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Master's Thesis

Foreign Trade – Case Study of Egyptian Cotton

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Foreign Trade – Case Study of Egyptian Cotton

Abstract

The purpose of this thesis is to examine the fundamental elements of Egyptian foreign trade and the contribution of export growth to the growth of the Egyptian economy. The thesis will be divided into two parts – the theoretical and the practical ones. The descriptive, comparative, and econometric approaches will be used to identify the important of foreign trade for the Egyptian economy, the performance of cotton exports by analyzing the numeric data from Egyptian Central Bank using Gretl application. The decline in cotton production in Egypt can be attributed to a number of factors, including the mismanagement of agricultural policies, the overuse of land and water resources, the use of outdated farming methods and equipment, the lack of investment in research and development, and the lack of competitiveness of Egyptian cotton on the global market. In conclusion, the reasons for the decline in cotton production in Egypt include these factors. In order to address these factors, a comprehensive strategy will be required.

Keywords: foreign trade, exports, imports, Egypt, cotton

Zahraniční obchod – Případová studie egyptské bavlny

Abstrakt

Cílem této práce je prozkoumat základní prvky egyptského zahraničního obchodu a příspěvek růstu exportu k růstu egyptské ekonomiky. Práce bude rozdělena na dvě části – teoretickou a praktickou. Popisné, srovnávací a ekonometrické přístupy budou použity k identifikaci významu zahraničního obchodu pro egyptskou ekonomiku, výkon vývozu bavlny analýzou číselných údajů z egyptské centrální banky pomocí aplikace Gretl. Pokles produkce bavlny v Egyptě lze přičíst řadě faktorů, včetně špatného řízení zemědělských politik, nadužívání půdy a vodních zdrojů, používání zastaralých zemědělských metod a vybavení, nedostatku investic do výzkumu a vývoje a nedostatečné konkurenceschopnosti egyptské bavlny na globálním trhu. Závěrem lze říci, že důvody poklesu produkce bavlny v Egyptě zahrnují tyto faktory. K řešení těchto faktorů bude zapotřebí komplexní strategie.

Klíčová slova: zahraniční obchod, Vývoz, Dovoz, Egypt, Bavlna

Objectives and Methodology

Objectives

The purpose of this thesis is to examine the fundamental elements of Egyptian foreign trade and the contribution of export growth to the growth of the Egyptian economy. The thesis will be divided into two parts – the theoretical and the practical ones.

Methodology

Analyzing the numerical data provided by the Egyptian Central Bank, the World Bank through the use of the Gretl application will allow the descriptive, comparative, and econometric approaches to be utilized in order to determine the significance of international trade to the Egyptian economy as well as the performance of cotton exports. In addition to that, the author also estimates a linear regression equation that will help the author to identify the most important factors influencing the country's exports of cotton.

Introduction

Egypt has a long and rich history of cotton production, which has played a significant role in the country's economy for centuries. The cotton industry is one of the oldest and most important sectors in Egypt, with a profound impact on the nation's social, economic, and political landscape. Cotton is not only an essential cash crop for Egypt, but also a significant factor in the country's international trade relations. The motivation for writing a diploma thesis about Egypt's cotton production stems from the country's vital role in the global cotton market and the challenges it faces in maintaining its competitiveness. In recent years, the global cotton market has undergone significant changes, with shifts in supply and demand, fluctuations in prices, and increased competition from emerging cotton-producing countries. These changes have impacted Egypt's cotton industry, which has struggled to maintain its market share and profitability. Furthermore, the cotton sector in Egypt faces several challenges, including water scarcity, limited land availability, inefficient farming practices, and inconsistent government policies. These challenges have hindered the industry's growth and development, affecting the livelihoods of millions of farmers and workers in the cotton value chain. Given these challenges, understanding the dynamics of Egypt's cotton production is crucial for policymakers, industry stakeholders, and researchers. A diploma thesis focused on Egypt's cotton production can provide valuable insights into the industry's current status, challenges, and opportunities for growth and development. Moreover, such a thesis can contribute to the academic discourse on cotton production and trade, providing a better understanding of the factors that shape the global cotton market. The purpose of this diploma thesis is to provide a comprehensive analysis of Egypt's cotton production, including its history, current state, and future prospects. The thesis will examine the challenges faced by the industry and evaluate the policies and strategies that have been implemented to address them. Additionally, the thesis will explore the potential for innovation and technological advancements in the sector, as well as the opportunities for diversification and value addition in the cotton value chain. Finally, the diploma thesis on Egypt's cotton production is motivated by the importance of the industry to the country's economy, its impact on global cotton trade, and the challenges it faces in maintaining its competitiveness. The thesis aims to contribute to the academic discourse on cotton production and trade, provide insights for policymakers and industry stakeholders, and offer recommendations for the sustainable growth and development of Egypt's cotton sector.

The Analytical Part

The final part of the author's analysis is related to the linear regression estimation, where the author creates a regression that will describe the development of Egyptian cotton lint exports. Below, the author presents the dataset that is used for the estimation.

Table 1, dataset for the linear regression

Year	Export quantity, thousand tons	Exchange rate, domestic currency to USD	US cotton price per pound, USD	Area, hundred thousand ha	Yield, kg/ha
2001	81.609	3.97300000	0.43	3.15	1005
2002	161.12	4.499666667	0.41	3.02	960
2003	196.822	5.850875	0.6	20.18	919
2004	183.727	6.196241667	0.55	3.07	962
2005	96.749	5.778833333	0.5	2.75	743
2006	55.189	5.733166667	0.52	2.46	863
2007	128.335	5.635433333	0.57	2.4	880
2008	97.172	5.43250000	0.63	1.33	791
2009	15.441	5.544553309	0.57	1.19	790
2010	54.638	5.621942918	0.93	1.57	763
2011	61.217	5.932827652	1.36	2.2	737
2012	57.733	6.056058333	0.79	1.43	746
2013	42.027	6.87032500	0.83	1.3	729
2014	24.759	7.077608561	0.76	1.57	728
2015	37.093	7.691258333	0.63	1	697
2016	30.906	10.02540079	0.65	0.55	673
2017	27.88	17.78253352	0.73	0.91	718
2018	36.63	17.76729042	0.82	1.41	757
2019	70.781	16.77058184	0.67	1	664
2020	75.508	15.75917292	0.64	0.65	720
2021	81.084	15.64452728	0.93	0.85	717

Source: FAO, 2022.

Then, it is wise to mention the structure of the model that will be created by the author. Below, the author presents the very model that is estimated by her:
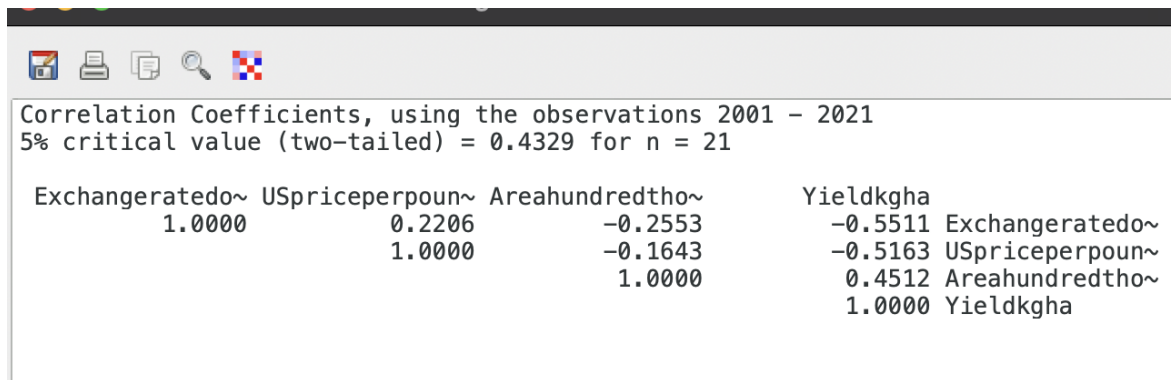
$$y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

- Y is export quantity in thousand tons.

- X_1 is exchange rate in domestic currency per one USD. The author believes that the sign of this component will be positive, since when the currency is depreciating, the quantity exported goes up.

- X_2 is US cotton price per pound of cotton. The author believes that as the average price of competitive cotton (US one) increases, it increases the export of the country as the Egyptian cotton is cheaper and demand for it increases.

- X_3 is harvested cotton area in thousand ha. The author believes that the sign will be positive as area is one of the most important factors of production in agriculture.

- X_4 is yield in kilograms per ha. The author believes that this sign will also be positive for the very same reason as for the area variable.

In addition to the estimation of the model, the author also conducts economic, statistical and econometric verifications. The author assumes absence of heteroscedasticity, absence of autocorrelation, normality of residuals and absence of multicollinearity. The author uses Gretl application for the linear estimation based on annual time series data reflecting the development of export of cotton lint in thousand tons. First, the author verifies if there is a presence of multicollinearity in the dataset using the correlation matrix from the figure below.
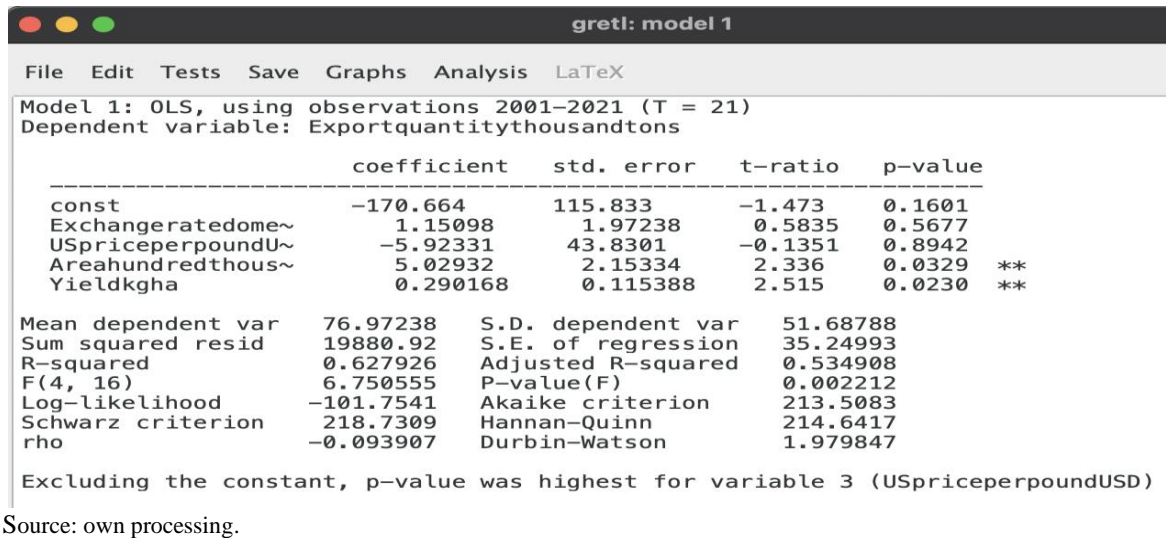
Figure 1, correlation matrix


```
Correlation Coefficients, using the observations 2001 – 2021
5% critical value (two-tailed) = 0.4329 for n = 21

 Exchangeratedo~ USpriceperpoun~ Areahundredtho~        Yieldkgha
        1.0000          0.2206         -0.2553          -0.5511 Exchangeratedo~
                        1.0000         -0.1643          -0.5163 USpriceperpoun~
                                        1.0000           0.4512 Areahundredtho~
                                                         1.0000 Yieldkgha
```

Source: own processing.

No multicollinearity as the correlation between independent variables is low, which is also underpinned by the P value attributed to the situation, where it is equal to 0.43. At the significance level of 5%, the null hypothesis about absence of correlation is not rejected, so the author can proceed to the OLS estimation.

Figure 2, OLS output

```
●  ●  ●                           gretl: model 1

File   Edit   Tests   Save   Graphs   Analysis   LaTeX

Model 1: OLS, using observations 2001–2021 (T = 21)
Dependent variable: Exportquantitythousandtons

                      coefficient   std. error   t-ratio   p-value
       ----------------------------------------------------------------
  const               -170.664      115.833      -1.473    0.1601
  Exchangeratedome~      1.15098      1.97238      0.5835    0.5677
  USpriceperpoundU~     -5.92331     43.8301      -0.1351    0.8942
  Areahundredthous~      5.02932      2.15334      2.336     0.0329   **
  Yieldkgha              0.290168     0.115388     2.515     0.0230   **

Mean dependent var    76.97238    S.D. dependent var    51.68788
Sum squared resid     19880.92    S.E. of regression    35.24993
R-squared             0.627926    Adjusted R-squared    0.534908
F(4, 16)              6.750555    P-value(F)            0.002212
Log-likelihood       -101.7541    Akaike criterion      213.5083
Schwarz criterion     218.7309    Hannan-Quinn          214.6417
rho                  -0.093907    Durbin-Watson         1.979847

Excluding the constant, p-value was highest for variable 3 (USpriceperpoundUSD)
```

Source: own processing.

Consequently, the author estimates the following model based on the dataset presented in the beginning of the chapter:

$$y_t = -170.664 + 1.15X_1 - 5.92X_2 + 5.02X_3 + 0.29X_4 + \varepsilon_i$$

Based on the model, following relationships are created:

- When the exchange rate increases by 1 unit of domestic currency to USD, the quantity of exports increases by 1.15 thousand tons.

- When the average price of US cotton increases by 1 degree, the quantity of exports decreases by 5.92 thousand tons.

- When the area increases by 1 hundred thousand ha, the quantity of exports increases by 5.02 thousand tons.

- When the yield increases by 1 kilogram per ha, the quantity of exports increases by 0.29 thousand tons.

All signs fully coincide with what had been assumed by the author (economic verification has successfully been passed), so she proceeds to the F test for the model. Based on the F value and P value related to it, which is equal to 0.002, the author can conclude that the model is significant at the significance level of 5 percent due to the fact that the null hypothesis about

insignificance of the model was rejected. Then, the author proceeds to t-tests related to each variable.

- Exchange rate is not significant at P = 0.5, where the null about insignificance was not rejected.
- Price of US cotton is not significant at P = 0.47, where the null about insignificance was not rejected.
- Area is significant at P = 0.03, where the null about insignificance was rejected and the alternative was assumed.
- Yield is significant at P = 0.02, where the null about insignificance was rejected and the alternative was assumed.

Therefore, just two variables are significance – yield and area. As for the quality of the model, it is equal to 0.62 (R square) or 0.53 for the adjusted R square, which is far from being perfect and it means that there are more factors that have not been included to this model that describe the development of cotton exports in Egypt. Below, the author presents the scatterplot where the comparison of fitted versus observed values is indicated.

Figure 3, scatterplot of fitted versus fitted
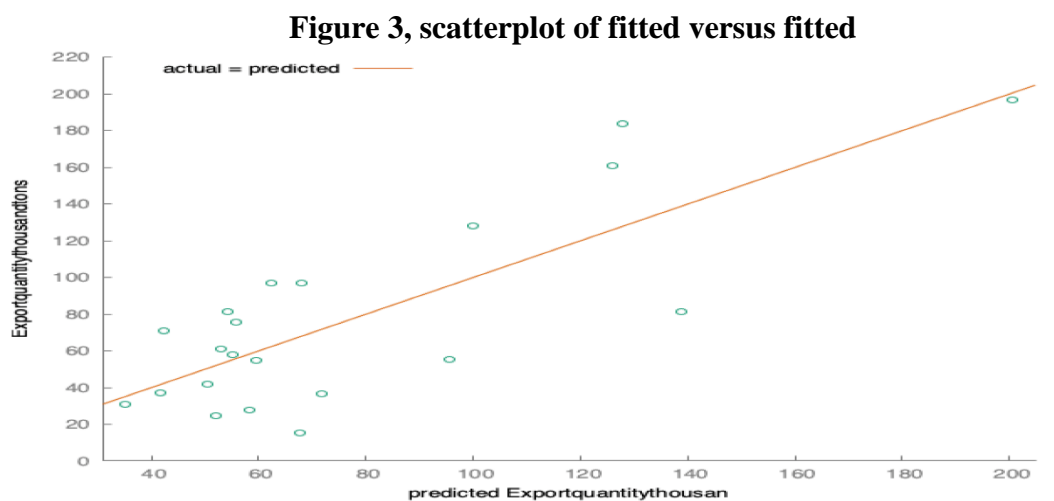
Source: own processing.

Finally, the author proceeds to the econometric verification:

Figure 4, econometric verification

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White's test for heteroskedasticity —
  Null hypothesis: heteroskedasticity not present
  Test statistic: LM = 17.0423
  with p-value = P(Chi-square(14) > 17.0423) = 0.253933

LM test for autocorrelation up to order 1 —
  Null hypothesis: no autocorrelation
  Test statistic: LMF = 0.152907
  with p-value = P(F(1, 15) > 0.152907) = 0.701271

Test for normality of residual —
  Null hypothesis: error is normally distributed
  Test statistic: Chi-square(2) = 0.722889
  with p-value = 0.696669
```

Source: own processing.

Consequently, based on the econometric tests, it can be said that there is no autocorrelation ($0.70 > 0.05$), no heteroscedasticity ($0.25 > 0.05$) and residuals are normally distributed ($0.69 > 0.05$). In addition to the absence of multicollinearity, the author can conclude that the model is BLUE.

Conclusion

Egyptian cotton presence in foreign markets and to maintain the global markets is very important, as it also supports the presence of Egyptian textiles in the domestic and global markets. This research aims to identify the factors that led to instability of the production and trade of Egyptian cotton, and to identify the mechanisms of action that can be followed to achieve productivity and marketing stable policy, and thus achieve stability of cotton farmer's income, and the preservation of the status of Egyptian cotton in global markets.

liberalization policies which adopted by the government led to a decline in area allocated for cotton cultivation and fluctuation of hectare productivity, that lower the total production of cotton at an annual rate and it is statistically significant ,where the cotton production reached 181 thousand tons in 2010 representing about 19% of the total production of the Republic during the period (2011-2020) it is decrease to 59 thousand tons which present only 6.3% from the total production at the same period which is statistically significant , that is because of the area liberalization policy which adopted by the government which led to decrease in area allocated to produce cotton from 220 thousand ha to the 65 thousand ha at the end of the study period. Also, the overuse of water resources, the use of outdated farming methods and equipment, the lack of investment in research and development, and the lack of competitiveness of Egyptian cotton on the global market. In conclusion, the reasons for the decline in cotton production in Egypt include these factors. In order to address these factors, a comprehensive strategy will be required, this strategy should also take under consideration correct the malfunction in the government's role in the market adjust, and lack of marketing information systems with regard to foreign markets for cotton, which resulted in a lot of problems and negative results such as the fluctuation of production and exports and inventory quantities, and lower returns to the farmer's market production of cotton. According to the results of previous research, the following is recommended:

1- The need for a stable policy for the production and export of cotton to ensure preservation of comparative advantage in the global markets and address the price imbalances between domestic and world prices for cotton production and supplies.

2-Directing greater investments for research on increasing productivity per hectare of cotton.

3- Provide an information base extends producers constantly with regular information about production costs and profitability of the competition sessions for cotton and how to reduce production costs and expected price for each class of cotton varieties in light of the global supply, so that the farmer can realize market conditions, which handles it.

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