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DOES EGYPTIAN ORANGE EXPORTS REALLY HAVE A MARKET POWER IN SAUDI ARABIA MARKET?

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Abstract

Egypt is one of the important orange exporters and Saudi Arabia also is an important import orange market. The Saudi orange market is a main market for Egypt which has a market share that exceeds half of Saudi orange market by 55.72%. This article aims to discover the degree of market power for Egyptian orange exports and other competitors in the Saudi market and if it is considered a measure of the relative mark- up by applying Residual Demand Elasticity approach. The results show that Egyptian orange exports has just a statistically signified market power by SUR and 3-SLS and has a negative sign, which may gain monopolistic profits by the relative mark-up over its marginal cost by about 63.7% without losing any of its market share. The source of Egyptian orange exports market power is due to: 1- product differentiation where Egypt exports navel orange most its export season compared with sweet orange which exported from other competitors. 2- Saudi Arabia Market demand characteristics which reflect on the consumers preference for Egyptian oranges.

Keywords: International trade, market power, residual demand elasticity, fresh orange, KSA, Egypt

1. INTRODUCTION

Egypt is an important orange exporters. It ranks the fourth among the top orange exporting countries after Spain, South Africa, and USA by 8.54% of the total world orange exports as an average quantity for the period 2000-2011, shows that table 1.

Table 1: Top exporter and importer countries of fresh orange and their percentage for the average period 2000-2011

Export country*		Import country**	
Country	Market share %	Country	Market share %
Spain	30.29	Germany	9.5
South Africa	18.8	France	7.91
USA	12.75	Russian Federation	7.69
Egypt	8.53	Netherlands	7.62
Greece	6.13	United Kingdom	5.72
Morocco	5.34	Saudi Arabia	5.28
Turkey	4.34	Canada	3.71
Netherlands	4.33	China, Hong Kong, SAR	3.36
Turkey	4.34	Belgium	3

* Countries more than 4% **countries more than 3%

Source: Own compilation based on FAOSTAT

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On the other side, Saudi Arabia is an important import orange market. It ranks the fifth among the top orange importing countries, by 5.28% of the total world orange imports, as an average quantity for the same period, after Germany, Russian Federation, Netherlands, and United Kingdom, table 1. Saudi Arabia is also one of the high-income countries and it does not produce orange, so it is a net importer of fresh orange and there are no barriers for access to its market. Therefore, orange export countries compete to have a share in Saudi Arabia orange market (Egyptian commercial services, 2011). These characterizes same Saudi Arabia market as a perfect competition but, However, because of product differentiation among competitors where each one, exports different species of orange, the market becomes a monopolistic competition market.

The Saudi orange market is a main market for Egypt that has a market share exceeds half of Saudi markets by 55.72%, followed by South Africa 27.24%, then Lebanon 10.24% shows that table 2. Where Egypt exports navel and sweet orange within its export season from the beginning of December until the end of May, but South Africa exports sweet orange within its export season from beginning of March until the end of September. As for Lebanon, it exports sweet orange within its export season beginning of December until the end of May (Egyptian commercial services, 2011).

We may arrange the three competitors market power according its market share as a traditional approach Egypt, south Africa and Lebanon regardless of whether leading to mark- ups. This article aims to discover the degree of market power for Egyptian orange exports and other competitors in the Saudi market and if it is considered a measure of the relative mark- ups. We apply Residual Demand Elasticity (RDE) approach to satisfy this goal and analyze the sources of this market power if it is present.

Table 2: The main parameters of Saudi imports of fresh orange for the period 2000-2013

Item / country	Egypt	South Africa	Lebanon
Quantity (thousand ton)	174.1	84.53	29.96
Market share %	55.72	27.24	10.24
Price (SR/ton)	1603	1851	515

Source: Own compilation based on Saudi central department of statistics & information

2. CONCEPTUAL FRAMEWORK

Market power is defined as the ability of a firm to charge a price above its marginal cost (Goldberg and Knetter, 1999). The exercise of market power leads to reduced output and loss of economic welfare by the ability of a firm (or group of firms) to raise and maintain price above the level that would prevail under competition (OECD, 2007). So it is necessary searching about the source of market power source; if it due to Monopolistic practices, Product differentiation and the nature of supply and demand in the market.

There are many methods to measure market power. The traditional methods include: market concentration, size of competitor's market share, and accounting profits. The new econometric methods include: methods based on responses to variation in cost, methods based on variation in the elasticity of demand, and methods based on detecting multiple pricing regimes (Baker and Bresnhan, 1992).

Market power can be expressed by Lerner Index which is denoted by $L = \frac{P - Mc}{P}$, where P is the output price and Mc is the marginal cost of a unit of output, but there are some difficulties are facing Lerner Index especially marginal costs accounting.

2.1. The RDE Approach

This search apply the RDE approach that was introduced by [Goldberg and Knetter \(1999\)](#) to measure market power in international trade based on aggregated market data. The theoretical model is based on [Glauben and Loy \(2003\)](#).

Suppose two exporting countries selling a product in a particular foreign destination market. The Inverse Residual Demand (IRD) function facing any of two exporting country can be written as:

$$P^I = D^I \left(Q^I, P^J, Z \right) : I, J = 1, 2 \quad I \neq J \quad \dots\dots\dots (1)$$

Where P^I and P^J are the prices of export products expressed in destination market currency. Z is a vector of demand shifters in the destination market. Country I profits are defined as:

$$\Pi^I = P^I Q^I - e^I C^I \left(Q^I \right) \quad \dots\dots\dots (2)$$

Where e^I is the exchange rate (destination currency per unit of export country currency), and $C^I Q^I$ is the total cost function of exporting in destination currency. The first-order condition for profit maximization implies:

$$\frac{\partial \Pi^I}{\partial Q^I} = P^I - e^I MC^I - Q^I \frac{\partial P^I}{\partial Q^I} \left(1 + \frac{\partial D^I}{\partial P^J} \frac{\partial D^J}{\partial P^I} \right) = 0 \quad \dots\dots\dots (3)$$

Where MC^I is the marginal cost expressed in source currency units. Assuming that the second order condition is met, then The Lerner index is thus:

$$L^I \equiv \frac{P^I - e^I MC^I}{P^I} = - \frac{Q^I}{P^I} \frac{\partial P^I}{\partial Q^I} \left(1 + \frac{\partial D^I}{\partial P^J} \frac{\partial D^J}{\partial P^I} \right) \quad \dots\dots\dots (4)$$

The right item of the equation denotes the competitive interaction between the exporter countries

and the source country exporters in destination market. $\theta^I = - \frac{Q^I}{P^I} \frac{\partial P^I}{\partial Q^I}$ is the inverse residual demand. If its absolute value equals zero, that means perfectly competitive market, where the exporter is a price taker and hasn't any market power, and there is no influence for the export quantity on its price. In contrast, if its value equals one, that means a monopoly, where the exporter is a price maker and has market power, which means true mark-ups and the export quantity influences the price. The absolute value estimate denotes the degree of market power; the larger value express more market power, but not necessarily measures the relative mark-up. A negative estimate indicates imperfect competition ([Pall et al., 2014](#)).

[Goldberg and Knetter \(1999\)](#) developed and applied a framework to measure the intensity of competition in export markets based on techniques used in domestic markets in the industrial organization literature, and commensurate with the available international trade data. They also applied a method which consists of one equation for mainly competitive exporter's to estimate the elasticity of Inverse Residual Demand which denote to exporter's market power as a result of the previous analysis.

The inverse residual demand function for an exporter is expressed as:

$$\ln P_{mt}^{ex} = \lambda_m + \eta_{mt} \ln Q_{mt}^{ex} + \alpha_{mt} \ln Z_{mt} + \beta \ln w_{mt}^N + \varepsilon_{mt} \dots\dots\dots (5)$$

Where η is the elasticity of Inverse Residual Demand, Q is the quantity exported by the export country, Z denote demand shifters for the destination market; consisting of various combinations of a time trend, real income, and the price level. W denote the cost shifters for the main competitors; including measures of input prices and exchange rate movements. ε is an error term. The remaining Greek letters denote parameters. This model was applied in many studies estimate the elasticity of Inverse Residual Demand (Glauben and Loy, 2003; Reed and Saghaian, 2004; Ismaiel and Al-rwis, 2009; Pall *et al.*, 2014).

3. EMPIRICAL MODEL AND DATA

It is assumed, that each exporting country faces a residual demand curve that slopes downwards, reflecting the market demand minus the supplies of other competitors in the same import market. The empirical model includes demand shifters; time trend, real disposable income for the destination country, and the exporter price in destination market currency price. It also includes cost shifter; bilateral exchange rate which is used as ideal cost shifter in international trade (Goldberg and Knetter, 1999).

As previously displayed at the introduction, Saudi orange import market has three main orange exporters; Egypt, South Africa, and Lebanon, therefore, three equations will estimate in the double log functional form for each three main exporters as follows:

$$\ln P_t^i = \lambda + \eta \ln Q_t^i + \alpha T_t + \beta \ln r_t^{sa} + \sum_{j \neq i} \delta^j \ln e_t^j + \varepsilon_t \dots\dots\dots (6)$$

Where the subscript i, j and t denote exporting countries and time, e index the bilateral exchange rate between Saudi Arabia and export countries (in SR per unit of the export country's currency). r Stands for Saudi nominal disposable income and the consumer price index respectively (both expressed in SR). The endogenous variables unit export prices in destination market currency. Symbol η is the elasticity of Inverse Residual Demand and its value is between zero and one.

The parametric signification of both demand and cost shifter will be used as an index to indicate the source of market power is on the demand side or the supply side, or in both.

According to previous equation, there are three equations one for each competitor. For Egypt

$$\ln P_t^{eg} = a_1 + \eta_1^{eg} \ln Q_t^{eg} + \lambda_1 T_t + \beta_1^{sa} \ln r_t^{sa} + \varpi_1^{so} \ln e_t^{so} + \varpi_1^{le} \ln e_t^{le} + \varepsilon_t$$

For south Africa:

$$\ln P_t^{so} = a_2 + \eta_2^{so} \ln Q_t^{so} + \lambda_2 T_t + \beta_2^{sa} \ln r_t^{sa} + \varpi_2^{eg} \ln e_t^{eg} + \varpi_2^{le} \ln e_t^{le} + \varepsilon_t$$

and for Lebanon:

$$\ln P_t^{le} = a_3 + \eta_3^{le} \ln Q_t^{le} + \lambda_3 T_t + \beta_3^{sa} \ln r_t^{sa} + \varpi_3^{eg} \ln e_t^{eg} + \varpi_3^{so} \ln e_t^{so} + \varepsilon_t$$

Previous studies applying the RDE approach used different methods to estimate the model's parameters. In this search, we use two methods Three Stage Least Square 3-SLS and Seemingly Unrelated Regression (SUR) which use the correlations among the errors in different equations to improve the regression estimate. When the SUR method consider all variables are independent, the 3-SLS method is used for Simultaneous equations and avoid simultaneity bias, especially over identified equations.

The empirical model uses annual data from 1990 to 2013. Data on Saudi Arabia imports and its prices are obtained from [Saudi Central Department of Statistics & Information \(SCDSI\) \(2014\)](#). The exchange rate is obtained from the International Monetary Fund. Saudi real disposable income is obtained from both International Monetary Fund and [\(SCDSI, 2014\)](#) World orange exports and imports are obtained from [Food and Agriculture Organization \(FAO\) \(2015\)](#) and [United nation Comtrade Database \(2014\)](#).

4. ESTIMATION RESULTS

Table 3 shows that Egyptian orange exports has just a statistically signified estimate two methods and has a negative sign. Statistically, the best estimate is by 3SLS which avoid basis. These results show that Egyptian orange exports faces an imperfect market and has market power, that can gain monopolistic profits by the relative mark-up over its marginal cost by about 63.7% without losing any of its market share.

It is also seen from the results of table 2 that South Africa and Lebanon orange exports have not a statistically signified estimate by 3-SLS and SUR. All competitors have a negative sign by all methods, that support the Saudi orange market is Monopolistic Competition because of the differentiation of their products.

Table 3: RDE results by 3-SLS. and SUR

Egypt			South Africa			Lebanon		
variables	3-SLS	SUR	variables	3-SLS	SUR	variables	3-SLS	SUR
$\ln Q_t^{eg}$	0.64*** (0.253)	-0.833*** (0.310)	$\ln Q_t^{so}$	- 0.07 (0.099)	-0.065 (0.120)	$\ln Q_t^{le}$	-0.175 (0.300)	- 0.204 (0.297)
$\ln r_t^{sa}$	0.386 (0.54)	0.869* (0.499)	$\ln r_t^{sa}$	0.685*** (0.163)	0.865*** (0.215)	$\ln r_t^{sa}$	0.601 (0.709)	1.211 (0.862)
$\ln e_t^{so}$	0.68** (0.342)	0.765** (0.33)	$\ln e_t^{eg}$	0.676** (0.195)	0.753*** (0.220)	$\ln e_t^{eg}$	0.427 (0.619)	0.753 (0.795)
$\ln e_t^{le}$	-1.56*** (0.494)	-2.098*** (0.584)	$\ln e_t^{le}$	-0.076 (0.153)	-0.141 (0.172)	$\ln e_t^{so}$	0.487 (0.474)	0.611 (0.475)
T_t	0.05 (0.62)	0.069 (0.062)	T	0.018 (0.012)	0.008 (0.015)	T	-0.023 (0.080)	-0.031 (0.08)
$\ln P_t^{so}$		-0.903** (0.392)	$\ln P_t^{eg}$		-0.107 (0.096)	$\ln P_t^{eg}$		-0.397 (0.266)
$\ln P_t^{le}$		-0.215* (0.122)	$\ln P_t^{le}$		-0.022 (0.074)	$\ln P_t^{so}$		-0.307 (0.621)

Notes: 1-The superscript ***, **, and * denotes that estimated parameter is statistically significant at 1%, 5% and 10%

^a -Numbers in brackets are standard error.

Source: Own calculations using STATA (version12)

Table 4 shows that the competition among the three competitors become strong during months April and May because all of them share the same time and export sweet orange. While the period from December to a middle of Mars the Competition is between Egypt and Lebanon and there is a product differentiation where, Egypt is exporting navel orange and Lebanon is exporting sweet orange.

South Africa has not any competition most of its export season from other competitors during the period from June to September. These results show there is no competition between Egypt and South Africa in general. Simple correlation coefficients among export prices of the three

competitors support this results and show that there is no competition between Egypt and south Africa, but

Table 4: Orange export season for Egypt, South Africa and Lebanon

Country Month	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct
Egypt												
South Africa												
Lebanon												

 Navel orange  Sweet orange

Source: Own design based on; Egyptian Commercial Service in Jeddah

Lebanon is facing competition from Egypt and South Africa as shown in Table 5.

Table 3 shows that Egyptian orange market power due to the characteristics of the supply side than on the demand side by two methods, where the parametric of cost shifters are signified estimate at level 1% and 5%, but the parametric of demand shifter are signified at level 10% by SUR.

So we can explain the sources of Egyptian orange market power by two reasons: 1-Product seasonality and differentiation as shown previous. 2-Saudi Arabia's location and its demand characteristics; where Saudi Arabia is the eastern neighbor to Egypt, and comes at the top of the countries that accommodate Egyptian workers abroad, about 25 % of the total number of Egyptian workers abroad in year 2013 ([Egyptian Ministry of labor and Immigration, 2013](#)). In addition, Egyptian nationality comes in the forefront of foreigners entering and leaving Saudi Arabia ([Saudi Interior Ministry, 2013](#)). The previous reasons are reflected on the consumption of the Egyptian orange. So the market power of Egyptian orange exports is considered as a measure of the relative mark- up.

Table 5: Simple correlation coefficient matrix among main competitor's export prices

Country	Egypt	South Africa	Lebanon
Egypt	1		
South Africa	0.491	1	
Lebanon	-0.0513	-0.0755	1

Source: Statistical analysis for data based on Saudi central department of statistics & information

5. CONCLUSION

Often adopt international trade studies to determine competitors in foreign markets based on the exporter's market share and thus studying market power for them. This does not reflect the real competition among exporters especially for fresh agricultural products, which vary in seasonal production and export; it is uncertain if the reliance on annual data. The Kingdom of Saudi Arabia import market of fresh orange is an example of this case; most of the previous studies considered each of Egypt and South Africa major competitors in accordance with market share, and each has market power.

This article study Egyptian orange exports market power, research and analysis, the source of this power and what is its relationship with other competitors, taking into account export seasons.

The results of estimated model confirm just the market power of Egyptian fresh orange exports because of product differentiation and the effects of some of other factors affecting the demand for

the Saudi market. Also indicate that there is no competitive relationship between Egypt and South Africa because of the different of the export seasons.

Finally, the finding of this article may have implications on increasing the Saudi food security of orange, where it is a net importer of fresh orange. For Egypt, it must be increase its exports of navel orange, where it has product differentiation of the other competitors.

It also may encourage more detailed market power studies taking into consider the Seasonality of export products especially, fresh agricultural products.

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Appendix

Table A1. Augmented Dickey-Fuller test for unit root

Test / Variable	Exported quantity			Export price			Bilateral exchange rate			Real income
	Egypt	South Africa	Lebanon	Egypt	South Africa	Lebanon	Egypt	South Africa	Lebanon	
1 lag with drift	**2.261-	**2.491-	**2.526-	**1.996-	0.365	1.612- *	** 0.549-	- ***2.636	***3.453-	*1.422

Notes: The superscripts ***, **, and * denote statistical significance at 1%, 5%, and 10% level respectively.

Source: Own calculations using STATA software (version 12)