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MAIN CHANGES IN FOOD TRADE IN EUROPE AND THE WORLD UNDER COVID-19 RESTRICTION

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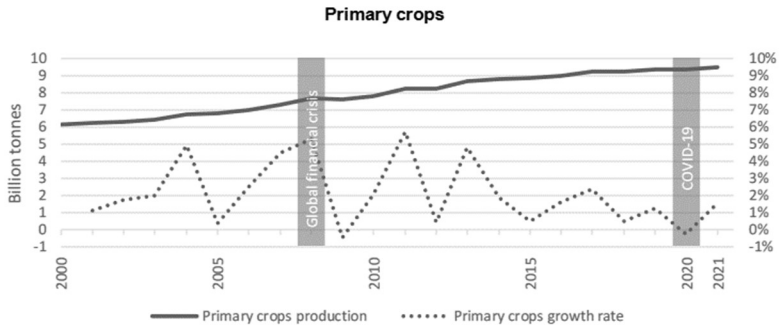
Abstract: Restriction during the 2020 COVID-19 pandemic has brought significant changes to all aspects of life, in food consumption and foreign trade. This raises questions about local and intercontinental food trade and transport. The aim of this paper is to describe the European and global changes, focussing on their background and causes. Its methods are to examine the foreign trade data of the main food products in the WITS database using a trend function and to investigate possible changes by calculating the Balassa index. The first results show that in absolute terms, the value of foreign trade has not decreased for most food products, but that there has been a decrease for almost all food products compared to the expected value of the trend function. In addition to Ukraine's significant decline in competitiveness indicators, Russia's positive performance warrants further research. As well as China's significant competitiveness decline, the good performance of the US requires further analysis and comparison. The main conclusions of this research are that COVID-19 has also had an impact on food supply. There is a need to maintain and support local markets and regional trade in the face of global food trade, as only they can remain stable during these crises and austerity.

Keywords: COVID-19 restrictions, trade competitiveness, trend.

1. Introduction

COVID-19 has a significant negative impact on international trade for both exporting and importing countries. As can be seen from the data in Figure 1, there has been a decline compared to the optimistic growth. The effects, especially the effects of COVID-19 in importing countries, have become quite insignificant as of July 2020. This result suggests that the negative effects of COVID-19 on international trade have to some extent disappeared after the first wave of the pandemic. There are heterogeneous impacts across industries. Negative effects on non-essential consumer durables persist for a long time, while positive effects were observed in industries trading in health products (Hayakawa, K., & Mukunoki, H. 2021). A characteristic of pandemics is that they have a severe and restraining effect on the world economy. The food supply chain is a key sector of the economy. The impact of COVID-19 extends to the entire food production and supply chain. The effects of COVID-19 are experienced in terms of impediments to the movement of people and workers, changes in consumer demand, closures of production units, negative financial outcomes (Aday and Aday 2020).

Figure 1.: World agricultural production volumes and growth rates of primary crops



Source: FAO (2023)

As FAO, WITS and Statista data show us in 2020 there was a decrease in export volume increase in primary crops production, meat and mill production. There was also a decrease in export volume in total. In general true that countries have reduced their external trade as a result of the measures. Trade in essential staple foods was necessary, but there was a decrease in less important products. After the introduction of COVID-19, the level of trade between countries and the volume of trade decreased significantly. There was a noticeable change in the structure of the trade network. In December 2020, trade in most economies declined sharply (Vidya & Prabheesh 2020.

Table 1.: The volume of exports of main products in th. USD 2019-2021.

	2019	2020	2021
Total	17 878 525 164	16 684 346 247	20 947 571 214
02	134 363 626	133 826 285	152 333 319
03	111 725 516	100 625 770	118 873 481
08	122 815 075	126 204 350	137 139 078
10	109 972 607	118 890 494	149 138 166
12	93 394 387	106 753 518	125 613 219
15	96 200 955	108 970 378	160 090 690
22	121 331 391	116 535 541	137 905 370
Total	**19 438 410 612**	**18 279 882 169**	**22 804 522 387**

Source: WITS (2023)

Since food is a very important basic need for consumers, it was of paramount importance to provide access to it. This may have been the reason why agricultural production/trade markets were very resilient during the epidemic (Beckman & Countryman, 2021).

2. Materials and methods

The indicator used to measure comparative advantage was introduced by John Balassa in 1965 and was defined as follows.

$$B_{ij} = \left(\frac{X_{ij}}{X_{it}}\right) \Big/ \left(\frac{X_{nj}}{X_{nt}}\right), \qquad (1)$$

where x is the export, i a country, j a specific product, t a group of products, n represents a given group of countries (Balassa 1965).

From this, we can calculate an index of comparative advantage or disadvantage for product exports to the countries under study. Using the following formula: we compare the share of a country's product exports in the total exports of that country with the share of the reference countries' product exports in total exports. If $B > 1$, the country has a manifest comparative advantage over the reference countries, otherwise it has a manifest comparative disadvantage. Here, it is also possible to calculate the comparative advantage in relation to all countries in the world.

In particular, the Balassa index can be used to measure the effects of different economic policies (agricultural policies) on asymmetric values. The asymmetric value of the B index means that if a country has a comparative advantage in a product, the index values range from one to infinity, but if it has a comparative disadvantage, the values range from zero to one, which leads to an overestimation of the relative importance of a given sector (Fertő 2003).

A partial solution to the latter problem is the possibility of classifying the B index, developed by Hinloopen-van Marrewijk (2001):

Category A: $0 < B \leq 1$,

Category B: $1 < B \leq 2$,

Category C: $2 < B \leq 4$,

Category D: $4 < B$.

Category A includes those product groups that have no comparative advantage in terms of advantage, category B for those with a weak comparative advantage, category C for those with a medium comparative advantage, and category D for those with a with a strong comparative advantage.

The source of the trade data used to calculate the Balassa Index was the World Bank's WITS (World Integrated Trade Solution) database [14]. The data were downloaded at HS-2 (Harmonized Commodity Description and Coding System) level for agricultural products (chapters 1-24) for the period 2017-2021.

The structure of the products is the following:

01 -- Live animals / 02 -- Meat and edible meat offal / / 3 -- Fish and crustaceans, molluscs and other aquatic invertebrates / 04 -- Dairy prod; birds' eggs; natural honey; edible / 05 -- Products of animal origin, not elsewhere specified or included. / 06 -- Live tree & other plant; bulb, root; cut flower / 07 -- Edible vegetables and certain roots and tubers / 08 -- Edible fruit and nuts; peel of citrus fruit / 09 -- Coffee, tea, mate and spices. / 10 -- Cereals / 11 -- Products of the milling industry; malt; starches; inulin; wheat gluten / 12 -- Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder / 13 -- Lac; gums, resins and other vegetable saps and extracts / 14 -- Vegetable plaiting

materials; vegetable products not elsewhere specified or included / 15 -- Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes / 16 -- Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes / 17 -- Sugars and sugar confectionery. / 18 -- Cocoa and cocoa preparations. / 19 -- Preparations of cereals, flour, starch or milk; pastrycooks' products / 20 -- Preparations of vegetables, fruit, nuts or other parts of plants / 21 -- Miscellaneous edible preparations. / 22 -- Beverages, spirits and vinegar. / 23 -- Residues and waste from the food industries; prepared animal fodder / 24 -- Tobacco and manufactured tobacco substitutes.

The Balassa index is calculated for all countries in the world with exports averaging more than $1 billion in value in the last years (2017-2021). Where some data were missing, they were filled in by linear extrapolation.

To measure changes over time, we calculated values for all actual turnover data using a linear trend function. Here, the calculations were mainly for 2020 and 2021, as 2020 was the first year of decline. The difference between the actual value and the trend showed whether a decline was observed or, on the contrary, whether there was an increase. To measure the change in competitiveness, linear trends were also calculated for the Balassa indices. The difference between the trend values and the actual values shows the direction of change. If the actual value exceeded the trend value, then exports and competitiveness increased over the COVID-19 period, if there was a decrease, then exports and competitiveness per product decreased.

The purpose of the study is to see how the period between 2020-21 developed compared to the expected growth for the examined food categories. In the second step, we look at how the competitiveness of the main exporters based on the Balassa index changed at that time.

3. Results

3.1.1. Output analysis

The first analysis looks at the change in turnover of the largest exporters. At this level of analysis is the comparison of real 2020 and 2021 data vs. trend function data calculated. 16 product groups show falls in 2020 compared to the trend value. Different animal products, edible fruits, mill products, lac and gums, cocoa, prepared cereals, prepared vegetables and fruits, beverages, spirits, residues, and tobacco. We can see a sharp increase in oils, fats, edible vegetables, coffee, sugar. The reason for this is not panic stockpiling, because there are staple foods in both rising and falling products.

In this part, we analyze the countries where the decrease is significant and where the export of several product groups showed a decline. Chinese exports fell, but not significantly. In the case of exports from Peru, a significant decrease can be observed for some products (fish, animal products, tobacco). The drop in Thai exports is the most significant for sugar. The decline in Ukrainian grain is the most significant. This is due to a significant decrease in Russian agricultural imports. Considering the

low yield of the 2010s, there is a great potential for further growth of grain production (Mizik et al. 2020).

There is also a negative effect in the United States. The shortage is greatest in various edible products, beverages, edible fruits, and prepared vegetables. In the Czech Republic, only nine product groups show a decline. Oils, fats, and beverages experienced the largest drop.

The biggest winner is Greece, because meat exports have even increased. Indonesia's processed meat exports decreased, but Italy's exports of dairy products, beverages, and cocoa decreased significantly.

3.1.2. Balassa indicies changes

Table 2.: Changes in competitiveness in 2021.

Decreasers	Mixed	Increasers
CHILE	ARGENTINA	GREECE
CHINA	AUSTRALIA	INDIA
HUN	AUSTRIA	USA
INDONESIA	BRASIL	RUS
MALAYSIA	BELGIUM	
POLAND	CANADA	
R South Africa	CZECHIA	
SWTITZERLAND	DENMARK	
THAILAND	ECUADOR	
UKRAINE	FRANCE	
VIETNAM	GERMANY	

Source: writer calculation based on WITS (2023)

One result of the competitiveness analysis of the 24 product groups by country is summarised in Table 2. It shows that the competitiveness of most countries decreased during the COVID-19 pandemic. The reasons for this are complex. Products in which Poland had a comparative advantage in trade accounted for 55.5% of the Polish agri-food sector's world trade in 2017 (Szczepaniak 2019). Only one factor is the austerity caused by COVID-19. Most countries were affected in a mixed way during this period, with some products whose competitiveness declined and others whose competitiveness increased. The US situation is a transition between mixed and winning. It is rare to find a country where competitiveness has increased for most products. Greece and India are the best examples.Greece one of the winners. Only there are 3 fields falling. Live animals, meat, and mill products. India is the other with 4 falling groups. Live animals, dairy products, lac and cocoa are the products falling. Russia is one of the largest winners with only 1 groups falling but the export volume of this country is not significant.

4. Discussion and summary

The austerity caused by COVID-19 had winners and losers. One of the big losers was China. China, with significant resources but not necessarily efficient, has had

significant or small declines in several products. Ukraine is also one of the major decliners. Switzerland also lost in many areas, but with its significant economic background this was not a major shock. As one of the winners of this competitiveness analysis was Russia. The question arises whether the war in 2022 and the facts listed have anything to do with it.

What could be responsible for the decline in export volume?

Decrease in production volume.

The purpose of maintaining food safety (most countries).

The weakness of the export structure China).

A drop in the product's competitiveness for another reason (USA).

Decline in the economy of importing countries (more countries).

A limitation of the article is that a more thorough investigation is needed to determine the reasons behind the changes in the production, export, and competitiveness of each product category, and to what extent they affected the examined categories.

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