exporting is more important for Italy as it faces weak economic growth and high unemployment. Exports can help stimulate economic growth and create new jobs. Finally, the importance of exports for Italy is reinforced by the brief history of the euro. Before the introduction of the single currency, Italy had regularly devalued its national currency to boost its exports by making its products cheaper in foreign markets. With the euro, this is no longer possible, which further reinforces the importance of exports for the Italian economy.

Food exports play a vital role in the Italian economy, representing a significant share of the country's total exports. Italy is globally recognized for its fine cuisine and quality food products, such as pasta, wine, olive oil, cheese and charcuterie. These food exports have a significant impact on the Italian economy on several levels. First, they stimulate job creation and maintain economic activities in the regions producing these products. This helps support local communities and reduce unemployment. Furthermore, Italian food exports have an important cultural role, allowing Italy to promote its culture and culinary heritage internationally. Italian cuisine is a true ambassador of the country's culture, and these exports reinforce the global recognition of this cultural wealth. The quality, diversity and authenticity of Italian food products generate strong demand in international markets. This means that Italy can benefit from this growing demand and thus contribute to its economic growth. Additionally, the export of Italian food products plays a vital role in reducing the country's trade imbalance, increasing export earnings and improving the overall trade balance.

For this reason, the aim of this work is to investigate the impact of food exports on economic growth in the case of Italy. To accomplish this objective, we will outline the essential patterns of food exports and economic growth in the second section. The third section will encompass our literature review. In the fourth section, we will delineate our empirical methodology, with a focus on data collection and the chosen model. The fifth section will showcase our empirical findings. Lastly, in the sixth section, we will present our conclusions and provide recommendations.

Food Exports and Economic Growth in Italy

Italy has an economy strongly oriented towards foreign trade, which has been constantly increasing in terms of quantity and value for many years. Although Italy is a country poor in raw materials, most trade does not concern these goods: even if we consider oil and natural gas, which, in terms of value, comprise a significant share of imports, most trade movements are in manufactured goods and take place with industrialized countries. In 2016, for the tenth consecutive year since the International Trade Center (ITC, UNCTAD and WTO agency) in Geneva began its market analysis, Italy remains the second most competitive country in world trade after Germany. In fact, we will highlight in this section the evolutions and characteristics of economic growth, exports, imports, and exports of food in the Italian context.

Economic Growth in Italy

The passage characterizes Italy as an industrialized nation with a diverse economic landscape, boasting a noteworthy Gross Domestic Product (GDP) both in total and per capita. As of 2017, Italy held the position of the world's eighth-largest economy, trailing behind major players such as the United States, China, Japan, Germany, the United Kingdom, France, and India. The 1970s presented a formidable challenge for Italy and Europe due to the initial oil shock, triggering an extended crisis in heavy industries. Despite these difficulties, the light manufacturing sectors successfully navigated the challenges, playing a pivotal role in rejuvenating the Italian economy, particularly in terms of exports. This rejuvenation was accomplished by targeting areas that had historically experienced prolonged economic stagnation. The resurgence was credited to the industrialization of specific regions, driven by the impressive performance of a production organization model that emerged in the 1960s. This model involved the clustering of small and medium enterprises (SMEs) into networks centered around the production of a specific range of products. This collaborative and interconnected approach enabled these regions to combine resources and expertise, contributing significantly to the broader economic recovery. It reflects a transition towards more agile and adaptable industrial structures, with SMEs playing a notable role in propelling economic growth, especially in the export domain.

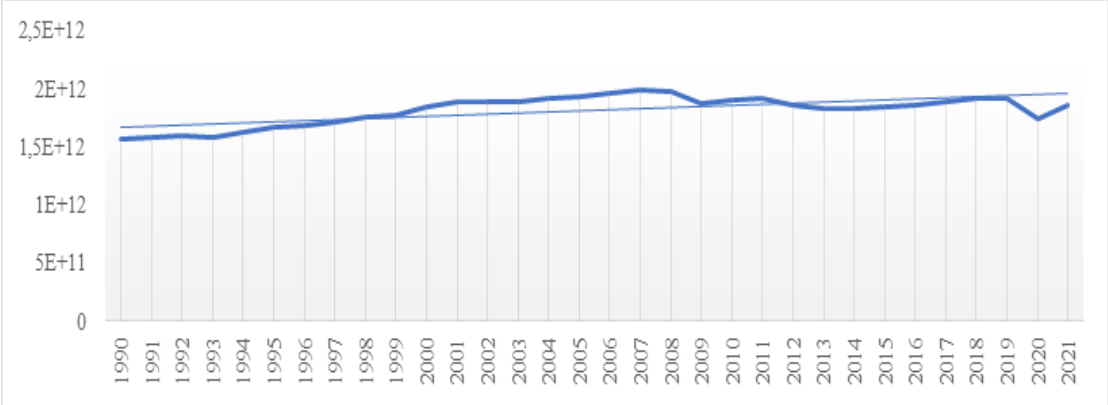

Figure 1: Trend of Gross Domestic Product at Constant Price

Source: World Bank Indicators

Over the past few decades, Italy has diligently adhered to a stringent fiscal policy to align itself with the economic and monetary standards mandated by the European Union. This commitment not only allowed Italy to embrace the euro at its inception in 1999 but also enabled the nation to sustain moderate interest rates and maintain low inflation levels. Despite its seamless integration into the Eurozone, Italy has faced a persistent challenge of economic performance lagging behind the European average since the 1990s. In light of this ongoing economic struggle, the Italian government has proactively embarked on a series of reforms. These reforms are strategically designed to bolster the country's competitiveness in the short term while fostering sustainable economic growth in the long term. The primary objective of these comprehensive reforms is to address the economic disparities Italy has faced and propel the nation towards a more robust and competitive position within the international economic landscape. By implementing these measures, the government aims not only to overcome immediate economic challenges but also to enhance Italy's overall standing and influence on the global economic stage. These efforts signify a concerted push to ensure Italy's economic resilience and competitiveness in the face of evolving international economic dynamics.

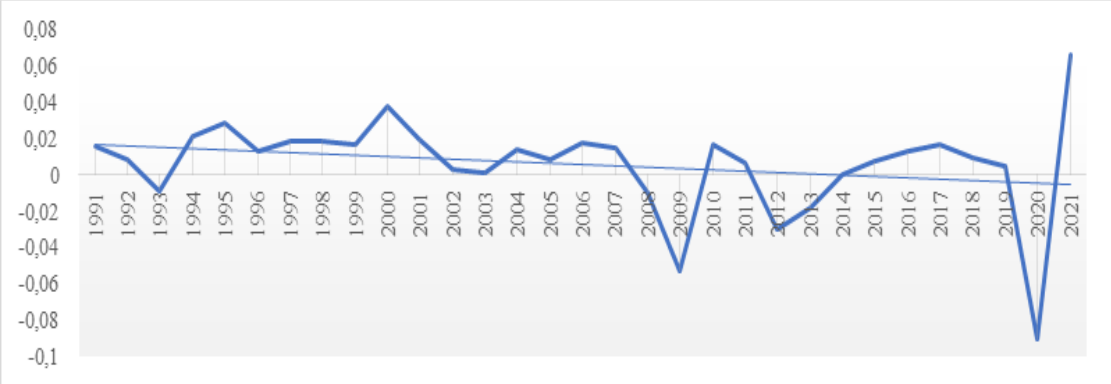

Figure 2: Trend of the Growth Rate of the Gross Domestic Product at Constant Price

Source: World Bank Indicators

However, implementation of reforms, such as reducing compulsory fees, easing the labor market, and reforming the onerous pension system, progressed slowly due to a sluggish economy, trade union opposition, and government instability. The economic crisis of 2008 shook the country severely, as it suffered two severe recessions (2008-09, 2011-13), along with a background social crisis and an unprecedented restructuring of its banking system. However, since 2012, Italian exports, especially in specialized sectors such as fashion, machine tools, automation, agrifood, pharmaceutical industry and high technology, have been increasing very strongly every year, with a record reached in 2017. Italy's GDP in constant prices fell by 10% between 2008 and 2017, and despite very good export performance, the country's industrial production in 2017 remained 20% below its pre-crisis level, due to a sharp decline. In domestic demand 7.8. In Figure 1, it is evident that Italy's constant-price gross domestic product exhibits a consistent upward trajectory over the period from 1990 to 2021. Turning to Figure 2, we observe a contrasting trend in the growth rate of Italy's constant-price gross domestic product over the period from 1991 to 2021, primarily driven by the economic crisis that struck the nation in 2008. This crisis resulted in adverse impacts on both domestic demand and investment, ultimately leading to a decline in the growth rate of the gross domestic product.

Trade in Italy

Since the beginning of the 1990s, the trade balance (and therefore also the balance of payments) has registered significant surpluses with intra-Community trade, which is growing rapidly, and also with extra-Community trade, which is increasing sharply in terms of the quantity of goods imported, but given the low price of raw materials, falling in value. This means that Italy continues to import more and more, but at decreasing costs. The trend started in 1992 when, for the first time, a very small surplus was recorded, multiplied by ten during the following year due to the devaluation of the Italian lira (that of September 1992 and subsequent ones) and the reduction of imports for the contraction of domestic demand. Even when, in the following years, domestic consumption began to increase again and, with it, imports, exports remained considerably more important in terms of value.

Although many non-Italian operators and observers consider these devaluations to be competitive devaluations (i.e., deliberately generated to make Italian sales abroad more advantageous), the rise in exports and the surplus in the trade balance continued to occur even in the years after 1996 (stabilization of the exchange rate and return to the EMS). Between 2005 and 2008, Italian exports increased by 16.6% in average unit value and by 5.5% in volume.

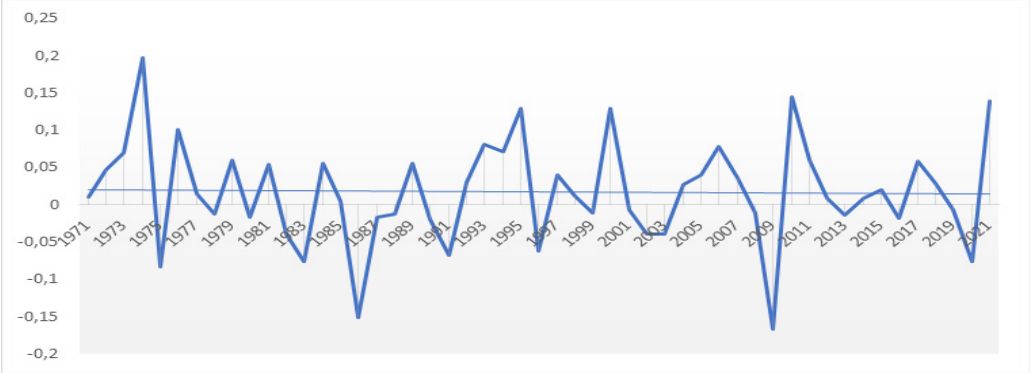

Figure 3: Evolution of the Growth Rate of the Share of Trade Openness (% of GDP)

Source: World Bank Indicators

On the contrary, although imports increased by only 0.5% in volume, they rose by 22.9% in average unit value, largely due to the rise in commodity prices. In 2009, a year of crisis, there was a serious collapse in foreign trade volumes, particularly for exports, while the average import-export unit value remained almost stable, slight drop. In 2012, Italy's trade balance returned to surplus, and in that year, it ranked 31st globally. In 2013 Italian export returned to pre-crisis levels and in the same year the trade surplus was the 16th largest in the world, 10th in 2014 and 8th in 2015. In 2016, the Italian trade balance recorded a surplus of 51.566 billion euros (up almost 10 billion compared to the surplus of 41.807 billion in 2015), the highest level since 1991, when the start of the time series.

During the period 1971 - 2021, Figure 3 shows that the growth rate of trade openness (% of GDP) is characterized by a downward trend. Indeed, there are several reasons that explain the downward trend of trade openness in Italy. Among these reasons, it can be noted that the Italian economy is strongly affected by foreign competition, especially from Asia, which produces goods at lower costs. This competition led to a drop in Italian exports and an increase in imports. Another reason is that Italy has experienced very low economic growth in recent decades, which has hampered the growth of trade and foreign investment. Likewise, Italy has experienced chronic political instability which has discouraged foreign investment in the country. Regular government changes and political crises have also created uncertainty that has hampered trade. Finally, it can be noted that the Italian state has traditionally played an important role in the economy, especially in strategic industries such as energy and transport. This intervention has often been perceived as a brake on commercial freedom.

Food Sector in Italy

The food industry in Italy boasts a deep-rooted culinary legacy that spans centuries. Italian cuisine, renowned globally for its diversity, rich flavors, and authenticity, reflects the nation's passionate commitment to cooking with high-quality ingredients. From iconic pasta and pizza to an array of cheeses, olive oils, wines, and desserts, Italy offers a spectrum of dishes that encapsulate its culinary heritage and inventive spirit, drawing inspiration from authoritative sources such as Parasecoli (2019), Middione (2021), Montanari & Brombert (2015). Italy stands out for its commitment to producing top-tier food items, often crafted using traditional methods handed down through generations. Parmigiano-Reggiano and mozzarella are hailed as the finest cheeses globally, while Italian extra virgin olive oil is renowned for its purity and robust flavor. The excellence of Italian wines, ranging from Chiantis to Barolos, is widely acknowledged, as highlighted in works by Palma (2018), Vaquero et al. (2022), and Piñeiro et al (2022). Functioning as a major player in global food exports, Italy's food products are in high demand worldwide, significantly contributing to the nation's economy. The export

portfolio encompasses a diverse array of items, spanning from fresh produce to processed goods. Notably, Italian pasta, sauces, cured meats, and wines enjoy widespread popularity on the international stage.

Italy also attracts numerous tourists in search of authentic culinary experiences. Culinary tourism is booming, with visitors from around the world coming to sample Italian specialties at local trattorias, open-air markets, and picturesque wine cellars. Italian regions are famous for their regional specialties, adding a cultural dimension to the exploration of Italian cuisine {Inspired from: Ingrassia et al. (2022), Black (2012), Kostioukovitch (2009)}. While Italy values its culinary traditions, the food sector is not immune to innovation. Italian companies constantly seek ways to improve quality, sustainability, and technology in food production. More and more businesses are adopting environmentally friendly practices, including organic farming and the production of organic products. Italy maintains high-quality standards for its food products. Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) labels are common, guaranteeing the authenticity of products and their connection to specific regions of the country. These standards contribute to the reputation of Italian products for quality {Inspired from: Wilson (2002), Bolognini (2018), Hajdukiewicz (2014), Sampalean et al. (2021), Mora & Menozzi (2009)}. The food sector in Italy is a national treasure that combines tradition, quality, diversity, and innovation. It embodies the Italian passion for cuisine and remains an essential economic driver for the country.

Food Exports in Italy

Italy stands out as the leading European producer of gastronomic products boasting designations of origin or typical characteristics, and it holds the second position in agricultural production within Europe, trailing behind only France. This agricultural prowess is underscored by its global rankings: Italy ranks first worldwide in artichoke production, second in grape and olive production, third in kiwis, peaches, and nectarines, fourth in apricots, fifth in pears, seventh in tomatoes and cherries, and is a significant global producer of commodities such as wine, pasta, hazelnuts, canned vegetables, meat, and oilseeds. Moreover, Italy has earned the distinction of being the fourth-largest food exporter in the European Union, following the Netherlands, Germany, and France. Simultaneously, it stands as the eighth-largest global importer of agri-food and seafood products. This data reflects Italy's pivotal role in both the European and global agricultural and gastronomic landscape. The country's agricultural output, diverse range of products, and prominent position in international trade underline its significance as a major contributor to the world's food industry. The intricate combination of quality, tradition, and innovation in Italian agriculture positions the country as a key player in the global agri-food sector.

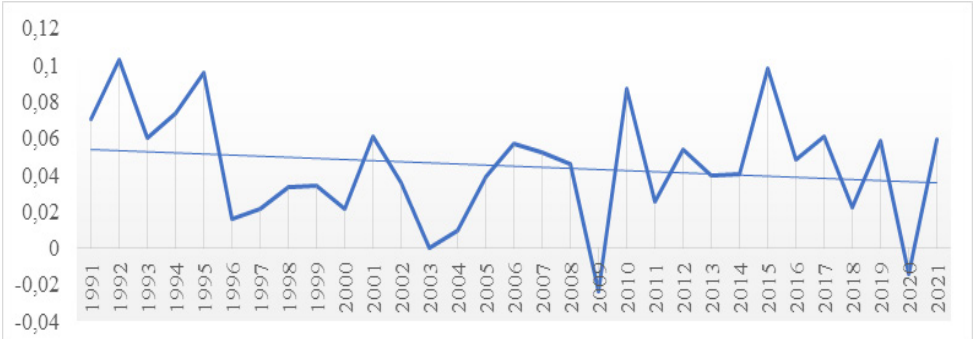

Figure 4: Trend of Growth Rate of Food Exports at Constant Price during the Period 1991-2021

Source: World Bank Indicators

The main exported products are cheese (4th world exporter), olive oil (2nd world exporter), wine (2nd world exporter) and tomatoes (1st world exporter of peeled tomatoes). Italy's main customers are Germany, France, the United States, and the United Kingdom. Italy is the 2nd world importer of cheese and pork, 3rd importer of coffee and 4th importer of wheat. In 2019 Italian imports of agricultural products amounted to EUR 40.3 billion, while exports reached more than EUR 44.7 billion, the country's agricultural trade balance being in surplus.

Figure 4 illustrates a notable decline in food exports from Italy over the period 1991-2021. This downward trajectory could be influenced by various factors, including heightened competition from other food-producing nations, fluctuations in the global market, shifts in consumer preferences, and disruptions in the supply chain due to events such as global economic crises. To provide a more nuanced and accurate analysis of this trend, a detailed examination of international trade data, coupled with an exploration of Italian government policies, becomes essential. By delving deeper into these aspects, a comprehensive understanding of the dynamics influencing the decline in food exports can be attained. The subsequent section of our discussion will delve into a thorough review of relevant literature to shed additional light on this complex phenomenon.

Literature Review

The purpose of this section is to introduce prior empirical studies that have explored the subject matter that informs our empirical methodology, as presented in the fourth section. This section is divided into two parts. In the first segment, we will review recent research concerning the relationship between exports and economic growth. Exports can stimulate economic growth by stimulating economic activity and creating jobs. The export of goods and services allows companies to increase their production and benefit from an economy of scale. It can also lead to increased investment in export-related infrastructure and improved productivity. Exports can also improve a country's trade balance by generating foreign currency earnings, which can help reduce the trade balance deficit. Furthermore, being export-oriented can encourage firms to focus on innovation and adopt effective management practices to compete in global markets. However, depending on exports can make an economy more vulnerable to fluctuations in global demand and economic shocks that affect importing countries. Therefore, economies need to diversify their sectors to reduce their dependence on exports. Indeed, the diversification of exports is essential for the economic development of a country because it allows the latter to reduce its dependence on one or two export industries. If a country depends on only one export industry, it can be very vulnerable to price fluctuations or other disturbances in the international market. By diversifying exports, the country can reduce the risks associated with these fluctuations and increase its ability to adapt to changes in the market. In addition, export diversification allows the country to take advantage of economic growth in a greater number of international markets. This increases the possibility of finding new markets where it can export its products and services, which can stimulate the economic growth of the country and increase employment. Finally, export diversification can also help promote competitiveness and innovation. By being more exposed to a variety of markets, the country can adapt to the demands of each of these markets and thus develop new technologies and new products. This can help ensure that the country remains competitive in the international market and boost its long-term economic growth. It is for this reason, we will attack in the second paragraph of this section, the recent works that describe the link between food exports and economic growth.

Exports and Economic Growth

A comprehensive exploration of the relationship between exports and economic growth has been the subject of numerous investigations. This section aims to provide a comprehensive overview of recent research findings in this domain. In the context of North African nations, a study conducted by Ben Yedder et al. (2023) revealed intriguing insights. Using the Panel CS - ARDL model, the research indicated that exports did not exhibit a clear impact on economic growth from 1990 to 2021. The dynamics of this relationship were further elucidated through an analysis of the Brazilian scenario by Bakari et al. (2021a). Their findings, based on cointegration analysis and the VECM model over the period 1970-2017, demonstrated that exports exerted a positive influence on long-term economic growth. Shifting focus to Ethiopia, Tessema (2016) delved into the correlation between exports and economic growth from 1995 to 2014. His empirical investigation yielded evidence supporting the notion that exports played a pivotal role in driving economic growth in the Ethiopian context. Turning attention to Italy, Bakari & Saaidia (2018) conducted an examination spanning from 1985 to 2015. Employing cointegration analysis and the VAR model, their research concluded that there was no discernible causal relationship between exports and economic growth in Italy. Further complicating the narrative, Bakari et al. (2021b) explored the relationship between exports, imports, and economic growth in Tunisia from 1971 to 2015. Surprisingly, their findings suggested no significant relationship between these variables. In contrast, Bakari (2019) investigated the causality relationship between exports, imports, and economic growth in Morocco. The result, indicating that only economic growth had a discernible causal effect on exports, suggests that, in the context of Morocco's economic dynamics, the growth of the overall economy plays a pivotal role in influencing the volume or performance of exports. In simpler terms, as the economy of Morocco expands or contracts, there is a consequential impact on the country's export activities.

In the context of Vietnam, Nguyen (2017) conducted a thorough investigation spanning the period from 1986 to 2015. Employing cointegration analysis and the ARDL model, the research revealed a counterintuitive negative long-term effect of exports on economic growth, with no significant short-term relationship identified. This nuanced finding suggests a complex interplay between export activities and the broader economic landscape in Vietnam. Shifting focus to Turkey, Tapşın (2016) analyzed the causal relationship between exports and economic growth from 1974 to 2011 using the Toda and Yamamoto causality method. Surprisingly, the results indicated no clear connection between exports and economic growth in the Turkish context, emphasizing the need for context-specific examinations of this relationship. In the Canadian context, Bakari (2016a) delved into the relationship between exports and economic growth over the period 1990 to 2015. Employing the VAR model and Granger-Causality tests, the empirical findings showcased a bidirectional causality, indicating that exports influenced economic growth, and vice versa. This bidirectional causality suggests a symbiotic relationship between exports and economic growth in Canada during the specified timeframe. Meanwhile, in the complex economic landscape of India, Fakraoui & Bakari (2019) explored the nexus between exports and economic growth from 1960 to 2017. The research yielded intriguing results, indicating no long-term relationship between exports and economic growth. However, a short-term effect of exports on economic growth was identified, underscoring the temporal nuances in the impact of export activities on the Indian economy.

Nopiana et al. (2022) conducted an examination in the context of Indonesia spanning from 1989 to 2018. Their findings unveiled a distinctive negative impact of exports on economic growth. This unexpected result prompts a closer look at the unique economic dynamics within

Indonesia during the specified timeframe, raising questions about the factors contributing to this counterintuitive relationship. Shifting focus to the United States, Bakari & Tiba (2019) undertook a study covering the period from 1970 to 2016. Their research, utilizing cointegration analysis and the VECM model, established a positive long-term impact of exports on economic growth. This suggests that, in the U.S. context, export activities played a significant role in fostering sustained economic growth over the specified timeframe, highlighting the diverse outcomes observed in different global economies. In the German economic landscape, Bakari (2017c) delved into the nexus between exports and economic growth over the period 1985 to 2015. Through a comprehensive approach involving cointegration analysis, VAR modeling, and Granger Causality Tests, the research concluded that exports indeed promoted economic growth in Germany. This positive correlation aligns with the understanding that Germany, as a major global exporter, has benefited from its export-oriented economic model, indicating a favorable relationship between export activities and economic growth.

Zhu et al. (2022) conducted a comprehensive assessment using the Wald test and VECM model to explore this relationship in Asian countries from 1981 to 2016. Their findings revealed a positive impact of exports on economic growth, indicating that, in the context of these Asian nations, export activities contributed positively to overall economic growth during the specified timeframe. Shifting attention to Spain, Bakari (2021) employed cointegration analysis and the VECM model to investigate the connection between exports and economic growth from 1970 to 2017. The research confirmed a positive long-term effect, suggesting that in Spain, exports played a crucial role in fostering sustained economic growth over the specified period. In the context of Africa, Bakari (2022a) conducted a thorough analysis spanning from 1960 to 2018, utilizing a variety of econometric methods. The results of this extensive examination showcased a positive bidirectional relationship between exports and economic growth across the African continent. This positive correlation suggests that, in the African context, exports and economic growth are mutually reinforcing, underscoring the potential for export activities to drive economic development. Examining China, Bakari et al. (2019a) discovered a positive short-term and long-term impact of exports on economic growth over the period from 1960 to 2015. This finding aligns with the broader narrative of China's rapid economic development, where exports have played a pivotal role in driving overall economic growth. Turning to Uruguay, Bakari et al. (2019b) delved into the intricate connections between exports, domestic investment, imports, and economic growth from 1960 to 2017. Their results indicated that, in the long run, exports, imports, and domestic investment did not significantly impact economic growth. However, in the short term, exports had a positive influence. This nuanced finding suggests that, in Uruguay, the relationship between exports and economic growth may be more immediate and dynamic in the short term.

In a comprehensive study focusing on the top ten richest Asian countries, Bakari et al. (2022) investigated the impact of trade openness on economic growth from 1990 to 2020. Utilizing static gravity modeling and various statistical methods, their findings indicated a positive influence of trade openness on economic growth within these nations. This suggests that a more open and expansive approach to international trade positively contributed to the economic development of these Asian countries during the specified period. Shifting focus to Greece, Bakari (2022b) scrutinized the intricate relationship between exports and economic growth over the period from 1970 to 2020. The analysis, employing cointegration analysis and VECM modeling, revealed no significant long-term connection between exports and economic growth in the Greek context. This nuanced finding underscores the complexity of the relationship between exports and economic growth and highlights the unique economic

dynamics within Greece. In a broader analysis encompassing 28 developed countries from 1998 to 2021, Bakari (2022c) explored the interplay between exports, domestic investment, and economic growth. The results of this investigation indicated that exports strengthened the positive relationship between domestic investment and economic growth in these developed nations. This suggests that, in developed countries, exports played a reinforcing role in enhancing the positive impact of domestic investment on overall economic growth. Turning attention to emerging Asian countries, Sultanuzzaman et al. (2019) investigated the impact of exports on economic growth from 2000 to 2016. Employing the Generalized Method of Moments (GMM) model, their findings indicated a positive effect of exports on economic growth within these emerging economies. This suggests that, during the specified period, exports played a crucial role in driving economic development in emerging Asian countries.

Tang & Abosedra (2019) assessed 23 Asian countries from 2010 to 2016 and discovered a positive relationship between exports and economic growth. This finding suggests that, during this period, the export activities of these Asian nations played a contributing role in fostering overall economic development. In Luxembourg, Usman et al. (2012) explored the connection between exports and economic growth from 1975 to 2009, reporting a positive effect of exports on economic growth. This outcome highlights the beneficial impact of export activities on the economic growth trajectory of Luxembourg during the specified timeframe. Shifting focus to India, Subhan et al. (2021) studied the nexus between exports and economic growth using the VAR model and annual data from 1961 to 2015. Their empirical analysis suggested a positive impact of exports on economic growth in India. This positive correlation underscores the role of exports in contributing to India's economic development during the examined period. In Nepal, Panta et al. (2022) examined the relationship between exports and economic growth from 1965 to 2020 using the VECM model. Surprisingly, their analysis identified no long-term association between exports and economic growth in Nepal. This nuanced finding suggests that, in the context of Nepal, the relationship between exports and economic growth may be more complex and influenced by various factors. In four Southern African countries, Tivatyi et al. (2022) investigated the relationship between exports, imports, and economic growth from 1980 to 2019. Their comprehensive analysis, incorporating cointegration, VAR modeling, and VECM modeling, revealed that exports positively influenced economic growth in these Southern African nations. This positive impact indicates the vital role played by exports in driving economic development in this region. In a study involving Indonesia, Malaysia, Thailand, and the Philippines, Lam (2016) identified a two-way causal relationship between exports and economic growth. This finding suggests a mutually reinforcing dynamic where exports and economic growth positively influence each other in these Southeast Asian nations. In Mauritania, Bakari & Krit (2017) explored the causality between exports and economic growth from 1960 to 2015, concluding that exports had a causal effect on economic growth. This causal relationship underscores the pivotal role of exports in shaping the economic trajectory of Mauritania. Turning attention to Pakistan, Jan et al. (2019) investigated the impact of exports on economic growth from 1981 to 2016. Their findings indicated that exports had a positive impact in the long run, highlighting the enduring contribution of export activities to Pakistan's economic growth. In Iraq, Abdulla & Ali (2019) studied the causal relationship between exports and economic growth, indicating that exports positively affected economic growth in the long run. This positive causal relationship emphasizes the role of exports as a driving force in Iraq's long-term economic development.

Shah et al. (2020) conducted a study in Pakistan spanning from 1976 to 2015, revealing that exports played a promotive role in economic growth in the long run. This positive impact suggests that, over the examined period, Pakistan's export activities contributed significantly

to the country's overall economic development. In the context of India, Reddy (2020) explored the connection between exports and economic growth from 1980 to 2019. The research established a bidirectional relationship, indicating that economic growth and long-term exports influenced each other positively. This finding highlights the mutually reinforcing nature of the relationship between India's export activities and its economic growth over the specified timeframe. Analyzing the case of Panama, Bakari & Mabrouki (2017a) delved into the causal relationship between exports and economic growth from 1980 to 2015. Their findings indicated that exports had a causal effect on economic growth in Panama. This causal relationship suggests that the export sector played a pivotal role in shaping Panama's economic trajectory during the examined period. Turning to Peru, Bakari et al. (2020) investigated the nexus between exports and economic growth from 1970 to 2017. Surprisingly, their analysis concluded that there was no long-term relationship between exports and economic growth in Peru. This nuanced finding suggests that other factors or specific economic dynamics may have influenced the absence of a sustained relationship between exports and economic growth in the Peruvian context. In the case of Nigeria, Bakari et al. (2018c) studied the nexus between exports and economic growth from 1981 to 2015. Their findings indicated no significant relationship in either the long run or the short run. This result suggests that, during the specified period, the relationship between exports and economic growth in Nigeria may have been influenced by factors other than direct causation. In Japan, Bakari (2017b) examined the impact of exports on economic growth from 1970 to 2015, determining those exports had a positive influence. This positive correlation suggests that, in the Japanese context, export activities played a constructive role in driving economic growth over the examined period. The study conducted by Akermi et al. (2023) aimed to understand the impact of exports on economic growth in Albania over the period spanning 1996 to 2021. To do this, they used advanced analytical methodologies such as cointegration analysis, the VECM (Vector Error Correction Model) and the WALD test. The results of their empirical analysis indicated that there was no causal relationship between exports and economic growth, either in the short term or in the long term. In other words, Albania's exports do not seem to exert a significant influence on the country's economic growth, neither in the short nor in the long term, according to the parameters assessed by the statistical methodologies employed. This conclusion suggests that other factors or variables could play a more determining role in Albania's economic growth dynamics during the period studied.

The exploration of the relationship between exports and economic growth traverses a diverse terrain, offering a mosaic of findings that highlight the contextual and temporal nuances inherent in this complex dynamic. From North Africa to Asia, from developed economies to emerging nations, the research findings presented underscore the variability in the impact of exports on economic growth. While some regions exhibit positive long-term effects, others reveal unexpected negative correlations, and certain countries manifest bidirectional causality. This heterogeneity prompts a nuanced understanding of the intricate interplay between exports and economic growth, emphasizing the need for tailored, context-specific analyses. As the global economy continues to evolve, further investigations into this relationship will be essential for policymakers, economists, and stakeholders alike to navigate the intricate pathways of economic development.

Food Exports and Economic Growth

The exportation of food products provides a nation with an avenue to augment its revenue through international sales. This, in turn, can serve as a catalyst for economic growth by generating funds that can be channeled back into the economy. Furthermore, the exportation

of food items can play a pivotal role in job creation, fostering employment opportunities not only in the agricultural sector but also in interconnected industries such as transportation and food processing. It is worth noting that in order to meet the demands of global markets, food export businesses must remain competitive in terms of both quality and cost, thus prompting investments in efficiency and innovation. These investments, in turn, enhance overall sector productivity and competitiveness. Moreover, food exports contribute to the expansion of international trade, serving as a catalyst for increased investment and economic development. However, it's essential to recognize that food exports can have adverse repercussions as well. If a country becomes excessively reliant on food exports for its economic growth, it becomes susceptible to disruptions in international markets or fluctuations in commodity prices, potentially making its economy vulnerable. Additionally, over-reliance on agriculture for exports can lead to an over-concentration of land and resources in this sector, potentially undermining economic diversification and food security in rural areas.

For instance, in the case of Ethiopia, Yifru (2015) conducted a study to explore the connection between agricultural exports and economic growth over the period from 1973 to 2013. His analysis, utilizing Granger causality tests, revealed that agricultural exports had a positive influence on economic growth. Conversely, Shah et al. (2015) examined the impact of agricultural exports on economic growth in Pakistan during the period from 1972 to 2008, finding a negative effect of agricultural exports on economic growth. In Nigeria, Ijirshar (2015) delved into the nexus between agricultural exports and economic growth from 1970 to 2012. By applying cointegration analysis and error correction models, the study showed a positive long-term relationship between agricultural exports and economic growth.

A broader analysis across North African countries by Bakari & Mabrouki (2018) encompassed the impact of agricultural exports on economic growth over the period from 1982 to 2016, revealing a positive effect on economic growth. Moreover, Adeabah & Asongu (2024) conducted a meta-analysis to investigate the effect of agricultural exports on economic growth in Africa, establishing a positive relationship. In South-Eastern European countries, Bakari & Mabrouki (2017b) investigated the impact of agricultural exports on economic growth from 2006 to 2016, utilizing a static gravity model and finding a positive effect. Bakari (2017a) delved into the influence of vegetable exports on economic growth in Tunisia during the period from 1970 to 2015, revealing that vegetable exports had a positive effect on economic growth in both the long run and short run.

In the context of India, Solanki et al. (2022) delved into the connection between agricultural exports and the performance of agricultural companies. Their study, conducted from 2012 to 2019 and employing GMM models, revealed an intriguing pattern. Contrary to conventional expectations, the analysis demonstrated a negative impact of agricultural exports on the performance of agricultural companies in India. Similarly, Nwokoye et al. (2021) explored the relationship between vegetable exports and economic growth in Nigeria spanning from 1988 to 2018. The results of their investigation unveiled a negative effect of vegetable exports on long-term economic growth in Nigeria. This implies that, over the extended period studied, the export of vegetables did not contribute positively to the overall economic growth of the country. Examining Tunisia, Bakari (2018) focused on the influence of citrus exports on economic growth during the period from 1970 to 2016. The findings indicated that, contrary to expectations, citrus exports did not exert a significant influence on long-term economic growth. However, there was evidence of a short-term effect, suggesting that the impact of citrus exports was more immediate in nature. Shifting to an assessment by Kappa (2022) on the influence of vegetable exports on economic growth in selected SAARC

economies over the period from 1988 to 2018, the results revealed no discernible long-term relationship between vegetable exports and economic growth. This suggests that, over the extended period studied, the export of vegetables did not exhibit a sustained influence on the economic growth of the selected SAARC economies. In the case of tea exports, Islam et al. (2021) conducted an analysis encompassing Bangladesh, India, and Sri Lanka from 1980 to 2018. Their findings pointed to a distinctive scenario: only in Sri Lanka did tea exports contribute to short-term economic growth, implying that the impact of tea exports on the economy varied across the countries studied. These diverse findings underscore the nuanced and context-dependent nature of the relationship between specific exports and economic performance, with results varying over different time frames and geographical regions.

Chantal et al. (2018) explored the effect of tea exports, coffee exports, and flowers exports in Rwanda using multiple regression analysis, revealing that only tea exports had a positive impact on economic growth. Furthermore, Bakari (2020b) studied the influence of olive oil exports on Tunisian economic growth over the period from 1970 to 2016, employing cointegration analysis and Error Correction Models, and found a positive impact of olive oil exports on economic growth, both in the long term and short term. In Pakistan, Mahmood & Munir (2018) conducted an analysis of the nexus between agricultural exports and economic growth over the period from 1970 to 2017, utilizing Johansen cointegration and Granger causality tests, and found no significant relationship between agricultural exports and economic growth. Conversely, Bakari (2016b) examined the impact of agricultural exports on economic growth in Tunisia during the period from 1988 to 2014, concluding that agricultural exports had a positive effect on economic growth. Bakari & Tiba (2022) investigated the nexus between agricultural exports and economic growth in China over the period from 1984 to 2017, using cointegration analysis and ARDL modeling. Their analysis revealed that agricultural exports caused economic growth, both in the long run and short run. Ahmed & Sallam (2018) conducted an examination in Egypt to understand the relationship between agricultural exports and economic growth. Their analysis spanned from 1970 to 2013, and the results revealed a positive impact of agricultural exports on economic growth. This positive effect was observed in both the long term and short term. In simpler terms, the study suggests that the export of agricultural products from Egypt played a constructive role in contributing to the country's economic growth over the specified period. This indicates that the income generated from agricultural exports positively influenced the overall economic expansion of Egypt, emphasizing the significance of the agricultural sector in fostering economic development in the country. The findings are relevant for policymakers and stakeholders, providing insights into the economic dynamics associated with agricultural exports in Egypt.

For Nigeria, Busari et al. (2022) conducted a study exploring the relationship between agricultural exports and economic growth from 1980 to 2018, and their results indicated that agricultural exports caused economic growth. However, in Namibia, Simasiku & Sheefeni (2017) examined the nexus between agricultural exports and economic growth over the period from 1990 to 2014, revealing no significant relationship between agricultural exports and economic growth. In Ghana, Siaw et al. (2018) found that cocoa exports had a positive effect on economic growth during the period from 1990 to 2011. Mawejje (2022) conducted a study exploring the impact of agricultural exports on economic growth over the period from 1994 to 2020, using ARDL models, and found that agricultural exports caused economic growth in both the long run and short run. Mbeeli (2019) investigated the nexus between agricultural exports and economic growth in Namibia during the period from 1998 to 2016, utilizing Granger causality tests, and the results indicated no significant relationship between agricultural exports and economic growth. In Cameroon, Njimanted & Aquilas (2015) explored

the relationship between timber exports and economic growth over the period from 1980 to 2014, employing cointegration analysis and VECM modeling, and found no significant relationship between timber exports and economic growth, both in the long run and short run. Shah et al. (2015) employed a Johansen cointegration econometric model to investigate Pakistan's economic growth. The study revealed a negative relationship between agricultural exports and economic growth, whereas a positive relationship was observed between non-agricultural exports and economic growth. The study's recommendations suggest that the Pakistani government should diversify its agricultural exports by adding value to processed products. Kang (2015) examined the Export-Led Growth (ELG) hypothesis, focusing on agricultural exports, particularly rice, across multiple countries. The study utilized the Vector Error Correction Model (VECM) and concluded that exports of agricultural raw materials, including rice, contribute to economic growth in countries such as Pakistan, Vietnam, and Thailand. Verter & Bečvářová (2016) conducted an empirical analysis in Nigeria using time series data from 1980 to 2012. Their study, based on Ordinary Least Squares (OLS) regression and Granger causality tests, did not confirm a causal relationship between the degree of agricultural openness and the country's economic growth.

Cynthia & Johannes (2017) conducted an empirical analysis, utilizing quarterly time series data for Namibia spanning from 1990 to 2014. Their research revealed that while agricultural exports demonstrated a positive impact on economic growth, this effect was statistically insignificant. On the other hand, non-agricultural exports were found to exert a direct and significant impact on Namibia's Gross Domestic Product (GDP). This suggests that, in the Namibian context, the influence of agricultural exports on economic growth may not be statistically robust, while non-agricultural exports play a more decisive role in driving the overall economy. In a similar vein, Toyin (2016) investigated the relationship between agricultural exports and economic growth in South Africa over the period from 1975 to 2012. Interestingly, the findings of this study indicated that there was no significant relationship between agricultural exports and economic growth in South Africa during the specified timeframe. This implies that, according to Toyin's analysis, the export of agricultural products did not exert a notable impact on South Africa's overall economic growth. Turning to Nigeria, Idumah & Awe (2017) conducted an assessment of the impact of timber exports on economic growth using Granger causality tests. Their results suggested that timber exports had a causal relationship with economic growth in Nigeria, indicating that the export of timber played a role in influencing the country's economic expansion. Additionally, Ibrahim (2017) explored the connection between agricultural exports and economic growth in Nigeria during the period from 1981 to 2014. Using dynamic ordinary least square analysis, Ibrahim's findings indicated a positive impact of agricultural exports on economic growth. This implies that, according to Ibrahim's analysis, the export of agricultural products contributed positively to Nigeria's economic growth over the specified time frame. In the case of Angola, Zayone (2019) employed cointegration analysis and ARDL modeling to investigate the relationship between agricultural exports and economic growth over the period from 1980 to 2017. The results indicated a positive impact of agricultural exports on economic growth in Angola. This suggests that, according to Zayone (2019)'s analysis, the export of agricultural products played a beneficial role in driving economic growth in Angola during the specified period.

The complex relationship between agricultural exports and economic growth is subject to multifaceted dynamics, as evidenced by a spectrum of studies conducted in various countries. While research across North African countries, South-Eastern European nations, and China suggests a positive correlation between agricultural exports and economic growth, disparities emerge in studies focused on countries like India, Nigeria, and Namibia. The

diverse outcomes underscore the significance of context-specific factors in determining the impact of food exports on economic development. As nations navigate the delicate balance between reaping the benefits of international trade and mitigating the risks associated with overdependence on a single sector, policymakers must heed the lessons offered by empirical research to formulate nuanced strategies that foster sustainable economic growth and diversification.

Data and Methodologies

The primary objective of this study is to assess the influence of food exports on the economic growth of Italy. To achieve this objective, it is imperative to elucidate the empirical methodology employed in this investigation. Specifically, our methodology will encompass the utilization of the Autoregressive Distributed Lag (ARDL) model as proposed by Pesaran et al. (2001). Several factors underpin our selection of this model. Firstly, the ARDL model is particularly well-suited for making empirical estimates based on relatively small datasets. Secondly, it possesses the capability to estimate variables with varying degrees of integration, encompassing both stationary variables in their levels and those in their first differences. Lastly, the ARDL model is adept at discerning the existence of cointegrating relationships between variables and establishing the direction of causality between these variables over the long term.

The empirical approach to modeling our research entails several key steps. In the initial step, we assess the order of integration for each variable through two widely recognized stationarity tests, namely the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Subsequently, we proceed to investigate the presence of a cointegrating relationship among the variables by means of Fisher's Bounds Test in the second step. The third step is dedicated to the estimation of our long-term ARDL model. To ensure the reliability and robustness of our findings, the final step involves subjecting our results to a battery of diagnostic tests.

In the domain of scientific-economic research, conducting empirical tests based on the cointegration approach adds a layer of complexity due to the intricate interdependencies among the variables under examination. To navigate this complexity, we initiate our analysis by adopting the neoclassical model, a refined framework influenced by the works of Awokuse (2007), Bakari et al. (2018a), Bakari et al. (2018b), Mahmood & Munir (2018), Abdelhafidh & Bakari (2019), Bakari (2020a), and Bakari & El Weriemmi (2022). This model is designed to investigate the causal linkage between exports and economic growth, taking into account essential factors such as capital, labor, exports, and imports. The model serves as a comprehensive tool to explore the dynamic relationships among these critical economic variables, offering a structured approach to unraveling the complex interactions that contribute to economic growth. The framework presented will be instrumental in shedding light on the intricate dynamics and causal relationships within the context of exports and economic growth.

$$Y = F[(K,L); X,M] \tag{1}$$

The augmented production function containing all these variables is formulated as:

$$Y = AK^{\alpha_1} L^{\alpha_2} M^{\alpha_3} X^{\alpha_4} \tag{2}$$

In equation (2) 'Y' designates gross domestic product, 'K' designates Capital, 'L' designates Labor, 'X' designates Export, 'M' designates Import and 'A' designates the level of technology involved in the country which is supposed to be constant. The returns to scale are associated with capital, labor, export and import which are exposed by $\alpha_1, \alpha_2, \alpha_3$ and α_4

respectively. All the variables are converted into logarithms to make linear the nonlinear form of Cobb-Douglas production. The passage describes the Cobb-Douglas production function with specific variables representing GDP, capital, labor, exports, and imports. The model incorporates returns to scale parameters for each input, and logarithmic transformation is applied to convert the nonlinear Cobb-Douglas function into a linear form for analysis. The Cobb-Douglas production function is putted in linear functional form as follows:

$$\log(Y_t) = \log(A) + \alpha_1 \log(K_t) + \alpha_2 \log(L_t) + \alpha_3 \log(X_t) + \alpha_4 \log(M_t) + \varepsilon_t \quad (3)$$

By keeping the level of technology constant, the analysis aims to focus exclusively on the relationship between exports and economic growth, without the confounding influence of technological changes. This allows for a more specific examination of the role of exports in driving economic expansion. The empirical analysis intends to explore the impact of exports on economic growth within a linear modeling framework, with careful consideration given to controlling for other factors such as capital, labor, and imports. Holding technology constant enables a more targeted investigation into the role of exports in economic development. The overhead empirical will look the impact of export on economic growth by holding technology constant. The linear model can be written as follows:

$$\log(Y_t) = \alpha_0 + \alpha_1 \log(K_t) + \alpha_2 \log(L_t) + \alpha_3 \log(X_t) + \alpha_4 \log(M_t) + \varepsilon_t \quad (4)$$

The purpose of categorizing exports into food and other categories is to gain a more nuanced understanding of the impact of different types of exports on the specified goals. This breakdown allows for a more targeted analysis of the influence of food exports versus other exports on the variables or outcomes of interest. By separating food exports from other exports, the analysis aims to capture the unique contribution of food-related trade activities to economic growth. the categorization of total exports into food exports (FX) and other exports (OX) is undertaken to achieve specific research goals. This categorization allows for a more nuanced analysis of the impact of different types of exports on economic growth within the context of the established linear model. We will divide the total export variables into two variables: a noted variable (FX) which refers to food exports and a noted variable (OX) which refers to other exports to determine our goals.

$$X = FX + OX \quad (5)$$

Equation (5) presents our export division (X) of which (FX) presents the food exports and (OX) presents the export in the other sector. In equation (6), (FX) and (OX) are relocated into logarithms in order to carry out linear the nonlinear form of Cobb–Douglas production. In this equation, the natural logarithm is applied to each component, including (FX) and (OX), to transform the Cobb-Douglas production function into a linear form. This transformation facilitates the analysis and interpretation of the model, as linear models are often more convenient for estimation and hypothesis testing in econometrics. The use of logarithms is a common practice in economics to handle multiplicative relationships in a more additive and linear manner. In this specific context, it allows for the linear modeling of the Cobb-Douglas production function, making it more amenable to empirical analysis.

$$\log(X_t) = \log(FX_t) + \log(OX_t) \quad (6)$$

When we merge equation 4 and 6, we obtain the following equation which presents our final model for our estimation. This is the combined equation, representing the final model for estimation. The model includes variables such as the natural logarithms of GDP (Y), capital (K), labor (L), total exports (X), food exports (FX), other exports (OX), and imports (M).

The coefficients represent the elasticities or returns to scale for each respective variable. This model can now be used for empirical estimation and analysis in the context of the specified economic scenario.

$$\log(Y_t) = \alpha_0 + \alpha_1 \log(K_t) + \alpha_2 \log(L_t) + \alpha_{3.1} \log(FX_t) + \alpha_{3.2}(OX_t) + \alpha_4 \log(M_t) + \varepsilon_t \quad (7)$$

In equation (7); {Y, K, L, FX, OX and M} present respectively economic growth, capital, labor, food exports, export in the other sector and import. The returns to scale are associated with food export, other export and import which are shown by $\alpha_1, \alpha_2, \alpha_{3.1}, \alpha_{3.2},$ and α_4 respectively.

In order to thoroughly examine the influence of food exports on economic growth in Italy, a comprehensive analysis will be conducted using a time series database covering the expansive period from 1990 to 2021. The dataset will be sourced and compiled from World Bank Indicators, ensuring reliable and globally recognized economic data. This temporal scope allows for a detailed exploration of the relationship between food exports and economic growth over more than three decades, providing a robust foundation for meaningful insights. The key variables to be considered in this analysis will be succinctly outlined in Table 1. This careful delineation of variables ensures clarity and transparency in the analytical process, allowing for a systematic investigation of how food exports align with and potentially impact the economic growth of Italy. By employing a well-defined dataset and focusing on pertinent variables, this analysis aims to uncover nuanced patterns and trends that contribute to a comprehensive understanding of the dynamics between food exports and economic growth in the Italian context.

Table 1: Description of Variables

No	Variable	Description	Source
1	Y	Gross domestic product (constant price)	World Bank Indicators
2	K	Gross fixed capital formation (constant price)	World Bank Indicators
3	L	Labor	World Bank Indicators
4	FX	Food exports (constant price)	World Bank Indicators
5	OX	Other exports (constant price)	World Bank Indicators
6	M	Imports (constant price)	World Bank Indicators

With a meticulously clarified empirical methodology guiding our investigation, the upcoming fifth section of our study is poised to unveil the empirical results derived from the comprehensive analysis of the impact of food exports on economic growth in Italy. Building on the rich dataset spanning from 1990 to 2021, sourced from World Bank Indicators, our empirical approach aims to discern intricate patterns, correlations, and causal relationships. By systematically examining the identified variables detailed in Table 1, we anticipate shedding light on how the dynamics of food exports have influenced Italy's economic growth over the substantial timeframe considered. In this section, we will delve into the nuanced findings, presenting a detailed account of the empirical results gleaned from our rigorous analysis. Our approach involves not only identifying statistical relationships but also interpreting the economic implications of these findings. Through a transparent and comprehensive presentation, we aim to contribute valuable insights to the existing knowledge base, providing a nuanced understanding of the interplay between food exports and economic growth in the Italian context.

Empirical Analysis

The aim of this section is to provide a comprehensive presentation of our empirical findings, encompassing various analytical steps. These include the examination of stationarity, the analysis of cointegration, the estimation of the long-term Autoregressive Distributed Lag (ARDL) model, and a scrutiny of diagnostic tests. As a crucial initial step in our estimation process, we are committed to identifying the order of integration for each variable under consideration. To achieve this, we employ both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. These tests serve the crucial purpose of assessing the stationarity of each variable. The determination of stationarity is paramount in time series analysis, as non-stationary data can lead to unreliable statistical inferences. Through the application of ADF and PP tests, we seek to ascertain the level of stationarity for each variable, laying the groundwork for subsequent analyses. This meticulous approach aligns with best practices in econometric modeling, where ensuring the stationarity of variables is a fundamental prerequisite for robust and reliable modeling. By transparently presenting the outcomes of these tests, we aim to offer a clear understanding of the initial steps in our empirical analysis and set the stage for the subsequent stages of cointegration analysis, ARDL model estimation, and diagnostic assessments.

Table 2: Results of The Stationarity Analysis

PP Test							
At Level							
		LOG(Y)	**LOG(K)**	**LOG(L)**	**LOG(OX)**	**LOG(FX)**	**LOG(M)**
C	t-Statistic	-2.2344	-1.1502	-0.9738	-3.8211**	-1.2604	-1.4873
CT	t-Statistic	-1.3811	-1.7581	-1.7899	-1.9460	-2.8431	-1.7761
At First Difference							
		d(LOG(Y))	**d(LOG(K))**	**d(LOG(L))**	**d(LOG(OX))**	**d(LOG(FX))**	**d(LOG(M))**
C	t-Statistic	-5.7347***	-4.3917***	-5.1646***	-5.6873***	-5.4537***	-5.7609***
CT	t-Statistic	-6.3306***	-4.2979***	-5.0939***	-10.7346***	-5.4482***	-5.8924***
ADF Test							
At Level							
		LOG(Y)	**LOG(K)**	**LOG(L)**	**LOG(OX)**	**LOG(FX)**	**LOG(M)**
C	t-Statistic	-2.1647	-1.0725	-0.9304	-1.9924	-1.2790	-1.4637
CT	t-Statistic	-1.5615	-1.6228	-2.1216	-2.3120	-2.8061	-1.8060
At First Difference							
		d(LOG(Y))	**d(LOG(K))**	**d(LOG(L))**	**d(LOG(OX))**	**d(LOG(FX))**	**d(LOG(M))**
C	t-Statistic	-5.7352***	-4.3917***	-5.0793***	-5.6337***	-5.4537***	-5.7595***
CT	t-Statistic	-6.2558***	-4.2851**	-4.9947***	-6.0382***	-5.4484***	-5.8210***
Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant							
MacKinnon (1996) one-sided p-values.							
C: With constant							
CT: With constant and trend							

The outcomes of the stationarity analysis are succinctly summarized in Table 2. The findings reveal a notable pattern: all variables exhibit integration of order 1, signifying that they are integrated at the first difference level. However, an exception is observed for the variable denoted as 'Log (OX),' representing other exports. Interestingly, this particular variable demonstrates stationarity in both level and first difference. Given this distinctive characteristic

of the Log (OX) variable, showcasing strong stationarity in the first difference, a strategic decision is made to consider all variables as stationary in the first difference. This choice serves as a pragmatic simplification for the subsequent modeling steps. With this acknowledgment, the Autoregressive Distributed Lag (ARDL) model becomes the selected framework for our analysis. This decision is underpinned by the recognition that first differencing renders the variables stationary, a crucial condition for the effectiveness of the ARDL model. By opting for this approach, we aim to maintain methodological consistency and ensure the robustness of our modeling strategy. The next stages of the analysis will build upon this foundation, incorporating cointegration analysis and the estimation of the ARDL model to delve deeper into the relationships between food exports and economic growth in Italy.

Moving to the second step of our analysis, we embark on verifying the presence of a cointegrating relationship among the variables incorporated in our model. This crucial evaluation is carried out using the Bounds Test, a widely recognized econometric tool for assessing cointegration. The criteria for establishing a cointegration relationship follow a well-defined econometric rule. Specifically, the static value obtained from the Bounds Test must exceed the critical value at both the bound (1) and the threshold of 1%. In other words, for a conclusive indication of cointegration, the calculated static value needs to surpass the critical threshold values determined by the Bounds Test. The importance of this step lies in its ability to provide insights into the long-term relationships among the variables. Cointegration suggests a stable, equilibrium relationship, implying that deviations from this equilibrium are temporary and tend to be corrected in the long run. By adhering to established econometric principles and rigorous statistical thresholds, we aim to robustly confirm or refute the existence of cointegration among the variables under scrutiny. This step serves as a pivotal bridge between the preliminary stationarity analysis and the subsequent estimation of the long-term Autoregressive Distributed Lag (ARDL) model, further enhancing the depth and reliability of our empirical investigation.

Table 3: Results of ARDL Bounds Test

ARDL Bounds Test		
Test Statistic	Value	K
F-statistic	12.32243	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

The outcomes of the cointegration analysis are meticulously detailed in Table 3, offering crucial insights into the relationships among the variables. A decisive observation emerges from the comparison between the calculated static value (12.32243) and the critical values obtained from the Bounds Test. Specifically, the static value significantly surpasses both the critical value at the bound (1) and the 1% threshold (4.68). This result provides a robust confirmation of the presence of a cointegration relationship among the variables in our model. The static value exceeding the critical thresholds is a clear indication that the variables share a stable, long-term equilibrium relationship. This finding is pivotal in guiding our modeling choices, affirming that deviations from this equilibrium are likely to be corrected over the long run. With the establishment of cointegration, we proceed to retain the Autoregressive

Distributed Lag (ARDL) model as the appropriate framework for our analysis. The foundational element of the ARDL model, the long-term equilibrium equation, stands as a pivotal tool for unraveling the complex dynamics and interconnections among the variables. Its formulation promises to provide an in-depth comprehension of the intricate relationships between food exports and economic growth in Italy. Each coefficient in the equation reflects the respective impact of the logarithm of its associated variable on the logarithm of economic growth. This equation encapsulates the intricate relationships and dependencies within the model, offering a quantitative framework for understanding how changes in these variables are interconnected and influence the overall economic growth in Italy over the long term.

The long-run equilibrium equation, a cornerstone of the Autoregressive Distributed Lag (ARDL) model, provides valuable insights into the dynamics between food exports and long-term economic growth. In this context, the equation suggests that food exports exert a positive influence on long-term economic growth. Specifically, our findings indicate that a 1% increase in food exports correlates with a 0.006030% increase in long-term economic growth. This positive relationship underscores the potential contribution of food exports to fostering economic growth over the long run. It suggests that as the volume or value of food exports from Italy increases, there is a corresponding positive impact on the country's economic growth trajectory. Furthermore, the long-run equilibrium equation also highlights the positive effects of other key variables. The capital variable 'Log (K),' representing capital, along with labor, other exports, and imports, all demonstrate positive associations with long-term economic growth. This implies that increases in these factors contribute positively to Italy's economic growth over an extended period. These insights from the long-run equilibrium equation offer a nuanced understanding of the intricate relationships between various economic variables. By quantifying the impact of food exports and other factors on long-term economic growth, the ARDL model provides a valuable framework for policymakers, researchers, and stakeholders seeking to comprehend and optimize Italy's economic dynamics.

Table 4: Estimation of the Long-term ARDL Model

ARDL Cointegrating And Long Run Form				
Dependent Variable: DLOG(Y)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
DLOG(K)	0.021022	0.020440	1.028463	0.3149
DLOG(L)	0.230202	0.149453	1.540303	0.1377
DLOG(FX)	0.006030	0.082955	0.072692	0.9427
DLOG(OX)	0.123208	0.048678	2.531104	0.0190
DLOG(M)	0.248220	0.056637	4.382632	0.0002
C	-0.004990	0.003461	-1.441775	0.1635
ECT	-1.237281	0.160563	-7.705893	0.0000
ECT: Error Correction Term				

The evaluation of long-term equilibrium equations becomes particularly important when considering the error correction term (ECT). The presence of a negative coefficient for the error correction term, coupled with a negative probability, adds weight to the credibility of the long-term relationships among the variables. This characteristic suggests that the system tends to rectify short-term deviations from equilibrium, reinforcing the idea of a stable, enduring connection. In Table 4, the results underscore the significance of the long-term equilibrium equation. The coefficient of the error correction term is -1.237281, with a probability value less than 5% (0.0000). This aligns with the expected characteristics of a

robust and credible long-term relationship. The negative coefficient indicates that, over time, any deviations from the equilibrium relationship are being corrected, and the probability value reinforces the statistical reliability of this correction. In light of these findings, it can be asserted that food exports play a substantial role as a source of economic growth in the Italian context. The significance of the error correction term highlights the system's capacity to adjust and maintain equilibrium over the long term, further supporting the positive impact of food exports on economic growth. To bolster the credibility and robustness of our empirical results, the next step involves subjecting our model to diagnostic tests, specifically the normality test and the Cumulative Sum (CUSUM) stability test. These tests serve as additional checks to ensure the reliability and validity of our findings, contributing to the overall strength of our empirical analysis. Essentially, these diagnostic tests provide further assurance regarding the accuracy and stability of the statistical model used to assess the relationship between food exports and economic growth in Italy.

Table 5: Diagnostic Tests

Heteroskedasticity Test: Harvey			
F-statistic	0.754975	Prob. F(7,22)	0.6297
Obs*R-squared	5.810730	Prob. Chi-Square(7)	0.5620
Scaled explained SS	6.258708	Prob. Chi-Square(7)	0.5099
Heteroskedasticity Test: ARCH			
F-statistic	0.898068	Prob. F(1,27)	0.3517
Obs*R-squared	0.933541	Prob. Chi-Square(1)	0.3339
Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.233606	Prob. F(2,20)	0.3125
Obs*R-squared	3.294418	Prob. Chi-Square(2)	0.1926

The diagnostic tests, as outlined in Table 5, play a crucial role in rigorously assessing the strength and reliability of our empirical estimates. These tests, namely the Harvey Test, ARCH Test, and Breusch-Godfrey Serial Correlation LM Test, each serve a distinct purpose in scrutinizing different aspects of our model. In econometrics, a key guideline is that the probability associated with each diagnostic test should ideally exceed 5%, indicating a level of statistical significance. In our analysis, the results from all diagnostic tests consistently reveal probabilities greater than 5%. This uniformity across all diagnostic tests provides robust evidence supporting the strength and credibility of our estimates. To delve into specifics, the Harvey Test examines heteroscedasticity, the ARCH Test explores the presence of autoregressive conditional heteroscedasticity, and the Breusch-Godfrey Serial Correlation LM Test assesses the existence of serial correlation in the residuals. The noteworthy observation that all these tests yield probabilities greater than 5% indicates that our model effectively addresses potential issues related to heteroscedasticity, conditional heteroscedasticity, and serial correlation. This reinforces the reliability of our empirical results. The diagnostic tests collectively affirm that our estimates are not only robust but also credible. By successfully accounting for possible concerns related to statistical heterogeneity, conditional heteroscedasticity, and serial correlation, our model further strengthens the validity of our empirical findings regarding the relationship between food exports and economic growth in Italy.

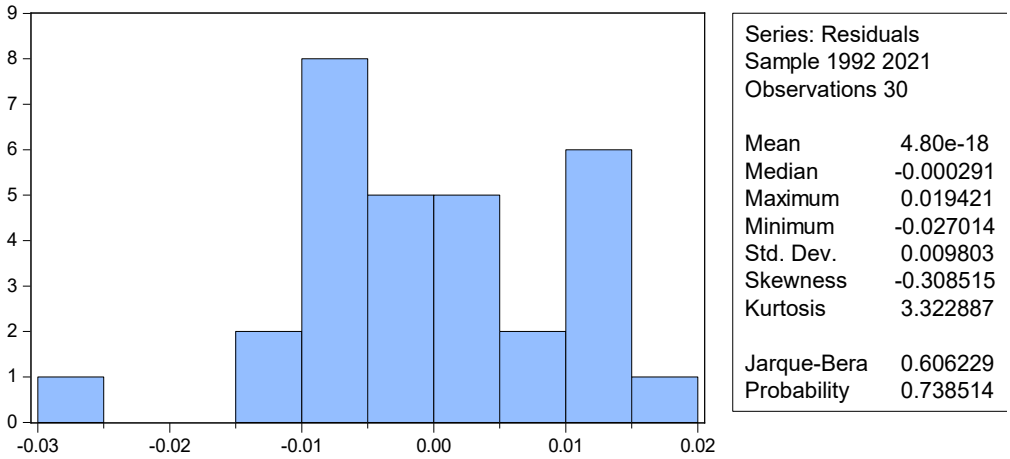

Figure 5: Normality Test

Figure 5 illustrates the outcomes of the normality test, specifically the Jarque-Bera test, which serves as a crucial diagnostic tool for assessing the normal distribution of residuals in the model. The econometric guideline is that the probability associated with the normality test should exceed 5%. In our analysis, the probability derived from the Jarque-Bera normality test is found to be greater than 5%, with a specific value of 0.738514. This result provides robust evidence that the residuals in our model follow a normal distribution. The normal distribution of residuals is a fundamental assumption in regression analysis, and when met, it enhances the reliability and validity of the estimates. The probability value exceeding 5% in the normality test indicates that our model and the results of our estimates are well-processed and acceptable. In other words, the distribution of residuals does not deviate significantly from a normal distribution, affirming the appropriateness of our model for capturing the relationships between food exports and economic growth in Italy. This reinforces the overall quality and soundness of our empirical analysis.

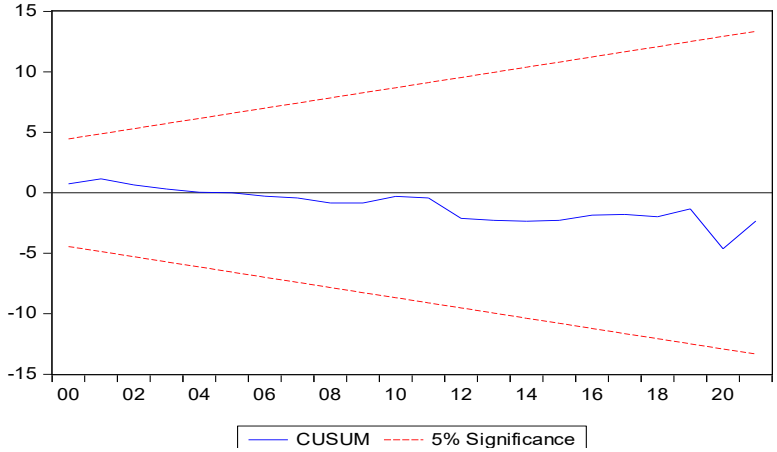

Figure 6 : CUSUM Test

The CUSUM test is employed to assess the stability of the model over time, and Figure 3 visualizes the results of this test. In the context of this analysis, a significant CUSUM test at the 5% level indicates that the model remains stable. When the CUSUM test is significant at the 5% level, it suggests that the estimated coefficients in the model have not exhibited substantial structural changes or deviations over the specified period. This stability is a crucial aspect of econometric modeling, as it ensures that the relationships captured by the model remain consistent and reliable throughout the observed timeframe. The significance of the CUSUM test at the 5% level in our analysis confirms that our model is stable. This finding

enhances the credibility of our results, indicating that the estimated relationships between food exports and economic growth in Italy remain valid and reliable over the studied period. It also implies that any potential structural changes or shifts in the relationships have been adequately captured and accounted for in the model. Overall, the stability of the model adds further confidence in the robustness and usefulness of our empirical findings.

Conclusions and Recommendations

The economic significance of the food sector is rooted in its connection to a fundamental human need: sustenance. The constant demand for food products renders the sector stable and appealing to investors, as people consistently require nourishment. Notably, food items are essential consumer goods, ensuring regular purchases even during economic downturns. This inherent resilience enables the food sector to withstand economic fluctuations, presenting a high probability of sustained, long-term growth. From a social perspective, the food sector plays a pivotal role in enhancing people's quality of life. Investments in innovative production methods like precision farming, advancements in efficient food storage and transportation facilities, and the application of cutting-edge food technologies contribute to the improvement of both the quality and quantity of food products. Moreover, such investments can have a positive impact on societal well-being. By addressing key aspects of the food supply chain, they have the potential to enhance access to quality food, particularly in regions grappling with food security challenges. Investments in food distribution infrastructure also play a crucial role in tackling social issues like malnutrition and food insecurity. Ultimately, investing in the food sector is indispensable for meeting fundamental economic and social needs. Such investments not only create job opportunities but also bolster food security, fostering a resilient economy. The importance of the food sector extends beyond economic considerations; it is intricately linked to the well-being of individuals and communities. By ensuring a stable supply of quality food products, investments in the food sector contribute to an improved quality of life, aligning with the essential needs of every person.

For these reasons, we have attempted in this work to examine the impact of food exports on economic growth in Italy during the period 1990 – 2021. To achieve this goal, we used an estimate based on cointegration analysis and the ARDL model. Empirical results indicate that food exports have a positive and favorable effect on Italian economic growth in the long run. This positive impact can be expressed for several reasons. In fact, the food industry represents an important part of the Italian economy, with almost a third of the total turnover of manufacturing companies in the country. Food exports are therefore a key sector that contributes to the country's GDP. Moreover, Italian food products are highly appreciated abroad for their quality and diversity, which makes them attractive to foreign consumers and companies. Food exports therefore allow Italian companies to reach a wider market and develop their activities. In addition, food exports also generate employment in Italy, as many food companies operate in rural and outlying areas. This helps stimulate employment and economic growth in these regions. Finally, food exports can also leverage other related industries, such as tourism. Italian food products are often seen as an integral part of the tourist experience in Italy, which can increase tourist flows and stimulate the economy. In short, food exports are a crucial element of economic growth in Italy, as they stimulate production, job creation and the attractiveness of the country.

Despite all the explanations and favorable impacts of food exports to the contribution of Italian economic growth, we noticed in the second section that food exports and economic growth are characterized by downward trends during the period 1991 – 2021. For this reason, we propose some approaches and measures to improve food exports could include

the promotion of Italian products in international markets, highlighting their quality and authenticity. Among these recommendations and strategies, we can cite:

1. Italy should strive to diversify its range of food products for export. Although Italian pastas, cheeses and wines are widely loved, creating new market niches with innovative food products can help expand the international customer base. Promoting organic products, lesser-known regional specialties and products adapted to specific diets can open up new opportunities.
2. It is imperative that Italy maintains and improves the quality of its food products. Farmers and food producers should be encouraged to adhere to high quality standards. The government could establish quality certification programs to guarantee the provenance and authenticity of Italian products. This would boost international consumer confidence.
3. Adoption of modern technologies in food production is essential. Automation, supply chain management, product traceability and food preservation improve efficiency and food safety. Additionally, technology can facilitate the promotion of Italian products abroad, notably through e-commerce platforms and traceability applications.
4. Italy should actively seek favorable trade agreements with other countries, especially those with growing demand for Italian food products. These agreements can reduce tariff and non-tariff barriers, making exports more competitive in the international market.
5. The promotion of the "Made in Italy" brand abroad must be strengthened. Italian food products are often associated with quality, tradition and culture, which provides a competitive advantage. Targeted marketing and promotional campaigns can strengthen this brand image and increase international demand.
6. It is essential to encourage innovation in the food sector. Investments in research and development can stimulate the creation of new food products and improve production efficiency. Innovation can also help meet changing trends in global demand.
7. Italy should strive to simplify administrative procedures related to exports. Businesses often face bureaucratic hurdles that can deter exports. Reducing bureaucracy will make it easier for companies wishing to export.
8. Collaboration between the public and private sectors is essential to developing effective export strategies. These partnerships can pool resources and knowledge to promote Italian food products abroad.
9. The Italian state could consider offering financial incentives to companies investing in food exports, including in the form of subsidies, loan guarantees or tax credits.
10. A sustained education and awareness effort is necessary to inform companies about market opportunities abroad. Businesses must be aware of exporting requirements and best practices to maximize their success.
11. Integrating sustainable practices into food production is crucial. Environmentally friendly food products are increasingly popular among international consumers. Italian companies should aim for environmental sustainability in food production to meet this growing demand.

By implementing these recommendations and strategies, Italy can strengthen its position in the global food market and boost its economic growth through larger and more diversified exports. The statement outlines several potential directions for future research in the field of food exports and their impact on economic growth:

1. ***Impact of the structure of food exports on economic growth:*** This research proposal aims to examine the impact of the structure of food exports on economic growth in Italy. The study would look at the specific composition or structure of food exports to understand which categories or types of food products have a greater influence on the economic growth of the country. It could explore, for example, whether products such as olive oil, pasta or wine contribute more significantly to economic growth compared to other food items. By analyzing in detail, the relative contribution of different food sectors to economic growth, researchers could shed light on specific areas that play a driving role in the Italian economy, providing valuable insights to guide public policies and business strategies.
2. ***Determinants of food exports in Italy:*** This line of research focuses on identifying factors that influence the level and nature of food exports from Italy. The analysis could involve examining variables such as agricultural practices, trade policies, market demand, consumer preferences, and other factors that impact the volume and diversity of food products exported from Italy. By looking at these elements, researchers seek to understand the driving forces behind the successes or challenges of the Italian food export sector. This approach would make it possible to identify significant trends, identify opportunities for improvement and enlighten decision-makers on the adjustments necessary to strengthen Italy's competitiveness in the global market. In sum, an in-depth analysis of these factors can contribute to a better understanding of the dynamics underlying Italy's international food trade.
3. ***Comparative studies with other countries:*** Comparative studies with other countries involve in-depth analysis of the similarities and differences between Italy and other nations, especially those with robust food export sectors. The objective of such studies is to evaluate Italy's food export performance and strategies compared to those of other countries. This comparison allows researchers to gain perspectives on best practices, potential areas for improvement, as well as unique characteristics of the Italian food export sector. By examining the experiences and practices of other countries renowned for their food export success, these studies provide an in-depth understanding of the international landscape, facilitating the identification of strengths and weaknesses specific to the Italian sector. Lessons learned from these comparisons can inform policymakers, businesses and industry players on effective measures to strengthen Italy's competitiveness in the global food export market.

These research proposals advocate for a more comprehensive investigation into the intricate relationship between food exports and economic growth in Italy. They propose a nuanced examination that delves into specific types of food products, explores the underlying factors influencing food exports, and draws meaningful comparisons with other countries. Such focused research avenues aim to provide a broader context for understanding the dynamics between food exports and economic growth. By concentrating on specific categories of food products, researchers can unearth insights into the unique challenges and opportunities associated with different segments of the food export industry. This approach allows for a more granular analysis that considers the distinct characteristics and market dynamics of various food items, contributing to a richer understanding of their impact on economic growth. Additionally, investigating the underlying factors driving food exports can reveal crucial determinants such as trade policies, market demand, production practices, and innovation. Identifying and comprehending these factors can inform policymakers, businesses, and industry stakeholders about potential strategies to enhance the competitiveness and sustainability of Italy's food export sector. Furthermore, proposing comparative analyses with

other countries provides a valuable benchmark for assessing Italy's performance in the global context. Contrasting practices, policies, and outcomes with similar or contrasting nations can highlight areas of strength or improvement, offering actionable insights for optimizing Italy's food export industry. Ultimately, these research proposals go beyond a broad examination of the relationship between food exports and economic growth. They advocate for a targeted and nuanced exploration, offering potential avenues for generating practical and strategic insights. Such research endeavors can contribute significantly to the informed decision-making of policymakers, guide industry strategies, and enrich the academic understanding of the complex interplay between food exports and economic growth in Italy.

Declaration

The sections on Conflict of Interest, Availability of Data and Materials, Author Contributions, and Funding Sources have been incorporated into the revised manuscript as requested.

Conflict of Interest

We affirm that there are no conflicts of interest related to this publication. Furthermore, there has been no substantial financial support for this research that could have influenced its findings.

Availability of Data and Materials

The data and materials utilized in this study are available upon request.

Authors' Contributions

All authors were involved in the discussion of results and contributed to the preparation of the final manuscript.

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