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FROM ORCHARD TO EXPORT: UNCOVERING THE DRIVING FACTORS OF EGYPT'S ORANGE MARKET

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Abstract

Egypt is predominantly known for its agriculture sector, which dates back to the time of the Pharaohs. During this era, agriculture was the most significant sector in the country. Therefore, any country with resources for agriculture should use them to develop this sector, increase production, and expand agricultural spaces. Such efforts will lead to increased economic growth and exports. Furthermore, prioritizing agriculture will help meet the needs of the people and reduce the nation's reliance on imports. Therefore, Egypt should benefit from their resources to improve their agriculture sector. For example, Egypt produces oranges in large quantities that there is huge surplus to export all over the world. Although Egypt has not fully exploited all its agricultural resources and land to produce oranges and other agricultural products, there is great potential for growth. If Egypt were to fully utilize its resources and improve its agricultural practices, it could rank higher in the international market for agricultural exports. Such efforts would undoubtedly contribute to Egypt's economic growth and development. Therefore, in this paper we will discuss the results of the consumption and production of oranges in Egypt to see if there is shortage or surplus and if oranges' market is elastic or inelastic, and at the end see if Egypt could produce more or not.

Keywords: *Egypt, agriculture, oranges, economic growth, production, surplus.*

JEL Codes: *D00, D01*

1. Introduction

Ancient Egypt's civilization owed a lot to the Nile River and its reliable seasonal floods. The Egyptians were able to create an empire based on abundant agriculture due to the river's regularity and the region's fertile land. One of the first populations to engage in extensive agricultural activity was the Egyptians. This was made possible by the Egyptians' inventiveness in creating basin irrigation.

Due to their agricultural techniques, they were able to produce both industrial crops like flax and papyrus as well as basic food crops like wheat and barley. Egypt covers a territory of roughly 1 million km2 and is in the north-eastern part of the continent of Africa. The Mediterranean Sea borders it on the north, the Gaza Strip and the Red Sea on the east, Sudan on the south, and Libya on the west. Its maximum east-west extent is about 1,100 km, while its north-south extent is roughly 1,080 km. Egypt raised the earnings of its farmers while increasing agricultural productivity by way of $1.4 billion in investments made in Egypt's agricultural sector since 1978 (USAID, 2022).

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When it comes to the amount of organic land in each African country, Egypt is seventh, after Tanzania, Uganda, Ethiopia, Tunisia, Kenya, and Sudan. In 2016, 105,000 acres of land in Egypt were under organic management, making up 5.9% of all organic land in Africa. Considered as a percentage of all agricultural land, Egypt ranks first with 2.8%, followed by both Tanzania and Uganda with 1.8%, and Africa with 0.2% (Siam & Abdelhakim, 2019).

Egypt has one of the rare agricultural systems that cultivate the available land intensively for more than two seasons each year and is fully irrigated. In 2010, there were over 3.7 million hectares of agricultural land in Egypt, with 78% of that being arable land and 22% being used for perennial crops. There are two subcategories of arable land. The primary ones contain perennial field crops, which in 2010 accounted for 56% of all agricultural land, and vegetables, which accounted for 22% of all agricultural land. Fruit trees and sugar cane are both included in the category of permanent crops, which made up 12% and 4%, respectively, of Egypt's total agricultural land in 2010 (Soliman, 2013). In the final decades of the 20th century, there was a steady increase in the global output of citrus fruits. In 2012/2013, it was estimated that 116 million tonnes of citrus were produced worldwide. About 57.4% of all citrus fruit produced worldwide is oranges, followed by grapefruit, tangerines (mandarins), lemons, and limes, with respective shares of 28.5%, 7.3%, and 6.8% (El-Kholei, 2014).

However, over the past ten years, citrus production in Egypt has been regarded as the most significant fruit crop. which saw a rise in the area devoted to the cultivation of citrus from 298 thousand acres in 1990 to 331 thousand acres in 2000, and ultimately to 419 thousand acres in 2012. This led to an increase in production from roughly 2.2 million tons in 1990 to over 4 million tons in 2012 (El-Kholei, 2014). About 70% of all citrus production in Egypt is made up of oranges. Oranges, on the other hand, are a winter fruit that thrives in Egypt's climate. It produces more than half of Egypt's entire fruit output. The lush Delta region and recently restored fields are planted with orange horticulture. Large farms (10–100 acres) produce about 80% of Egypt's total orange crop, while small farms (1–10 acres) produce 20% of it. The majority kind, navel oranges, account for around 70% of all the oranges produced in Egypt (El-Kholei, 2014).

The purpose of this research is to examine the performance and potential of Egyptian orange exports to foreign markets between 2007 to 2016 by using secondary data and descriptive data and analyse how the market of oranges could impact the economy and the exports of Egypt, and know what demand factors affecting consumption are, and to know well the product will be elastic or inelastic in the short run and long run and how much will the production be impacted by the suppliers' factors? What policy could be applied to maximize profit?

2. **Literature review**

The individual demand for each producer's product is typically assumed to be perfectly elastic at the price established by the intersection of the total supply and total demand of the produced good. This assumption forms the foundation of the neoclassical theory of perfect competition. This presumption is based on the claim that each producer can sell all his output at a price above market equilibrium and that if he set his price higher, he would sell nothing, while if he set it lower, he would suffer an unjustifiable loss of income (Nomidis, 2015). The firm's individual demand curve must have a shape that is comparable to the market's overall demand curve. This shape must be the same as the overall demand but on a lower scale in relation to the requested amounts. How could the market's overall demand curve, which represents the sum of the demand curves for each firm, have the normal form of a demand curve with a negative slope if the individual demand curves for those firms were completely elastic? Furthermore, we must keep in mind that the market's overall demand is the sum of individual consumer demands and that this sum, at a local or lower level, constitutes the demand for each

firm. So, these two demand curves must have the same shape since they both show what consumers want and need, even though they do so at different levels (Nomidis, 2015).

2.1. ***Perfect competition.***

According to economic theory, perfect competition exists when all businesses sell the same goods; market share has no bearing on prices, businesses can enter or quit the market without any obstacles, consumers have perfect or complete information; and businesses are unable to set prices. It is a market that is solely influenced by market forces, in other words. It is the opposite of imperfect competition, which better describes how the market was at the time (Hayes, 2022b,). A big and homogeneous market and a high number of consumers and sellers are the two characteristics of a perfectly competitive market. Instead of giant corporations that may regulate prices through changes in supply, the sellers are smaller businesses. There aren't many distinctions in the capabilities, features, and prices of the things they sell. This makes sure that consumers cannot differentiate between products based on tangible qualities like size or colour or intangible qualities like branding (Hayes, 2022a).

2.2. ***Policies of trade.***

Policies concerning trade, commitments made to lower or remove import tax and non-import tax obstacles that prevent the entry of foreign agricultural commodities onto the markets of the committing country are referred to as market access commitments trade. Commitments made to lower or remove import tax and non-import tax obstacles that prevent the entry of foreign agricultural commodities onto the markets of the committing country are referred to as market access commitments. Each World Trade Organization (WTO) member nation receives a market access schedule outlining the rates and timeline for the import tax reductions. Such timelines for market access go beyond just announcing import tax rates. They stand for pledges not to raise import taxes over the rates indicated; the "bound" import tax rates are the highest rates that could be imposed. The bound rates for wealthy nations are typically the rates charged (Tellioglu & Konandreas, 2017). In comparison to the developing-country average of 73 percent, Egypt has bound more than 99 percent of its import tariffs. As of 2012, customs tariff rates on all agricultural products are capped. The average bound import tariff for agricultural items is 98.3 percent, compared to a basic average of 60.5 percent for imposed imports. Tariffs on agricultural imports are only 12.5 percent (trade-weighted average), which is significantly lower than the rates applied by certain other developing and developed countries. Different agricultural items have different tariff rates based on how much of the total agricultural imports they make up (Tellioglu & Konandreas, 2017).

2.3. ***Walrasian model.***

The field in question is economics, specifically the Walrasian model. Even economists in this field struggle with the issue of money. In recent years, economic theorists have been attempting to devise a mechanism to finance the Arrow-Debreu iteration of the Walrasian general equilibrium model.

The biggest problem that the existence of money presents to theorists is that even the most sophisticated economic models cannot accommodate it. The most well-developed model of a Walrasian general equilibrium is, of course, the Arrow-Debreu form. Finding a different structure must be done first in order to maintain Arrow-logical Debreu's coherence and clarity, professor. The Theory of Value's presentation of the Arrow-Debreu model altered fundamental ways of thinking, and it swiftly became the accepted model of price theory. It serves as the industry standard in macroeconomics, public finance, international trade, and transportation (Dillard, 2010).

2.4. ***Classical and neo-classical economics.***

The phrase "classical economics" refers to the predominant school of economic theory in the 18th and 19th centuries. Most people view Scottish economist Adam Smith as the father of traditional economic theory. However, earlier contributions came from French physiocrats and Spanish scholastics. Some other important people in classical economics are David Ricardo, Thomas Malthus, Anne Robert Jacques Turgot, John Stuart Mill, Jean-Baptiste Say, and Eugen Bohm von Bawerk (Yong, 2021). The general framework of neoclassical economics emphasizes supply and demand as the primary factors influencing the creation, valuation, and consumption of products and services. It first appeared around 1900 to compete with the prior theories of classical economics. Unfortunately, the tremendous advancement in economic theory throughout the 1870s was mostly limited to one subfield of price theory. The "revolutionaries" of the time, Jevons, Menger and Walras, focused primarily on the theory of subjective value, and their immediate successors mostly followed in their footsteps. The demand element undoubtedly merited a lot more thorough investigation than the classical economists had given it, but the shift in emphasis wasn't entirely positive. Although this point of view had very little impact on Menger's theory, all three discoverers were hedonists, and their proclamations of value theory gave rise to numerous pseudo-scientific applications of hedonist ethics to economic policy. Only recently has the idea of switching from the utilitarian point of view to the less personal but safer theory of substitution started to get a lot of serious attention (Stigler & Irwin, 2017).

2.5. ***Comparative theory.***

The ability of an economy to produce a specific good or service at a lower opportunity cost than its trading counterparts is known as a comparative advantage. David Ricardo, theorist of "Comparative Advantage" is a theory that explains how trade benefits individuals, nations, and businesses. The most crucial idea in international trade theory is perhaps the theory of comparative advantage. It is also one of the ideas that is most frequently misunderstood. It is simple to pinpoint where the misunderstandings originated. First, it should be noted that the comparative advantage principle defies common sense. Many of the formal model's outcomes defy common sense. Second, it is simple to confuse this theory with another idea regarding profitable trade, the theory of absolute advantage, which is recognized in trade theory. Absolute advantage makes good intuitive sense. Many people mistakenly believe they comprehend comparative advantage when, in fact, they only grasp absolute advantage because of the confusion between these two ideas. Finally, it is far too common to just present the notion of comparative advantage in its mathematical form. It is very helpful to illustrate the fundamental findings and the more profound consequences of the theory by using numerical examples or diagrammatic representations. However, it is equally simple to visualize the outcomes mathematically without ever grasping the fundamental logic behind the theory (Gandolfo, 1998).

2.6. ***Theory of production.***

The relationship between the factors of production (land, labour, capital, and entrepreneur) and the output of products and services is examined by the theory of production. The "short run"—a time of production that enables production to adjust the amount of a variable input, in this example, labour—is the foundation of the theory of production. A production cycle called the "long run" lets producers try out different inputs and figure out the best way to combine things that affect the output (Macherey, 2022).

*2.7. **Adam Smith's theory.***

The foundation of Adam Smith's philosophy is the laissez-faire concept, which states that the state should not put any limitations on an individual's freedom. The three pillars of saving, labour division, and a sizable market form the foundation of economic development theory. The foundation of this philosophy is either saving or capital accumulation. According to him, "There is a set of rules or rights of justice and possibly even morality in general which are or may be known by all men by either reason or moral sense, and which possesses an authority superior to that of such commands of human sovereigns and such customary legal and moral regulations as may contravene them" (Debasish, 2015). Laissez-faire economics gives producers the freedom to produce as much as they want, make as much money as they can, and save as much as they want. Adam Smith thought it was acceptable to let the economy be driven, regulated, and controlled by the invisible hand, or the forces of competition driven by self-interest, to play their part in reducing the amount of savings for development.

3. **Product Overview**

*3.1. **Market Share & volume***

At a certain period, Egypt was number one in the world when it came to exporting oranges in 2021. After that, Spain was number one in the world when it comes to exporting oranges. By the end of 2020, Egypt had shipped about 1.6 million tons of oranges around the world (Egypt Independent, 2021).

SWOT analysis

- The strengths of agriculture in Egypt are that there are more people to work, many crops are producing more, exports are better, and some crops have less of a food gap and changes to the way landlords and renters interact, the existence of laws and rules, the involvement of different groups in ARD (Agricultural Research for Development), and a wide range of production activities (Elmenofi, El-Bilali, & Berjan, 2013).
- The weakness there are many points as the absence of a rural development strategy, unqualified work, agricultural lands with gaps, migrating young people, issues with water resources, high rates of illiteracy and poverty, and insufficient cooperation amongst ARD stakeholders. Cooperatives and agriculture also play a weak role (Elmenofi et al., 2013).
- The opportunities are establishing a rural development strategy, providing incentives to draw young people from rural areas, increasing cooperation and coordination amongst relevant parties, and improving SME's (Saturated Media Extract) among young rural people, preparing for low-skilled work, enhanced rural lending and finance as well as increased food exports.
- As for the threats are a rise in population density and rates, agricultural land losses, soil deterioration, an unstable political environment, water shortages, lack of valuation of agricultural lands, degradation of the environment, increased food imports and demand (Elmenofi et al., 2013).

PESTEL analysis

- The political factor is a significant amount of the global human population is impacted by agriculture, and political decisions can have a significant impact on this. Governmental measures, such as tariffs on imports or subsidies for farmers, are frequently implemented to help boost domestic output levels, as also government regulations have an impact on the purchase, production, and cost of agricultural goods and raw materials (Mostafa, Youssef & Abdelrahman, 2020).

- The economic factors are demand from consumers, global food production, and global export demand are all economic factors that have an impact on the agriculture sector. These elements, which are impacted by national policies, consumer demand, and global prices, control the price of agricultural products. The availability of raw supplies, such as water, fuel, fertilizers, and pesticides, has an impact on the sector as well (Mostafa et al., 2020).
- The social factor is that people in various nations have distinctive historical and cultural legacies relating to their involvement with the agriculture sector. The current generation has been taught how to farm by many generations before them. It should be noted, though, that most millennials are less interested in agriculture and more interested in technology and the service sector. This has contributed to the widespread misconception that only persons from poor backgrounds should work in agriculture (Mostafa et al., 2020).
- The development of technology has an impact on the breeding and selection of new seed varieties, the design of agricultural and agro-industrial equipment and buildings, and the application of scientific knowledge to the management of soil and water resources, among other technological variables. The use of chemical fertilizers, enhanced harvesting and storage methods, and other developments have made it possible to manufacture agricultural goods on a big scale that was previously not conceivable. Additionally, these technological advancements have made it possible to increase production through the use of better tillage and harvesting methods (Mostafa et al., 2020).
- In the agriculture sector, the weather is extremely important. For example, because oranges must be cultivated in a temperature range between 13°C and 38°C so oranges need mild weather, environmental problems like floods and drought hurt the agriculture sector in many nations (FAO, 2021).
- Domestic and international trade agreements, including those between nations and regions, government regulation, property rights, and product labelling are among the legal aspects that have an impact on the sector of agriculture. It should be remembered that every nation has its own laws and norms governing the agricultural sector. But the implementation varies from nation to nation (FAO, 2021).

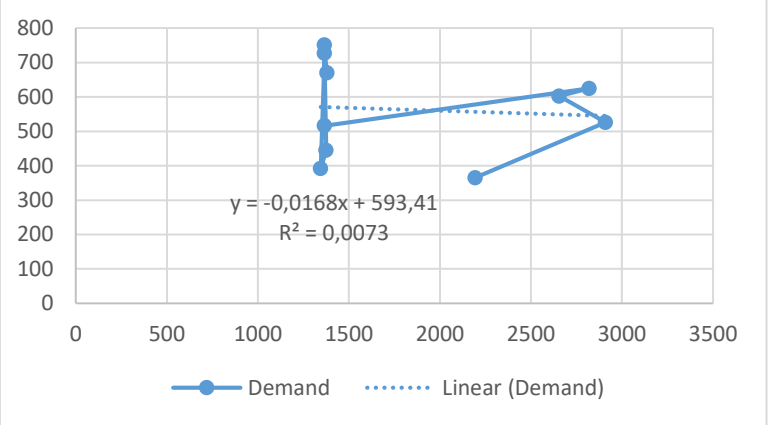
PORTER analysis

- The threat of new entrants is the capacity and competitiveness of consumers and the resources that new entrants often bring are new. Existing companies in the industry are threatened by this. Additional capacity keeps customers' costs low, which lowers revenue and returns for an industry's firms unless the demand for agricultural products is rising (Dobbins, Gray, Boehlje, Miller & Ehmke, 2004).
- Suppliers' bargaining power that they are limited in number, each farmer’s purchase only makes up a little portion of the businesses' sales, there are no suitable alternatives to the acquired product, and the good or service is unique (Dobbins et al., 2004).
- Buyers’ bargaining power, because the product is homogeneous, there are many alternative suppliers available. The buyers earn minimal profits and are sensitive to cost disparities. The purchased product is inconsequential to the ultimate quality or cost of the buyers' products (Dobbins et al., 2004).

4. **Industry Analysis**

This section analyses the demand and the supply of oranges in the Egyptian market to focus on the driving force for this market and to investigate if there is a shortage or surplus in this market.

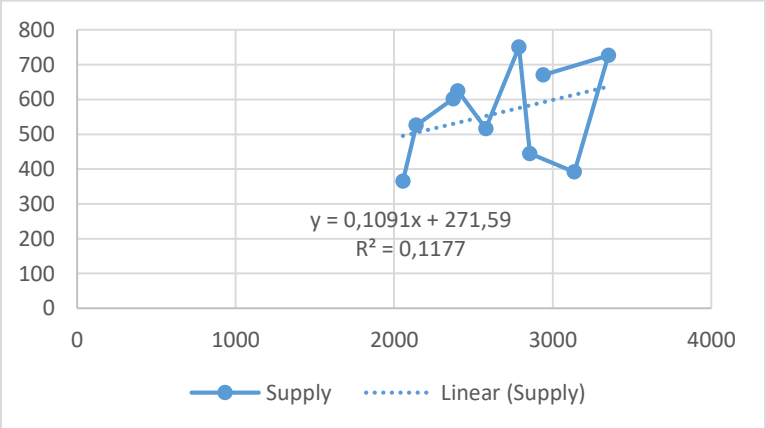
Figure 1. Demand graph from 2007 to 2016



Source: Prepared by the authors based on data from USAD

The primary fruit available in Egypt in the winter is oranges. Egyptians consume a lot of oranges since they are relatively inexpensive. Orange intake per person is thought to be around 18 kilograms per year. Due to the rise in the number of businesses making orange juice, the orange processing industry is growing. For processing, the majority of businesses rely on the Baladi and summer varieties. According to FAS Cairo, domestic consumption of fresh oranges would fall by 19.3% to 1.25 MMT in MY 2021/22. Due to lower production and more farmers choosing to export their fruit due to rising global demand for oranges, local consumption has decreased. Due to their high vitamin C, consumers worldwide have boosted their consumption of fresh oranges during the COVID-19 epidemic (Wally, 2021). As shown in Figure 1 in 2008 the consumption was very high and reached the highest point in units sold by 2910 per 1000MT, and the consumption was high between 2007 to 2010 by an average of 2644.75 per 1000MT until 2011 the consumption or the units sold decreased to 1365 per 1000MT because of the revolution and the political problems, and the consumption continued till 2016 by an average of 1366 per 1000MT. As shown in Figure 2 the regression model is a negative relation between the dependent variable and the independent variable so there is no violation.

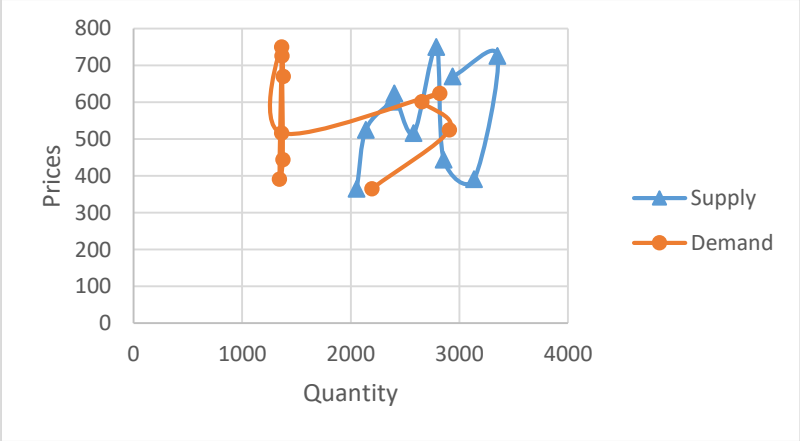
Figure 2. Supply graph from 2007 to 2016



Source: Prepared by the authors based on data from USAD

According to USAID (2022), agriculture contributes 11.3% to Egypt's GDP and employs 28% of the workforce. Although the industry is still dominated by local farmers utilizing traditional methods, the government's increased investment in the sector is leading to rapid changes. Egypt exported 5,6 million tons of agricultural products in 2021 compared to 5,1 million tons in 2020. Citrus fruit exports were the largest at 1,8 million tons in 2021 (Ryan, 2022). The most factors that affect the production of oranges are natural factors and weather, they are the main problem for the producers and the suppliers. The growth of citrus plants in Egypt in 2021 has been impacted by high temperatures and other weather-related problems. Orange farms will produce between 30 and 35 per cent less than they did last season, resulting in marginally higher prices (Shalaby, 2021). Egypt reached its highest point in the production of oranges in 2011 by 3700 per 1000MT compared to the other years, this increase is due to higher output due to better weather conditions, an increase in the number of new fruit trees and an increase in the total area collected. For the supply theory it should be positive relation, so as shown in figure 2 the regression model is a positive relation between the dependent variable and the independent variable so there is no violation.

Figure 3. Supply & Demand graph from 2007 to 2016



Source: Prepared by the authors based on data from USAD

According to Hamza (2015), figure 3 illustrates a consistent surplus from 2007 to 2016, which can be attributed to the popularity of oranges among citrus fruits. Farmers prefer to cultivate oranges due to their high export demand and value, and small-scale farmers who lack the resources to export can still benefit from the export market by selling their produce to larger farmers and exporters. In fact, there is always a surplus in the market of oranges in Egypt as thirty per cent of the entire area planted with oranges is made up of plantations in the Nile Delta region in addition most of the orange-growing land is found on desert reclaimed lands, which makes up 70% of the total area (Wally, 2021).

5. Price elasticity of demand

There are many varieties in the market of fruit and there are many substitutes, so if there is an increase in the price for a certain product or fruit the demand will decrease also as there are many substitutes instead of this product, same for oranges as oranges is elastic as it clears in the appendix in calculations of price elasticity of demand from 2007 to 2016. There are many factors that affect the price elasticity of demand as the price will decrease the more readily a customer may switch out one item for another. For instance, if someone enjoys both oranges and tangerines or apples, the demand for oranges will decline if orange prices rise because he will easily switch to tangerines or apple. This is because oranges and tangerines or apples are

seen as good alternatives to one another. In a certain period, oranges were a nearly inelastic product in the period of COVID-19 pandemic, when they taught people that they needed the oranges because of vitamin C to protect themselves from the virus (Kramer, Simnitt & Calvin, 2021).

6. Price elasticity of supply

The production of oranges in Egypt is very well as Egypt is one of the most countries that export oranges all over the world due to the surplus that it has because of the huge area in which Egypt grows oranges, so the price elasticity of supply in Egypt is elastic as it shows in the appendix. There are many factors that impact the price elasticity of supply such as the availability of resources, and the number of competitors as the price of a good or service becomes more elastic when there are more suppliers' other suppliers will hurry to fill the gap if one supply is unable to meet demand. If there is something that could affect the supply or the production of oranges, it will be a state of nature when the weather is not stable because oranges must be cultivated in a temperature range between 13°C and 38°C (FAO, 2021).

7. Conclusion

Finally, market of agriculture for Egypt is very important specifically oranges, since the time of the Pharaohs, agriculture has played a huge role in Egypt because of the Nile River and many other sources, and through agriculture, so Egypt began to pay attention to other fields such as engineering, medicine, and others. After we finished the analysis for oranges in Egypt, we knew that the market of oranges in Egypt is perfect competition and for the elasticity the price elasticity of demand and supply is elastic.

Brazil is the biggest producer of oranges in the world that produces 16.91MMT. Brazil also tries to make their product the cheapest one, to have the ability to export to most of the countries, and also one of the important factors they used to increase their production is technology as they use the newest equipment and machines to make the production or the orange cultivation more easily (Chung, 2018).

If Egypt wants to improve its production and become a more significant player in the global orange market, studying the case of Brazil could be beneficial. Brazil has a well-developed orange industry, and its success can be attributed to several factors, such as favourable weather conditions, efficient irrigation systems, and the use of modern farming techniques. By examining Brazil's approach to orange cultivation, Egypt can learn about best practices in farming, irrigation, and post-harvest handling to improve its production. Additionally, Egypt can consider using modern technologies such as precision agriculture, which involves the use of sensors, drones, and data analysis to optimize crop yields. By adopting such practices, Egypt can improve its productivity, increase its export potential, and become a more significant player in the global orange market.

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2. Appendix

Years	Prices ($ per ton)	Unit produced per 1000 MT	Unit Sold per 1000 MT	Change of prices	Change of quantity produced	Change of quantity sold	PED	PES
2007	365.099	2759	2194	-	-	-	-	-
2008	525.824	3500	2910	525.0044028	3499.11839	2909.140282	5.541173	6.664932
2009	602.022	3568	2655	601.0895606	3567.009621	2653.954178	4.415239	5.93424
2010	624.762	3645	2820	623.7805363	3644.010675	2819.030137	4.519266	5.841815
2011	516.32	3700	1365	515.2249656	3699.007488	1363.65233	2.646712	7.179403
2012	750.935	2450	1365	750.1201364	2448.796748	1364	1.818375	3.264539
2013	444.644	2570	1375	443.3878137	2569.023904	1374.00365	3.098876	5.794079
2014	391.803	2930	1345	390.7398268	2929.065455	1343.988971	3.439601	7.496204
2015	726.407	3000	1366	725.7062318	2999.011804	1365.007746	1.880937	4.132542
2016	670.28	3180	1380	669.2398142	3179.029126	1379.005098	2.060554	4.750209