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Sofistike Ürün İhracatının İlgili Sektör ve Ülke İhracatı İçerisindeki Önemi: Nano Kalsit Örneği

The Importance of Sophisticated Product Export Related Sector and In Country Export: Nano Calcite Example

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Öz

Son yıllarda inovasyon kapsamında işletmelerin üretimlerini geliştirme becerileri ve kompleks ürünlere yönelme yeteneklerindeki farklılıklar, işletme karlılığının yanı sıra, büyümesini ve ihracatını belirlemektedir. Araştırma, işletmelerin sofistike ürün geliştirmeleri sonucunda gerçekleştirdikleri ihracatın ilgili sektör ve ülke ihracatına etkisini belirlemek amacıyla hazırlanmıştır. Araştırma, sofistike ürün ihracatının, ilgili sektör ihracatı içerisindeki ve ülke ihracatı üzerindeki öneminin ve etkisinin üzerinde durulması bakımından önemlidir. Yine araştırma uluslararası ticaret çerçevesinde, nano kalsit yüksek teknoloji ürünün Türkiye genelindeki kalsit işletmelerin ürettikleri nano kalsit sofistike ürünün ihracatında yıllara göre değişiminin ortaya konulması ile Türkiye genelindeki diğer sofistike ürünlerin ihracatlarının gelecek dönemlerde yapılabilecek ülke ihracatı araştırmalarında kullanılması ve literatüre katkı sağlaması bakımından önemlidir. Araştırmanın örneklemini Türkiye genelindeki kalsit işletmeleri ile maden, taş ve toprağa dayalı sanayi ürünleri ihracatı yapan işletmeler oluşturmaktadır. Türkiye genelindeki kalsit işletmelerin ürettikleri nano kalsit sofistike ürün ihracatının, ilgili sektör ihracatına ve ülke ihracatına yönelik etkisi, 01-31 Temmuz 2020 tarihleri arasında TUİK'ten elde edilen veriler doğrultusunda incelenmiştir. Araştırma için Niğde Ömer Halisdemir Üniversitesi Etik Kurulu 01.08.2020 tarih ve 86837521-050,99-E,26830 Etik Kurul sayı numarasıyla gerekli izin verilmiştir. Araştırma verileri, Türkiye'de nano kalsit ihracatı yapan işletmelerin ihracat rakamları, ilgili sektör olan maden, taş ve toprağa dayalı sanayi ürünleri ihracat rakamları ve ülke ihracat rakamlarının karşılaştırılması şeklinde elde edilmiştir. Yapılan zaman serisi analizi sonuçları, 2000-2019 yılları arasında nano kalsit sofistike ürün ihracatının ilgili sektör ihracatına ve ülke ihracatına etkisini ve içerisindeki önemini göstermektedir.

Anahtar Kelimeler: Uluslararası Ticaret, Sosfistike Ürün, Nano Kalsit, İşletme, İhracat.

The Importance of Sophisticated Product Export Related Sector and In Country Export: Nano Calcite Example

Abstract

In recent years, the differences in the ability of businesses to improve their production and the ability to turn to complex products within the scope of innovation determine their growth and exports as well as operating profitability. The study has been prepared in order to determine the effect of the exports realized by the enterprises as a result of sophisticated product developments on the relevant sector and country exports. The research is important in terms of emphasizing the importance and impact of sophisticated product exports within

the relevant sector exports and on country exports. Also in the framework of international trade research, nano-calcite important point is to reveal the changes according to the year of Turkey's exports of high-tech products that they produce nano-calcite calcite sophisticated products of businesses in general. And also for use in the country's exports of research that can be done in the future export of other sophisticated products across Turkey. It could be counted as an important factor to contribute to the literature. The study sample with calcite mining enterprises across Turkey, constitute enterprises engaged in export of stone and earth-based industrial products. The effect of nano calcite sophisticated product exports produced by the calcite enterprises in Nigde and its region, on exports and country exports was analyzed in accordance with the data obtained from Turkish Statistical Institute (TSI) between 01-31 July 2020. Necessary permission was given for the research with the number of Ethics Committee of Nigde Omer Halisdemir University, 01.07.2020 and numbered 86837521-050,99-E, 26830 Ethics Committee. Research data, the company engaged in the export figures of Turkey exports nano-calcite mineral related sector, stones and earth-based industrial products export figures were obtained as the comparison of exports and the country. As a result of the time series analysis, between the years of 2000-2019, nano calcite gives the effect and the importance of the sophisticated product exports to the relevant sector and country export.

Keywords: International Trade, Economic Complexity, Sophisticated Product, Nano Calcite, Business, Export.

Introduction

Businesses tend towards innovation and export marketing in order to be in a superior position compared to their competitors and to reveal their different aspects compared to other businesses in their competitive environment (Kılıç & Yörükoğlu, 2020, p.46). One of the strategies that businesses use in their efforts to innovate and be different is to develop sophisticated products and enter global markets and export. Businesses that can develop sophisticated products and reach high export figures with global marketing provide themselves with extremely high added value, and therefore, sophisticated product production is among the factors that reveal the difference in growth and development among businesses today. In addition, it is thought that the exports realized by some companies as a result of sophisticated product developments reveal a difference in the sector's exports and country's exports.

Despite the fact that some firms have reached high export figures in recent years, they have not performed well enough in the international arena has led to the questioning of the content of their exports (Hüseyni & Çakmak, 2015, p.461). The export orientation, which is one of the growth strategy practices of the companies, contributes significantly to the evolution and economic growth of the business as a result of being local to international markets. However, it is observed that businesses tend to develop sophisticated products rather than ordinary products,

leading to more growth in export figures. In the framework of international trade, the study is important in terms of emphasizing the impact of the export of nano calcite high technology product by the relevant enterprise on the exports of the relevant industry, mineral, stone and soil based industrial products and country exports. İn the first part of the research, sophisticated product and sophisticated product export are analyzed theoretically. In the second part, the export figures of the enterprises that export nano calcite, the export figures of the mining, stone and soil based industrial products and the country export figures are compared.

Sophisticated Product

The word "sophisticated", which passes to Turkish from French, combines the meanings of the words complex, complex, contrived, misleading, quality, in one word (https://sozluk.gov.tr). The sophisticated product, which can also be used in terms of complex product or high-tech product, is to transform a product available in the market in terms of permanence, sustainability and profitability into a different, new and technological product suitable for sale in order to create an opportunity for the enterprise (https://bizobiz.net/urun-gelistirme). Sophisticated products, which can be presented in different product groups, are the result of the effective use of knowledge and skills in the production of related products. In the emergence of sophisticated products, the decision of business managers, production factors, and the level of technology required for production are influential (Hausmann & Hidalgo, 2011, p.310).

Export of Sophisticated Product and Importance

In recent years, sophisticated products or high-tech added-value products, which developed countries (especially Japan, South Korea, Singapore, Sweden, Switzerland, Germany, Austria, England and the United States of America) make the biggest contribution to their economic growth (Kurt & Azazi, 2018, p. 345). The fact that businesses produce knowledge, skills and efficient sophisticated products is an indication that a complex production (economic complexity) structure is strong and it can be concluded that the institutional quality level is in good condition (Yameogo et al., 2014, p.398).

Increasing the production potential of the companies producing sophisticated products and increasing the performance of the company enable the increase in the production volume. In other words, the companies producing sophisticated products provide efficiency in the production process and enable the production factors to be used more proactively (Taban & Şengür, 2014, p.356). In addition, the sophisticated products of the enterprises contribute significantly to the high added value of the products, to offer these products to the global markets through the export channel and to increase the export revenues of the enterprises (Kılıç et al., 2014, p.115). At the same time, sophisticated product production gives countries and businesses competitive power in international markets. In order to achieve competitive advantage in global markets, countries and businesses must constantly renew their technological infrastructure and use their information and communication technologies more effectively and efficiently

(Göçer, 2013, p.218-219). OECD member countries and Turkey on the size of the export sophisticated products, in order to examine their impact on development and economic growth has benefited from the data of the World Bank 1992-2016 period. As a result of the analysis conducted utilized these data, the share of exports in total exports of sophisticated products in Turkey, except for the years 1999-2001 took place in the lower level of 2%. In addition, Turkey is well behind other OECD countries in terms of producing and exporting sophisticated products (Host, 2018, p.56). The fact that not all products are the same in terms of business performance results, specializing in some products instead of developing or diversifying products can lead to more growth of the business. The more sophisticated products and variety produced by the enterprises as a result of the advanced technology they use with their talent (knowledge and skill level), this causes it to differ from other businesses.

Industries Producing Sophisticated Products

The sectors that produce sophisticated production differ from country to country and from business to business. For this reason, it is not the right approach to make a precise classification or distinction about the sectors that can produce sophisticated products. However, it is possible to say that the sectors that produce sophisticated products in general consist of automotive, energy, mining, textile, telecommunications, informatics, defense, electronics, health, recycling and security sectors. Sectors producing sophisticated products require intensive labor, talent (knowledge and skill level) and cooperation in the production process in order to maintain and increase their competitiveness in the market. Economic complexity index is used to measure this level of labor, talent and cooperation. The calculation is done as follows (Hausmann et al., 10.08.2018):

Economic Complexity Index (ECI)

$$\text{Diversity: } k_{c,0} = \sum_{p} M_{cp}$$

$$\text{Ubiquity: } k_{p,0} = \sum_{pc} M_{cp}$$

[….]

$$ECI = \frac{\vec{K} - <\vec{K}>}{\text{stdhata}(\vec{K})}$$

In this equation; The eigenvector associated with the second largest eigenvalue of $\vec{K}$, $\acute{M}cc'$ matrix, < > represents the mean.

Table 1. Economic Complexity World Ranking (2018)

Rank	Countries	ECI	Change in 5 Years
1	Japan	2,43	=
2	Switzerland	2,17	1 Up

3	South Korea	2,11	4 Up
4	Germany	2,09	2 down
5	Singapore	1,85	=
6	Austria	1,81	2 Down
7	Czechia	1,80	1 Down
8	Sweden	1,70	=
9	Hungary	1,66	=
10	Slovenia	1,62	3 Up

Source: The Atlas of Economic Complexity – Harvard University

Japan, Switzerland and South Korea are among the countries with the highest economic complexity index worldwide, and South Korea has been one of the most sophisticated products in the past five years.

Table 2. Turkey Complexity Ranking (2000-2018)

Years	Rank	ECI
2000	56	0,12
2001	55	0,16
2002	54	0,13
2003	52	0,14
2004	50	0,24
2005	48	0,28
2006	47	0,42
2007	45	0,50
2008	42	0,51
2009	46	0,46
2010	42	0,54
2011	40	0,61
2012	38	0,66
2013	42	0,58
2014	38	0,66
2015	40	0,55
2016	41	0,50
2017	36	0,64
2018	40	0,64

Source: The Atlas of Economic Complexity – Harvard University

Production of sophisticated products businesses across Turkey are given in Table 2. sophisticated products manufactured in Turkey in the last 20 years has increased rapidly.

Nano Calcite and Its Export as a Sophisticated Product

Turkey has also been involved in developing countries often export labor-intensive products and raw materials. Turkey's sophisticated products are lead to adverse consequences for the country's foreign trade with the developing countries to import from developed countries, and this usually gives the foreign trade deficit (Timberlake, 2013, p.216). Businesses that can produce sophisticated products increase their production amounts and exports and realize their growth as planned. On the other hand, companies that cannot achieve this can become a global enterprise by increasing their production by supplying sophisticated products (Kızılkaya et al., 2017, p.64). Nano calcite is the most stable form of naturally abundant inorganic substance Calcium Carbonate ($CaCO_3$) and it is present in the form of a glassy luster trigonal crystal form, which is found in various forms of crystal in nature (Çayırlı, 2017, p.166). Nano calcite is used as filling material in various industries such as paper, ink, plastic, electronics, optics, ceramics, metallurgy, pharmacy, using filling material decreases the price of the product and increases some physical and mechanical properties of composite materials (http://www.nigtasmikronize.com).

Nano calcite, which has a very high purity, transparency and excellent crystal structure, is the main input of many basic industries, as a whitener in the paint industry, as well as in the plastic industry, cement, calcium carbide, metal polish, as well as in the paint, filling and coating in paper, rubber and textile products. (Uçurum et al., 2015, p.151). Although there is no regular and sufficient information about world reserves, the world nanocalcite market size is 25 billion USD and its production is around 138.5 million tons (Yener, 2015, p. 40). Around 20 businesses that are in Turkey are conducted in Europe and these all are the world's nano-calcite exporter and make an export to many countries (https://www.turkishexporter.com.tr/tr/kalsit-ihracati/?page=2). In an environment of intense competition, businesses attach importance to research and development activities in order to create new products and increase the quality of the existing product in order to maintain their existence and gain superiority against their competitors, and tend towards the strategy of producing and exporting sophisticated products by following technological innovations. Especially the companies that produce and export nano calcite as a sophisticated product offer the advantage of rapid growth, high profits in a short period of time and an early place in global markets. The production and export of nano calcite, usually carried out by small and medium-sized enterprises, affects the local, national and international value and position of the business.

Literature Review

In the very few literature studies for sophisticated product production, it was preferred to use high technology product or R&D concepts instead of

sophisticated product production. Delibalta (2018) has also made clear mention of the study calcite sector and the importance of Turkey's foreign trade in the economy. In this study, he examined the economic contribution of mining enterprises. Delibalta said that the mining sector is a locomotive sector in the development of the country and said that an annual production of 1.5 trillion US dollars and a volume of 10 billion tons was made. The purpose of doing these researches is to provide forward-looking ideas to the institutions that will invest in the sector. In the study conducted by Uçurum (2014), the usage areas of calcite filler were examined and the sectors were examined. The calcite mentioned here is micro calcite and it is a product that uses information and technology actively and effectively. It can fall into a sophisticated product class. In this study, it shares tests and analyzes on calcite products. In his study in Weldemicael (2012), he investigated the effects of investments of foreign resources on the relevant sectors, the proximity of the production point to the market and finally the institutional quality on the country's sophisticated product production. In this article, it is said that institutional quality has a direct and positive effect on the export of sophisticated products, and countries that attach importance to the quality factor in production have more say in the export of the product.

In the study of Saadi (2011), it examined the effect of sophistication in exports on developing countries and developing countries' markets in terms of economic understanding. Although it has not developed its sample over nano calcite, its conclusion is that the export of sophisticated products increases the exports of countries in general and provides a strong competition opportunity in the global markets. It is also another result of this power bringing market growth in sophisticated product. Bayudan et al. (2014), on the other hand, examined the structural change of countries' sophisticated product exports. Examining the changes of Asian countries, the authors concluded that sophisticated product exports contribute to the economic development of countries and explained the economic development of Asian countries in this way. Hariharan et al. (2014), while talking about the structure of nano calcite, says that it is more environmentally friendly compared to other calcites and provides an advantage in terms of cost. At this point, obtaining these two effects occurred after serious and long studies on the product and added value to the product. Study of Can (2016) was found that economic globalization positively affects economic complexity. Anisja et al. (2017) also showed in their study that the smoothness rate of normal toothpastes on tooth surfaces is less than that of toothpastes produced by using nano calcite carbonate, and that toothpastes produced by using nano calcite carbonate are more beneficial for dental health and perform better cleaning. Here, the benefit of the product produced with nano calcite to the sector can be analyzed.

Hao et al. (2013) mentioned the benefits and advantages of nano calcite carbonate in asphalt and granite production. In this study, it is stated that nano calcite carbonate in granite and asphalt production will increase the stickiness of these two materials and provide cost advantage. Dong et al. (2007), in another study, it has been observed that calcium carbonate decreases

the cost and provides a price advantage in plastic film production. In this way, it has been demonstrated that it has a positive effect on the growth of the relevant sector and brings an advantage in its trade. In their studies using panel data analysis, Özer and Çiftçi (2009) found that there is a positive and high-rate relationship between R&D and exports for OECD countries. Husseini and Lighter (2015), South Korea and Turkey, as exports of being similar to the sectors that contribute to the sophisticated value as well, by exporting intensive products more technology, according to South Korea's Turkey were determined to raise the sophistication value of exports. Akın et al. (2018) examined the effect of increasing the quality of exports on the foreign trade limit of the country in their study on the quality of exports. He says that the increase in the complexity of the products produced in a country is a factor in the related country's being more competitive in the international market and in the increase in the added value it obtains.

Nano Calcite and Its Effects on Export

Customers of sophisticated companies, which are generally international markets, carry out export-oriented marketing activities. The need to be known to the public about the extent to which the companies that export sophisticated products affect the exports of the relevant sector and the country reveals the attractiveness of conducting research in this field. The research examines whether the exports of enterprises producing nano-calcite products, which are sophisticated products, have an impact / importance on the exports of the relevant sector, mineral, stone and soil-based industrial products, and the country's export.

Purpose and Importance of the Research

Recently, it is used by researchers in the scope of marketing and export marketing as well as in economic activities in the exports of the enterprises, which are realized as a result of the development of sophisticated products. The sophisticated products of knowledge, skills and technology produced by businesses are important in export activities as well as being effective on business sales. In this context, the purpose of the study, knowledge, with exports of mineral products that can perform sophisticated nano-calcite content production skills, stones and land-based industrial export sector in Turkey and reveal the relationship between the general export samples.

The research is important in terms of emphasizing the effect of nano calcite sophisticated product on the export made by the relevant sector within the framework of export marketing. At the same time results of the study, Turkey is an important country in terms of exports to be used in research that can be done in the future export of other sophisticated products in general.

Scope of the Research

The research covers the years 2000-2019. Accompanied by data for these years, Turkey's exports of the products they produce nano-calcite calcite business in

general, metal, stone and land-based industrial products export figures and overall export figures of Turkey are taken into account. The study was conducted between 01-31 July 2020 and export figures were evaluated annually.

Methodology

In the econometric analysis, the relationship between the export and the sector and country exports, which occurs as a result of the sophisticated product production of the enterprises, is analyzed. In the analysis, independent variables are calcite producing enterprises that export as a result of the production of sophisticated products, and dependent variables are the general exports of the country with the export of industrial products sector based on the mineral, stone and soil in which calcite is included. In other words, the analysis investigates the effect of calcite enterprises, which export sophisticated products, on the relevant sector and country exports.

Econometric analysis covers 2000-2019 period and annual data are used in the analysis. Data for the econometric analysis period were accessed from two sources. mineral dependent variable, stone and land-based industrial products sector, export figures for the General Directorate of Mineral Research and Exploration (MTA) from the database, Turkey's annual in from obtaining export figures Turkey Exporters Assembly (TIM) have been utilized from the database. The arguments that export sophisticated products give Turkey Statistical Institute (TUIK) were obtained from the database.

Data used in econometric analysis, symbols of data and explanations of variables are presented in Table 3.

Table 3. Data Used in Econometric Analysis, Data Symbols and Explanations of Variables

Symbol	Variable Name	Explanations on Variables
DNKUSD	Export of Companies Producing Calcite	Turkey refers to the total annual export figure of calcite producing and exporting business.
DMIUSD	Export of mining, stone and soil based industrial products sector.	Shows the annual export figures of the industrial products sector based on mineral, stone and soil in Turkey
DLIUSD	Country Exports	It shows total export figures of Turkey

Turkey exports of sophisticated products they produce calcite of businesses in general, are given the implications for export to the export sector and country concerned. The model constructed to analyze is as follows.

$$SOF_t = \beta_0 + \beta_1 FG_t + u_t \qquad (1)$$

Findings and Evaluation of the Research

The following conclusions are reached in terms of evaluating the findings obtained in line with the data obtained from the research to be structured:

The tables include the Eigenvalue and Trace test statistic values, which are the results of Johansen cointegration test.

Table 4. Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.**
None*	0.945567	85.18218	29.79707	0.0000
At Most 1*	0.886769	38.60972	15.49471	0.0000
At Most 2	0.209258	3.756545	3.841466	0.0526

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0,05 Critical Value	Prob.**
None*	0.945567	46.57246	21.13162	0.0000
At Most 1*	0.886769	34.85318	14.26460	0.0000
At Most 2	0.209258	3.756545	3.841466	0.0526

Max-Eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Generally, the fact that the trace statistic value is greater than 5% critical value indicates that there is an alternative hypothesis with at least one cointegration vector among the variables. Considering the results, it is concluded that Nano Calcite has a long-term cointegration relationship between the country's exports and related products trade in relation to Nano Calcite production and trade. In other words, when twenty years of data are examined, the relationship is more than one year. And it is also understood that nano calcite has a long-term relationship with country trade, that is, it affects the relevant sector in the long term. It is seen that Max Eigenvalue value provides cointegration like Trace Statistics value.

Table 6. VAR Analyses Results

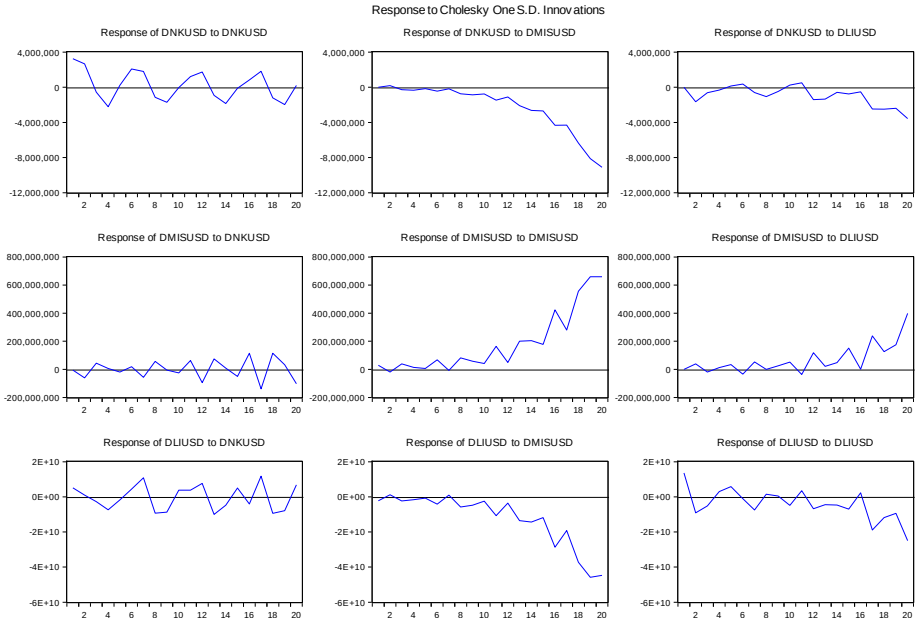
	DNKUSD	DMISUSD	DLIUSD
R-squared	0.714109	0.966510	0.606676
Adj. R-squared	0.285273	0.916276	0.016691
Sum sq. resids	6.33E+13	5.12E+15	1.30E+21
S.E. equation	3248659.	29225563	1.47E+10
F-statistic	1.665225	19.23990	1.028291
Log likelihood	-254.7564	-289.9053	-389.4335
Akaike AIC	33.09455	37.48816	49.92918
Schwarz SC	33.57742	37.97102	50.41205
Mean dependent	1959279.	49239320	6.85E+09
S.D. dependent	3842677.	1.01E+08	1.48E+10

Table 7. VAR Analyses Results

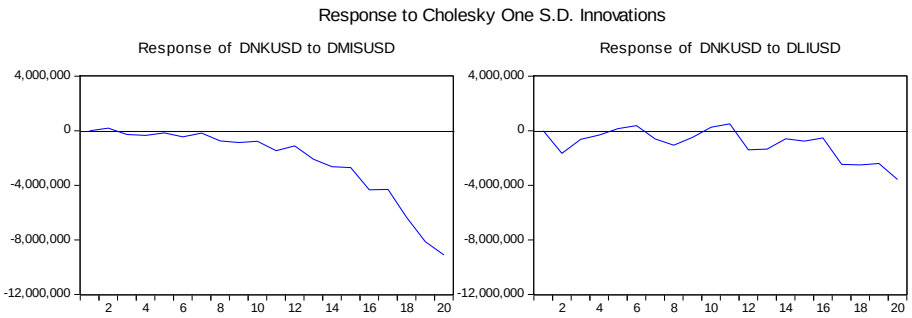
Variance Decomposition of DNKUSD: Period	S.E.	DNKUSD	DMISUSD	DLIUSD
1	3248659.	100.0000	0.000000	0.000000
2	4517050.	86.28162	0.176354	13.54202
3	4604497.	84.57165	0.529910	14.89844
4	5127783.	86.72434	0.866040	12.40962
5	5137193.	86.58366	0.970090	12.44625
6	5568834.	87.50724	1.462926	11.02983
7	5883562.	87.66704	1.399415	10.93355
8	6132675.	84.16706	2.784523	13.04842
9	6445208.	83.25345	4.346547	12.40000
10	6496070.	81.96068	5.684250	12.35507
11	6784699.	78.26102	9.875130	11.86385
12	7226746.	74.71776	11.05650	14.22574
13	7697891.	67.28891	17.12092	15.59017
14	8369462.	61.87548	24.44066	13.68386
15	8828535.	55.62631	31.33585	13.03783
16	9881941.	45.09718	44.20559	10.69722
17	11207041	37.65328	49.15274	13.19398
18	13180521	28.07373	58.76847	13.15780
19	15796730	21.11765	67.40507	11.47727
20	18581771	15.27397	72.72838	11.99765

After long-term cointegration between the mentioned variables is proved, it is possible to make predictions about the direction and severity of the effect by conducting VAR analysis through the effect response multiple graphs. At this point, the height of R^2 (Table 5) gives the fit in regression. In other words, Nano calcite production, which is a sophisticated product,

has a positive effect on the trade of the country and related products. In Table 6, it is understood that this effect has decreased over the years (DNKUSD).



Graph 1. Impact Response Analysis Results



Graph 2. Impact Response Analysis Results

When we look at the Response of DNKUSD to DMISUSD, we can interpret it as follows: When we apply a unit shock to DMIUSD, DNKUSD responds as a continuous decrease / decrease. A similar situation is when one unit of shock is applied to DLUSD, DNKUSD decreases and increases in the first ten years' period, and decreases in the second ten years' period.

Table 8. Granger Causality Test Results Applied to Trend-Free Data

Pairwise Granger Causality Tests
Date: 07/01/20 Time: 15:54
Sample: 2000 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DMISUSD does not Granger Cause DNKUSD	17	0.04684	0.9544
DNKUSD does not Granger Cause DMISUSD		0.71296	0.5098
DLIUSD does not Granger Cause DNKUSD	17	0.63869	0.5450
DNKUSD does not Granger Cause DLIUSD		1.24656	0.3222
DLIUSD does not Granger Cause DMISUSD	17	0.57786	0.5760
DMISUSD does not Granger Cause DLIUSD		1.02500	0.3882

After the existence of the cointegration relationship between the variables is revealed, a causality test is performed to determine the direction of the relationship. Detection of the causal relationship between the two series was developed by Granger (1986). Granger causality test is used to determine whether there is a causal relationship between variables and the direction of the relationship. In cases where the direction of the relationship between economic variables cannot be determined, the interaction and direction between the variables are demonstrated by Granger test. In the Granger causality test, internal and external variables are not distinguished and the interaction between the variables is measured simultaneously. The zero hypothesis and alternative hypothesis to be tested in the Granger causality test are as follows; H0: There is no causal relationship between variables; H1: There is a causality relationship between the variables.

According to the results of the Granger causality analysis, there is no causality between the data, with the 17th observation at the level of 1%, 5% or 10% significance.

Discussion and Conclusion

Exports are evaluated in parallel with the developments in global marketing in small, medium and large enterprises in developing and still developing or developed countries. At the same time, It is also considered as a proactive activity that is always valued and supported by different development programs. Exporting of sophisticated products has an important place among the revenues included in the export of the country. Enterprises exporting nano calcite product with high sophisticated product value and market value, besides being in high profit and rapid growth, also provide them the advantage of gaining an early place in global markets.

The effect of nano calcite on mineral exports and Turkish export market has been decreasing over the years. There may be two reasons of this case. Firstly, Turkish mine export basket is expanding and although nano calcite product export grows as a percentage, it shrinks in terms of its place in total mine export. Second, due to the nano-calcite product of a sophisticated product, and because of the complexity index in Turkey falling back to the

list, difficulty in making production and reduce the amount of production. This reduces the share in total mining exports. decline in Turkey will be the most appropriate description of the index decline.

On the other hand, the share of nano calcite in total country's exports emerges as an increase or decrease and in terms of complexity over the years. There may be many reasons for this increase decrease or complexity; Increasing - decreasing sales prices, fluctuations in the country's exports, economic crises in the world, finding different suppliers and a decrease in demand for the product, a pandemic period can be counted in many reasons. Which of these reasons will have a clearer effect for the subject of a separate researches.

In future studies, "The importance of sophisticated product imports in the relevant sector and country imports" and "The importance of sophisticated product exports and in meeting imports (foreign trade deficit)" can be examined theoretically or practically. The research findings are considered to contribute to the public's needs for information and for the literature, as well as to help marketing and finance managers developing business export marketing planning and strategies.

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