Czech University of Life Sciences Prague

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Extended Abstract of Bachelor Thesis

Export of Czech commodities to Kazakhstan in comparison to other export destinations

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Czech Agricultural Export to Kazakhstan

Abstract

This thesis focuses on finding the potential of various commodities in export from Czech Republic to Kazakhstan. The theoretical part will identify the current situations of commodities and their possible restrictions with observed period will be from 2016 to 2021.

The practical part will analyse each commodity through time series, correlation analysis or through regression. The regression analysis will vary between linear and polynomial depending on the type of data. Results for export to Kazakhstan will be compared to Russia, Serbia and Turkey where applicable. Correlations and residuals between Kazakhstan and the three picked non-EU countries will be calculated.

This thesis will list the commodities with potential out of the commodities analysed and state the decision whether the item views Kazakhstan as a potential destination or not.

Keywords: Kazakhstan, Export, Agriculture, Commodities, Correlation, Chain base Index, Fixed base Index, mean, Correlation of residuals, Serbia, Russia, Turkey

Český agrární vývoz do Kazachstánu

Abstrakt

Tato práce se zaměřuje na zjištění potenciálu různých komodit při vývozu z České republiky do Kazachstánu. V teoretické části bude zjištěn současný stav komodit a jejich možná omezení, přičemž sledované období bude od roku 2016 do roku 2021.

V praktické části budou jednotlivé komodity analyzovány pomocí časových řad, korelační analýzy nebo pomocí regrese. Regresní analýza se bude pohybovat mezi lineární a polynomickou v závislosti na typu dat. Výsledky pro vývoz do Kazachstánu budou případně porovnány s Ruskem, Srbskem a Tureckem. Budou vypočteny korelace a rezidua mezi Kazachstánem a třemi vybranými zeměmi mimo EU.

V této práci budou uvedeny komodity s potenciálem z analyzovaných komodit a bude uvedeno rozhodnutí, zda daná položka považuje Kazachstán za potenciální destinaci, či nikoli.

Klíčová slova: Kazachstán, vývoz, zemědělství, komodity, korelace, řetězový základní index, index pevné základny, průměr, korelace reziduí, Srbsko, Rusko, Turecko.

1 Objectives and Methodology

1.1 Objectives

The aim of this thesis it to identify agricultural commodities with the highest potential for Czech export to Kazakhstan. Such evaluation will be based on comparison of statistical data for Kazakhstan itself as well as the data for three major non-EU countries: Russia, Serbia, Turkey.

1.2 Methodology

The values for the import and export between Kazakhstan and Czech Republic with side comparisons of Turkey, Russia and Serbia and among other will be held in specific files for each commodity that will be compared and evaluated. The data will be evaluated through the use of Multiple linear Hypothesis testing including instances of hypothesis testing in simple regression. The chi-square test or the Fisher exact test will be used depending on the necessary conditions for the specific situations. Relative risk will be used to calculate chances of one country exporting or importing a specific commodity compared to another, determining if it is more likely to happen or not. Basic statistical tools such as the mean, mode, max and min will be used to describe the data sets. The correlation coefficient will be used to measure the linear relationship between two numerical variables, in order to remove trend the correlation will be used on the residuals of the actual and theoretical data calculated through regression. Predictions for the future year will be made through the use of confidence interval estimates and quadratic trend functions. Polynomial regression will be used to predict data that has more shifts from increases to falls, for more accurate data predictions, which would otherwise off put the estimate of a linear regression. Time series will be used to describe the average growth rate as well as the Fixed base index and Chain base index.

Theoretical Part

In accordance with journal article from M. Svatoš and L. Smutka, the paper's focus is on pinpointing different advantages in different commodities of the Czech agrarian sector. The commodity total is split into ten categories and later shown in a graph, this enables a more concrete approach to each commodity type. In such a way that helps illustrate the competitive ability of agrarian trade in Czech Republic (Svatoš & Smutka, 2012).

There is used Balassa index, RCAI index, LFI, geometric mean and some basic statistical methods. For RCAI index, if the value is lower than 1, the conclusion would be that the country has a comparative disadvantage concerning the commodity in question. The conclusion for this work states that CZ is more dependent on agrarian trading than in the past (Svatoš & Smutka, 2012).

Next chapter focuses on identification of different commodities that are exported or imported into Kazakhstan from Czech that all based off Artom Lukashov's reports. The potential of this country consists of 3 main reasons: The vast territory of Kazakhstan (9^{th} largest country in the world) including the fact that the country is a neighbour of the most promising market in the world – China. The growing population and GDP resulting in an increase in demand for higher quality agricultural products. At this point in time the economy of Kazakhstan was driven mainly by the mining sector (mining and exports of oil and natural gas), resulting in the policy of Kazakhstani government to heavily subsidize (to input money) into agricultural and food sector with the help of funds that are generated in the state budget by the mining sector (Lukashov, 2021).

Various restrictions affect the import prices such as bread, flour, salt, eggs, rice, sugar, butter, beef and chicken meat, milk and some vegetables such as carrots (Lukashov, 2022). The share of investment funds being put into the agricultural sector in Kazakhstan is at 6.1%, leading to the understanding and the possible conclusion that there will be more of an export of commodities from Kazakhstan into other countries such as Czech Republic (Lukashov, 2021). The amount of fish exported in this year is at 20.8 million dollars, which doubles the amount from the previous year of 2020. Almost 90% of this value comes from caviar. (Lukashov, 2021). The event in KazAgro and KazFarm organizations showed that there is a high interest on the Czech breeding cattle area sector (Kalinová, Olga; Velvyslanectví ČR v Nur-Sultanu, 2021).

2 Practical Part

The data for the chosen commodities is to be statistically analysed with the use of time series tools such as fixed base and chain base Index, both giving a certain showcase of the characteristic of how the data changed through the set time range of 6 years from the year 2016 to 2021. The correlation coefficient will be used to compare Kazakhstan's data to the data of three chosen non-EU countries, for this work Russia, Serbia and Turkey were chosen. The correlation analysis is to be analysed by its residuals in order to eliminate the effect of a possibly present trend. To eliminate the trend from the correlation it is necessary to create theoretical data values which will later be subtracted from the actual values to find residual values which will then be correlated among Kazakhstan, Serbia, Russia and Turkey to find the true correlation without the trend affecting it. Regression for prediction is used through polynomial regression with parabola. This is used for data concerning Kazakhstan for commodities where the shifts are very drastic and thus may affect the prediction were it a linear regression.

The commodities selected to be evaluated are: Bovine animals (Live), Sheep and goats (live), Birds' eggs (in shell), Malt whether or not roasted (including malt flour), Vegetable products, roots and turbes, Food wastes and prepared animal feeds, Beer made from malt, Oil seeds and oleaginous fruits.

The bovine animal (live) commodity has a polynomial equation of $y'=96.554x^2 – 330.06x + 658.4$, this prediction results in a predicted value of export in 2022 to 3058.126 thousand USD. Along with the prediction as well as the stable correlation of varying from medium weak strength to highly strong, in addition to the exclusion of trend and the anomaly year, the values suggest that Kazakhstan has potential.

For sheep and goats commodity, only Serbia could be compared to Kazakhstan due to lack of data for the other two countries. The correlation between the two countries showed a very weak negative coefficient of -0.0544. The inconsistent history of the export to the country of Kazakhstan creates doubts on its futre, while its recent year shows a possible spark of intrest in the upcoming years. Leading to a very unclear potential for the country of Kazakhstan at the moment.

Birds' eggs (in shell) commodity predicts an estimate of 3343.85 thousand USD in the year 2022. The coefficient of correlation without trend for both Russia and Serbia compared to Kazakhstan showed a relatively strong correction strength of 0.71798 and

0.68088 respectively. Due to the sudden decrease in export to Kazakhstan for birds' eggs in shell in 2021, it is necessary to be warry as this drop is mainly due to the cause of restrictions related to veterinary issues in the country and thus may be temporary.

The Malt whether roasted (including flour) commodity through the fixed and chain base Index calculations show that in the set time range, Kazakhstan is importing 24.4681% from Czech Republic, while rising up in 2021 having 164.2857% of what the country exported in 2020. Kazakhstan has a high possible range of export interest and combining it with the fact that the country is on the rise with the export from Czech Republic regarding this commodity, Kazakhstan can be listed as having potential on importing it.

For the Vegetables products commodity, the chain base Index shows a large upswing in the year 2021 being at 344% than what it had the year prior. The correlation coefficient without trend is calculated without Turkey, due to lack of data for export to this destination during the time range. The correlation between Kazakhstan and the other countries is weak, with the highest being 0.3049. the steady increase of Kazakhstan through the years as well as the steady chain base results show potential for this commodity.

The food wastes and prepared animal feeds commodity shows a decrease overall through the time range in the fixed base index calculation, while a slight increase in the chain base having an index of 1.019608. The statistical time analysis using fixed and chain index in table 17 show additional proof that Kazakhstan has little potential for the import of food wastes and prepared animal feeds from the Czech Republic.

Beer made from malt show that while Kazakhstan and turkey which have low values and are also Muslim countries are showing an upswing in the years of 2021, while Russia and Serbia countries that have a history of importing in the thousands are plateauing. The correlation coefficient showed weak correlations between Kazakhstan and Russia, Serbia, while a medium strength correlation with Turkey, showing that the two are on a similar rise. The number show that even though the country imports less, there may be a trend in going upwards in the future, although as of now the value exported to Serbia and Russia are still much higher and thus have more potential. The Oil seeds/oleaginous fruits showed negative shifts in the chain and fixed base index, furthermore the polynomial prediction estimated lower values, further lowering the potential.

3 Conclusion

Kazakhstan has vast potential for many commodities for export from the Czech Republic. After analysing the chosen commodities and further comparing the data with other non-EU countries through various statistical tools, the conclusions on whether each of the commodities sees Kazakhstan as a destination with potential for export from Czech Republic have been made.

The everlasting interest for the import of Bovine animals (Live), that has shown data with more potential for export from Czech Republic than Russia, Turkey and or Serbia. Thus, Bovine animals have potential. The sheep and Goat (live) commodity favours Kazakhstan, while understandably this is mainly due to the final year and its sudden rise which may or may not be an anomaly. None the less it would be foolish to not investigate this commodity as it is a possible beginning of a future trend. Thus, Sheep and Goats have potential. The Malt whether roasted (including malt flour) commodity showed a good amount of value that the country of Kazakhstan is capable of being interested in, showing a healthy shift from the fall in previous year to a slow but steady growth. Thus, the Malt whether roasted commodity has potential. Vegetable's products, roots and turbes are a commodity for Kazakhstan with a steady rise as was determined by time analysis such as the chain base index. While Russia being on a decline and Serbia not having a strong mean or as high a value in the recent year, Kazakhstan has potential for the export of vegetable's products, roots and turbes from the Czech Republic.

Taking into account the impact of the sanctions imposed by the EU towards Russia in the current moment (as well as possible future Russian contra sanctions), it is clear that Czech exporters will be forced to increase their efforts on other markets. Kazakhstan can be one of such potential markets, although with limitations given by its relatively small population of 19 million and average GDP per capita comparable to Bulgaria. This thesis shows some of the commodities with potential, but it can be expected that there are more gaps on the market that are not yet covered by the Czech export. Among the agricultural commodities, already exported from the Czech Republic to Kazakhstan, the highest export potential seems to be mainly in bovine animals (Live), sheep and goats (Live), Vegetable products, Malt and possibly Birds' eggs. These results are in line with the interest of Czech companies registered by the embassy of Czech Republic stationed in Nur-Sultan

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