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# UKRAINE ON THE EUROPEAN AGRICULTURAL PRODUCTS MARKET: THE EXTRA-EU TRADE ISSUES

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**Abstract.** Trade plays a vitally important role in the provision of livelihoods for farmers and people employed in the spheres connected with the food supply chain. It also contributes to the insurance of food security across the globe and provides greater choice in goods for consumers. The data under analysis are the food, drinks and tobacco (SITC 0+1) exports amounts of Ukraine to the EU and of the EU to China. The timeframe under research is nine years – from 2011 till 2019 included. The purpose of the research is to analyse whether the agricultural products exports of Ukraine to the EU are correlated with the said exports of the EU to China and if they are, how strong the correlation is. The research is conducted using such statistic tools as the univariate analysis, the normality distribution analysis, the comparative analysis, the Pearson correlation and Spearman correlation coefficients, judging by the data scales and distributions. According to the research results, the agricultural products exports of the EU to China are approximately three times bigger than those of Ukraine to the EU. Judging by the calculated Pearson and Spearman correlation coefficients of the agricultural products exports from Ukraine to the EU and from the EU to China and their *p*-values, the H0 hypothesis of zero correlation between the said exports can be rejected.

**Keywords:** international trade, agricultural products exports, Ukraine, the European Union, China, correlation.

**JEL Classification:** C1, F14, F17, Q17.

## Introduction

The development of the whole human civilization began with agriculture, and though humanity has changed much since the times immemorial, agriculture remains very important for all the people in general and every single human being in particular. In some countries, the significance of agriculture is more obvious, but in reality every country in the world depends on agriculture more or less (TIS, n.d.). Agriculture plays a very important role in the life of any economy. In addition to providing food for people, forage for animals and raw materials for industry, agriculture also provides employment opportunities to a large percentage of the population (Dane, 2020).

As different countries are located in different climatic zones having different climatic conditions, not always preferable for the agricultural production, trade comes into play to exchange agricultural products between regions and countries. Trade plays a vitally significant role in providing raw materials as for farmers and for people employed in the food supply chain. It also contributes to reducing food insecurity across the globe and provides greater choice in consumer goods (OECD, n.d.). Trade between countries allows food to shift from surplus to deficit areas. Agricultural trade is especially important for keeping either global or regional food systems sustainable. It also helps to provide a better variety of the offered products. Without trade, the pressure on the local and national food systems to provide food security for citizens would be greater and carry with it significant burdens on natural resources and on government budgets (Ash & Greenville, 2015).

The international trade in agri-food products has grown immensely over the last twenty years, reaching almost 7% in real terms annually between 2001 and 2019. But the agricultural products trade isn't increasing just like that, it's becoming global. A growing share of agri-food trade takes a prominent place in the global value chains, that is the agricultural and food processing value chains that are developed in some countries, connecting the agri-food with the other economy sectors from across the world (OECD, n.d.). Among the agricultural goods

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traded internationally, food products make up almost 80 per cent of the total. Another category of agricultural products to be worth paying a special attention at is raw materials. Since the mid-1980s, trade in processed and other high value agricultural products has been expanding much faster than trade in the basic primary products such as cereals (WTO, n.d.).

In the present times of such challenges as the COVID-19 pandemic, climate changes, turbulences on the political stage, etc., the agricultural products suppliers, that is exporters, gain more and more importance and influence as they pro-vide something the whole humanity can't exist and function without, that is food. But, first of all, let's see what those most powerful countries in terms of the overall exports are (Figure 1).

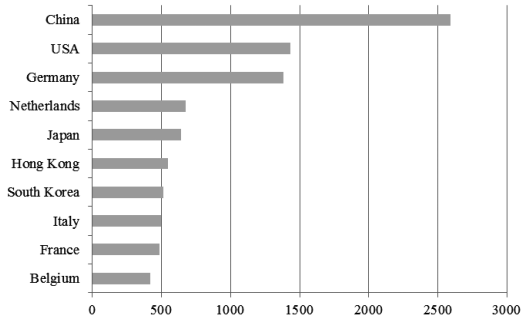


Figure 1. Leading export countries worldwide in 2020, bln USD (source: author's elaboration on the basis of Statista, 2021)

As you can see from the data visualised in Figure 1, ten leading export countries are those considered to be the most highly economically developed and politically influential. Among the other reasons, it is because exporting is often touted as a way to increase economic growth (Bernard & Jensen, 2001). More than that, exports help a country to earn valuable foreign exchange. The foreign exchange can be utilized to pay for imports and for repayment of external loans (Google Sites, n.d.). But, sticking to the subjects of the research, it should be pointed, that the first place among ten leading export countries is taken by China in 2020. We cannot find the EU in the figure given above as countries alone, not countries unions, are presented in it. But, what is significant is that five out of ten leading export countries in 2020 are the EU member states. In addition, the U.S. exports some $2 trillion in goods and services to world markets annually (International Trade Administration, n.d.). And more than that, the EU, the United States and China accounted for 43% of world trade in goods in 2020 (Eurostat, 2021). So, thanks to the data visualised in Figure 1, we see what countries are the biggest exporters in the world as for 2020. And what about Ukraine? Ukraine is not among them. More than that, it is not even among the 20 leading export countries. Thereby, we see the scientific gap in the issue – in most scientific and market researches the correlation, and therefore the level of influence, is calculated and analysed as between the equivalent players. Equivalent means similar in territory, economic development and political influence. A country, small in territory or under developed in the economic sense, is not considered to be able to have any influence on the big and economically/politically influential global players. And that is the background having induced the author to conduct the research presented in the article. Therefore the purpose of the research as well as the scientific problem to be resolved is to assess whether such a small (in terms of its territory if compared to the biggest countries in the world) and not that economically influential country as Ukraine has any correlation with such economically and politically powerful global players as the EU and China. And that, in turn, is the novelty of the research. The choice was given to the agricultural products exports because of all the proofs for their importance stated above. More precisely, the exact purpose of the study is to analyse whether the agricultural products exports of Ukraine to the EU have any correlation with the agricultural products exports of the EU to China and if they do, how strong that correlation is.

## 1. Methods and materials

Agricultural exports are an important source of economic profit for many countries (Xu & Hsu, 2022). A significant growth in the amounts of real exports in most cases causes the growth of the real gross national product because of the definite reasons. Exports are the source of the foreign currency, which, in turn, is used to purchase the necessary manufactured goods, capital and technology. Because of the foreign rivalry pressure, the motivations for the technological development, economies of scale, and higher ability operation leading to extra resourceful management exports indirectly contribute to the economic growth (Slaw et al., 2018). Taking into account everything stated above, the importance of the precise and full data analysis goes without saying, as the appropriately analysed data can address some simple yet complicated questions in trade like what export potential the commodity holds, whether the commodity is competitive or not in the international market, what the new markets one should look up to, and other questions of the kind. In other words, this information could make huge difference in the decision-making of traders and policymakers… (Singh, 2020).

The data under analysis are the food, drinks and tobacco (SITC 0+1) exports amounts of Ukraine to the EU and of the EU to China. SITC stands for the Standard International Trade Classification. It is a product classification of the United Nations used for external trade statistics (export and import values and volumes of goods), allowing for international comparisons of commodities and manufactured goods (Eurostat, n.d.). The timeframe under research is nine years – from 2011 till 2019 included. The purpose of the research is to analyse whether the

agricultural products exports of Ukraine to the EU are correlated with the said exports of the EU to China and if they are, how strong the correlation is. To achieve the purpose of the research, the amount and dynamics of the agricultural products exports from Ukraine to the EU and from the EU to China were compared, having used a line graph for the purpose of better data visualisation; the agricultural products exports from Ukraine to the EU and the agricultural products exports from the EU to China were analysed separately, having used bar charts for better data visualisation; trend lines were built for the data analysed through the timeframe under research plus two more following periods taken for the projection making with the help of appropriate functions, having chosen from the exponential, linear, logarithmic, polynomial and power functions (the criterion for the right choice of the function to build the general trend line for the data under research was the values of the $R^2$ coefficients); the Pearson and Spearman correlation coefficients as well as their $p$-values were calculated and analysed. The Pearson's Correlation Coefficient is also called as Pearson's r, the Pearson product-moment correlation coefficient (PPMCC), or bivariate correlation. It measures the linear correlation between two analysed variables. Pearson's correlation coefficient is the covariance of two variables divided by the product of their standard deviations (Pathak, 2020). The Spearman correlation coefficient is a nonparametric, correlation statistic that measures the strength of the association between two rank-ordered variables. The Spearman correlation coefficient does not meet the normal distribution assumption of parametric statistics (Frey, 2018).

## 2. Discussion

Ukraine is a country located in the Eastern Europe (Britannica, 2022). Ukraine is called a breadbasket of Europe as it contains approximately 25% of the world's most fertile black soil lands. The main agricultural crops thanks to which Ukraine is known as one of the world agricultural products and exports leaders are grains and forage crops, including wheat, corn, barley, sunflower, sugar beet, legumes, fruits and vegetables, tobacco, etc. (DLF, 2020). Thanks to its favourable geographical location, rich natural resources and accelerated pace of development of the agricultural sector, Ukraine could become a world leader in food production (Pidorycheva, 2018), as fertile soils and temperate climate give Ukrainian producers strong competitive advantages (Burachek & Mykhailenko, 2018). Ukraine has a rather large consumer market, educated and cost-competitive work force as well as rich natural resources. Ukraine's Association Agreement with the EU gives Ukraine preferential market access and is accelerating Ukraine's economic integration with the EU (U.S. Department of State, 2020). The Association Agreement (AA) and Deep and Comprehensive Free Trade Area (DCFTA) are important tools to bring Ukraine and the EU closer together as these documents promote deeper political ties between the said subjects, stronger economic links and the respect for common human values. The main aim of the AA/DCFTA is to boost trade in goods and services between the EU and Ukraine by lowering trade tariffs and gradually changing Ukraine's rules and laws on trade bringing them in line with the EU's ones. Due to the said agreements implementation, the EU is already Ukraine's largest trading partner, accounting for around 40% of its trade in 2019. As for Ukraine, it is the 18$^{th}$ trading partner of the EU accounting for approximately 1.1% of the EU's total trade (European Commission, 2021).

To start the research, let's compare the amount and dynamics of the agricultural products exports from Ukraine to the EU and from the EU to China visualized in Figure 2.

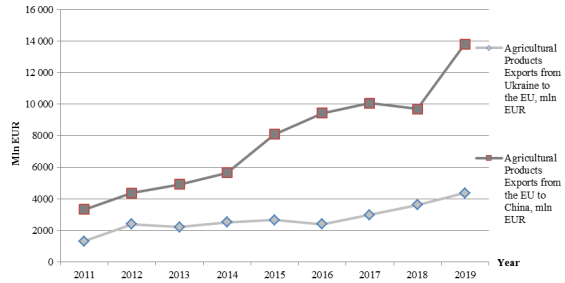


Figure 2. Agricultural products exports from Ukraine to the EU and from the EU to China, mln EUR (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

Having looked at the data visualized in the figure given above, we see, that the exports amounts under research differ either in their dynamics or in the volume. From the beginning of the timeframe under analysis till 2014 included the agricultural products exports from Ukraine to the EU were approximately two times less than those from the EU to China. But after 2014 the difference between the agricultural products exports amounts was three and even four times, having decreased to three times in 2019. The dynamics of the exports amounts under research also differ from each other. The agricultural products exports of Ukraine to the EU dynamics is flatter than that of the EU to China, having amount decreases in 2013 and 2016, while during the rest of the years the amount increases were observed. Visually, the Ukrainian agro exports to the EU dynamics can be divided into three upward segments: 2011–2012, 2013–2015 and 2016–2019. As for the agro – products exports from the EU to China dynamics, it looks similarly with the one of Ukraine's till the year 2014 included, after which we observe a sharp increase of the agro – exports till the year 2017 included. What draws our attention the most is the absolute upward trend of the EU – China agro – exports with the only exception in 2018.

To expand the research, let's follow the agricultural products exports from Ukraine to the EU for the timeframe under analysis presented in Figure 3.

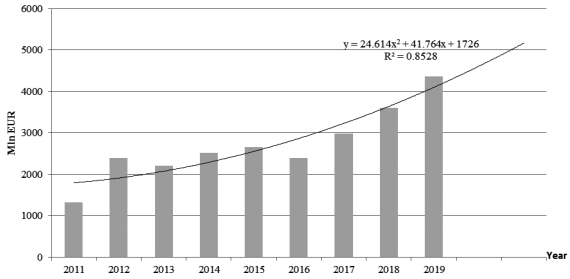


Figure 3. Agricultural products exports from Ukraine to the EU, mln EUR (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

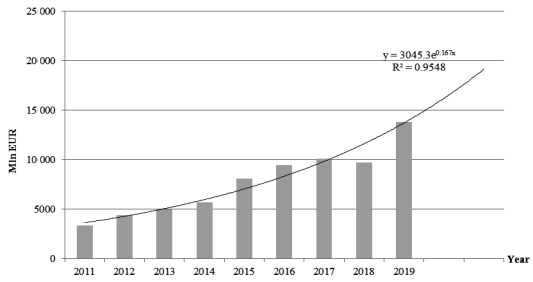


Figure 4. Agricultural products exports from the EU to China, mln EUR (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

Having cast a closer look at the data presented in Figure 3, we state, that despite of some fluctuations in the agricultural products exports from Ukraine to the EU, meaning – two amount decreases and all the rest with the increases of different values, the trend line is upward through the whole timeframe under analysis. The trend line for the data analysed was built using the polynomial function, having chosen from the exponential, linear, logarithmic, polynomial and power functions. The criterion for the right choice of the function to build the general trend line for the data under research was the values of the $R^2$ coefficients. Of course, the $R^2$ coefficient is considered to be only one of the indicators to point to the right function, but the research presented in the article is not about the pure statistical one, using means and tools of statistical analysis as a helping tool to conduct the research at the fullest way possible. The trend line was built not only for the data research during the timeframe under analysis, but continued through two more periods ahead taken to make the projection. As we can see from the data visualisation, the trend line during the projected periods continues its upward direction.

As for the second subject of the presented research, it should, firstly be said, that the EU is committed to open trading relations with China. On the 30th of December, 2020, the EU and China concluded the negotiations on the Comprehensive Agreement on Investment (CAI). According to the agreement the EU investors will have a better access to China's market. But, nevertheless, the Comprehensive Agreement on Investment has not been ratified yet. Therefore, it has not entered into force yet (European Commission, 2022). But, nevertheless, China is considered to be the most important trading partner of the European Union: in 2020, the EU and China traded goods worth € 586 bn (imports and exports). This represents 16% of all EU trade in goods. In 2020, China was the most important EU import trade partner (22%), followed by the United States (12%). On the other hand, the United States imported the biggest amount of goods exported from the EU (18%), with China ranked second (10%). Compared to 2000, China's share of EU trade has nearly tripled from 5.5% to 16.1% (DEStatis, n.d.).

To compare the agricultural products exports from Ukraine to the EU with those from the EU to China, let's analyse the latter with the help of the data visualisation in Figure 4.

The thing that catches one's eye immediately after having looked at the data visualised in the figure given above, is a rather big difference between the agricultural products exports amount of the first year under research, that is the year 2011, and the last one, that is 2019. The agricultural products exports from the EU to China in 2019 are approximately four times higher than those of 2011. The possible explanation of such an increase, especially in the year 2019 itself, may be China's switch from the US to the EU due to the turbulences in China – USA trade relations. The trend line for the data under research is therefore upward not only through the whole timeframe under analysis, but during two following periods taken for the projection making as well. The said trend line was built using the exponential function, having chosen from the exponential, linear, logarithmic, polynomial and power functions, taking into account the values of the $R^2$ coefficients. What should be pointed to here is that there was a little bit difficult to choose the right function to build a trend line for the data of the agricultural products exports from the EU to China as the values of the $R^2$ coefficients of the exponential, linear, polynomial and power functions had slightest differences.

Statistics helps better evaluate the market access opportunities; give more options for the decisions making about the negotiating strategies; assess the comparison of commitments as well as provide a statistical background for the discussions and disputes settlings. Not only international corporations and organisations but private business entities also need the information mentioned above to be aware of the possibilities offered by the liberalization of trade. It should also be added, that the analysis of markets also requires the trade data to be linked to the output data, whether in terms of activities or of products (UNO, 2002). To make the comparative analysis of the agricultural products exports from Ukraine to the EU and from the EU to China fullest possible, let's analyse the simple statistics of the data under research presented in Table 1.

To better understand the data presented in the table given above, it should be explained that "N" stands for "number of observations", "Std. Dev." – for "standard

Table 1. Simple statistics of the agricultural products exports from Ukraine to the EU and from the EU to China (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

| Variable | N | Mean | Std. Dev. | Sum | Min. | Max. |
|---|---|---|---|---|---|---|
| Agricultural products exports from the EU to China, mln EUR | 9 | 7702 | 3392 | 69320 | 3334 | 13795 |
| Agricultural products exports from Ukraine to the EU, mln EUR | 9 | 2714 | 869.68432 | 24428 | 1315 | 4362 |

deviation", "Min." – for "minimum value" and "Max." stands for "maximum value". To have a broader analysis of the data, let's compare their simple statistics. The mean of the agricultural products exports from the EU to China is approximately three times bigger than that of Ukraine to the EU. The standard deviation of the ag-exports from the EU to China is almost four times bigger than that of Ukraine to the EU. The difference between the sums of values of the data sets under research is the same as the one between the means, to be precise it is 2.8 times with the favour given to the agri-exports of the EU to China. The minimum value of the agricultural products exports from the EU to China is 2.5 times bigger than that of Ukraine to the EU and the maximum one – 3.2 times bigger. The results of the comparative analysis of the simple statistics once again prove the fact that the agricultural products exports of the EU to China are approximately three times bigger than those of Ukraine to the EU.

Taking into account everything stated above, the next step is to be made in the research, that is to analyse if the agricultural exports of such a small (according to the territorial basis if compared to the EU and China) country as Ukraine correlate with the said exports of the EU to China. To do that, the Pearson correlation coefficients will be calculated and analysed. To refresh one's memory, it should be stated that Pearson correlation coefficient or Pearson's correlation coefficient or Pearson's r is defined in statistics as the measurement of the relationship strength between two variables and their association with each other. That is, Pearson's correlation coefficient calculates the effect of change in one variable when the other variable changes (QuestionPro, n.d.). The Pearson correlation coefficients of the agricultural products exports from Ukraine to the EU and from the EU to China are presented in Table 2.

Judging by the calculated Pearson correlation coefficients of the agricultural products exports from Ukraine to the EU and from the EU to China and their *p*-values presented in the table given above, the H0 hypothesis of the zero correlation between the exports amounts

Table 2. Pearson Correlation Coefficients of the Agricultural Products Exports from Ukraine to the EU and from the EU to China (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

| Pearson Correlation Coefficients, N = 9<br>Prob > \|r\| under H0: Rho = 0 | | |
|---|---|---|
| | Agricultural products exports from the EU to China, mln EUR | Agricultural products exports from Ukraine to the EU, mln EUR |
| Agricultural products exports from the EU to China, mln EUR | 1.00000 | 0.88570<br>0.0015 |
| Agricultural products exports from Ukraine to the EU, mln EUR | 0.88570<br>0.0015 | 1.00000 |

mentioned above can be rejected. The value of the Pearson correlation coefficient between the agricultural products exports from Ukraine to the EU and from the EU to China points to the correlation between the data sets under research close to perfect. On the other hand, we should remember one of the rules of the statistics, that is the rejection of the H0 hypothesis doesn't mean the confirmation of the H1 hypothesis.

As the data in none of the data sets under research can be called normally distributed, being right skewed in both cases, another test is to be conducted to double check the presence/absence of the correlation between the exports mentioned above. The Spearman correlation coefficients will be calculated to prove/reject the H0 hypothesis. Just to remind, Spearman correlation coefficient is a nonparametric data analysis technique. It measures the strength and direction of the statistical dependence of ranking between two variables. Spearman correlation does not have any assumption about the data distribution (Voxco, n.d.).

Table 3. Spearman correlation coefficients of the agricultural products exports from Ukraine to the EU and from the EU to China (source: author's own elaboration on the basis of the data from Eurostat, 2022a)

| Spearman Correlation Coefficients, N = 9<br>Prob > \|r\| under H0: Rho = 0 | | |
|---|---|---|
| | Agricultural products exports from the EU to China, mln EUR | Agricultural products exports from Ukraine to the EU, mln EUR |
| Agricultural products exports from the EU to China, mln EUR | 1.00000 | 0.91667<br>0.0005 |
| Agricultural products exports from Ukraine to the EU, mln EUR | 0.91667<br>0.0005 | 1.00000 |

As it was stated earlier, the Spearman correlation coefficients calculation doesn't require the analysed data to be normally distributed, the said test seems to be more robust with the data sets having deviations from normality. The Spearman correlation coefficients and their *p*-values calculated by the author and presented in Table 3 allow us reject the H0 hypothesis of the zero correlation between the agricultural products exports from Ukraine to the EU and from the EU to China. The Spearman correlation coefficient of the agricultural products exports of Ukraine to the EU and of the EU to China has even the higher value than that of the Pearson coefficient presented above and is closer to denote almost perfect positive correlation between the exports analysed. And that adds a lot to the understanding of the agricultural products market functioning as well as the geopolitical events happening in Europe nowadays.

## Conclusions

Agriculture plays a vitally important role in any economy as well as it is commonly known as the backbone for developing countries economic systems (Ismail, 2021). The agricultural production of the European Union is dominated by livestock products (including dairy), grains, vegetables, wine, fruits, and sugar. The commodities to be mostly exported are grains (wheat and barley), dairy products, poultry, pork, fruit, vegetables, olive oil, and wine (Economic Research Service & U.S. Department of Agriculture, 2022). In 2020, the extra-EU agricultural products trade accounted for 9% of the total extra-EU international trade in goods. This was one percentage point higher than that in 2019, mostly due to the trade decrease of the other goods because of the Covid-19 pandemic. Between 2002 and 2020, the agricultural products trade of the European Union doubled (Eurostat, 2022b).

The main issues of the EU with Ukraine relations are pointed out in the Ukraine–European Union Association Agreement and the Deep and Comprehensive Free Trade Area (DCFTA). The conclusion of the document mentioned above point to the fact, that the EU and Ukraine are seeking more and more closer relationships with each other, approaching gradual economic integration and deepening of the political co-operation with each other (European External Action Service, 2021). The EU is Ukraine's largest trading partner while Ukraine takes the 18$^{th}$ place among the trading partners of the EU (European Commission, 2021). Though, Ukraine is not among the most important trade partners of the EU and the country is not considered a highly economically developed one, the research was conducted as to assess whether the agricultural products exports of Ukraine to the EU have any correlation with the agricultural products exports of the EU to China."

According to the research, the exports amounts under research differ either in their dynamics or in the volume. The agricultural products exports amount of the EU to China is approximately three times bigger than that of Ukraine to the EU. The agricultural products exports of Ukraine to the EU dynamics is flatter than that of the EU to China, having amount decreases in 2013 and 2016, while during the rest of the years the amount increases were observed. The agricultural products exports of the EU to China have absolutely upward dynamics with the only exception in 2018. Such a constant upward trend of the agricultural products exports from the EU to China as well as its sharp increases in 2015 and 2019 point to the extreme importance of the agricultural production of the EU for China and the intensification of the EU – China trade relations. One should also point to the outstanding difference between the agricultural products exports from the EU to China in 2019 and those of 2011, which is approximately four times higher. The possible explanation of such an increase, especially in the year 2019 itself, may be China's switch from the US to the EU due to the turbulences in China – USA trade relations.

The trend line of the agricultural products exports of Ukraine to the EU is upward through the whole timeframe under analysis as well as two following periods taken for the projection making. The trend line for the data analysed was built using the polynomial function. The trend line for the agricultural products exports of the EU to China is upward not only through the whole timeframe under analysis, but during two following periods taken for the projection making as well. The said trend line was built using the exponential function. The trend lines for the data analysed were built using the appropriate function, having chosen from the exponential, linear, logarithmic, polynomial and power functions. The criterion for the right choice of the function to build the general trend line for the data under research was the values of the $R^2$ coefficient. The results of the comparative analysis of the simple statistics once more prove the fact that the agricultural products exports of the EU to China are approximately three times bigger than those of Ukraine to the EU.

Judging by the calculated Pearson correlation coefficients of the agricultural products exports from Ukraine to the EU and from the EU to China and their *p*-values, the H0 hypothesis of the zero correlation between the exports amounts mentioned above can be rejected. The value of the Pearson correlation coefficient between the agricultural products exports from Ukraine to the EU and from the EU to China points to the correlation between the data sets under research close to perfect. The Spearman correlation coefficients and their *p*-values allow us reject the H0 hypothesis of the zero correlation between the agricultural products exports from Ukraine to the EU and from the EU to China. The Spearman correlation coefficient of the agricultural products exports of Ukraine to the EU and of the EU to China has the higher value than that of the Pearson coefficient and is closer to denote almost perfect positive correlation between the exports amounts analysed.

So, despite the fact, that Ukraine has experienced acute political, security, and economic challenges during

the past six years (World Bank in Ukraine, 2020), in addition it is not among the biggest and most highly economically developed countries in the world, according to the research results presented in the article, the country should be taken into consideration when analysing, planning and forecasting the global agricultural products trade flows in general and every single country's one in particular, as Ukraine proves to be an important agricultural products supplier, that, in turn, is vitally important for ensuring food security in the times of the challenges and turbulences of nowadays. According to the research, the agricultural products exports from Ukraine to the EU have almost perfect correlation with the said exports from the EU to China, that means Ukraine's capacities in the agricultural production and exporting should be taken into account when analysing, planning and forecasting either the agro – exports from the EU to China and, therefore, the agro – imports to China from the EU. Another significant issue to pay attention at is, that, if it is a matter of common knowledge, that the economic situation in any given country influences its exports amount, then the turbulences in the political life of the given country are the issue to be solved by the country itself and aren't generally considered to be a matter of direct influence especially on the agro – exports. But, if the country has such a strong correlation with big and influential global players, the smallest turbulences in any sphere of its functioning should be like a bell for everybody involved to pay attention at and help resolve the matter in order to protect at least one's own interests as well as the trade relations being worked on and created for years. The research presented above as well as its results will be interesting and useful for the public administration officials either of the governmental or NGOs of the international, multinational and local levels, business and non-business entities working in the spheres connected with agriculture and international trade, academic community representatives, decision makers of all the levels as well as beginners and experienced specialists in the statistical and data analysis. The research presented in the article is worth to be further expanded in the direction, but not limited to, of the adding more international trade subjects either big and influential or small but exporting substantial amounts of agricultural products in order to analyse what country/country unit influences the others agricultural products exports the most, which of them have the strongest correlations and what projections of the agricultural products exports they have for at least some two – three years. There are still definite limitations for the research expansion, as in any, like the availability of the statistical data needed for the future research, especially in the case with Ukraine, due to the extraordinary situation in the country and absolute unpredictability of its duration as well as the time needed for the renewal of the country's international trade functioning.Another limitation able to influence the research itself as well as its results is the existing and possible forthcoming challenges not only one country/country unit but the whole humanity is facing nowadays, like the COVID-19 pandemic, climate changes, turbulences in the political life of even the smallest and underdeveloped country and all the changes and limitations they can cause. But, despite all the challenges and limitations existing nowadays and those possible to emerge in the future, the topic of the agricultural products exporters correlation is extremely interesting, vitally important and worth to be further researched.

## Disclosure statement

I declare that I do not have any competing financial, professional, or personal interests from other parties.

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