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**International Trade and Containment Measures**  
**during the COVID-19 Crisis**

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**Abstract**

*The COVID-19 pandemics generated a health crisis, but also an economic crisis that manifested globally and determined economic disturbances at various levels. Due to the rapid spread of the COVID-19, governments all over the world took measures to contain the virus and its health-related effects. However, the measures also impacted the economic life of countries, companies, and individuals. The present paper focuses on the study of the linkage between the containment measures taken by authorities to limit the spread of the virus (measured via the Stringency index) and one important economic activity, the international trade of a country (looked at as both exports and imports). The study considers two European countries, Romania and Poland, respectively, and the analysis comprises the main years of the pandemics, 2020 and 2021. The methods employed are descriptive analysis and inferential analysis, via the correlation analysis. The results illustrate that there is a negative association between the measures taken by authorities to diminish the spread of the COVID-19 virus and the international trade of the countries, with stricter measures being linked with decreases in international trade. However, for the overall period 2020-2021, the links are weak in both countries, and the exports and imports have been influenced differently in Romania as compared to Poland. The paper contributes with more evidence on the influence of the COVID-19 containment measures on the economy.*

**Keywords:** COVID-19 crisis, international trade, containment measures, Romania, Poland.

**JEL Classification:** F18, F40, I15.

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## **1. Introduction**

The COVID-19 pandemics generated a health crisis, but also an economic crisis that manifested at global level and triggered economic multi-layered disturbances (Tudorache, Nicolescu, 2021). Due to the rapid spread of the COVID-19, governments around the world took numerous measures to contain the virus and its health related effects. These measures also impacted the economy from different perspectives, including at the country level. Various researchers investigated the containment policies taken by national authorities and how they influenced different aspects of societies by looking at how COVID-19 containment measures impacted trade (Lucio et al., 2022) or the epidemic curves (Cascini et al., 2022) or how they interact with politics (Plümper, Neumayer, 2022). Despite the differences in the scope, the stringency, and the duration of the government-imposed measures taken to limit the COVID-19 spread in different countries, they impacted the economic life in those countries.

The present paper focuses on the study of the linkage between the containment measures taken by governmental authorities to diminish the spread of the virus and the international trade of a country. The main objective is to identify the existence or not of a relationship between the evolution of containment measures taken by national governments and the evolution of international trade of countries (seen as exports and imports, separately). For this purpose, the study analyses the situation in two European countries, Romania and Poland. The analysis refers to the main years of the pandemics, 2020 and 2021. The methods used are descriptive analysis and the correlation analysis.

The main aim of the research is to shed more light on the influence that the containment measures taken by authorities during the COVID-19 pandemics had on the evolutions of the international trade at the country level during the same period.

## **2. Literature and Problem Statement**

In the face of a rapid spread of the COVID-19 virus globally and the associated health problems, governments had to take measures to limit the impact of the COVID-19 on the health of the population. From the very beginning of the COVID-19 the measures taken were based rather on non-pharmaceutical public health policies that included restrictive interventions such as physical distancing, wearing face masks, and eye protection, as well as lockdown measures and travel restrictions, and also case finding, contact tracking, and isolations (Cascini et al., 2022). Later on, starting 2021, pharmaceutical interventions, such as vaccinations were taken, but at the same time the non-pharmaceutical restrictions were imposed during the whole period of the pandemics, including periods as late as 2022 (Cascini et al., 2022).

The purpose of taking such measures was to try to manage the pandemics and to diminish the negative effects of the virus on the populations' health. However, the containment policies adopted by governments to limit the spread of the virus, had unfavourable economic and social side-effects (Plümper, Neumayer, 2022).

Negatively affected by the containment measures were the economic activity and the international trade flows, as studied by Lucio et al. (2022), who found in Spain that the negative effects were concentrated in the first wave of the COVID-19 pandemics between March and May 2020 and that the containment measures had larger effects on companies' exports than on imports. In this way, they illustrate that the drop in demand was a main contributor to the reduction of trade flows in Spain. They also called for more studies on the effects of containment measures on international trade during the COVID-19 pandemics. The present paper answers such calls and comes to bring more information about the relationship between containment governmental policies and measures during the COVID-19 and the international trade flows at the country level (total exports and total imports of the country) in two other European countries, Romania and Poland. The value added of the paper refers to the extra evidence brought about the association between restrictive measures and international trade flows in two different European countries.

### **3. Research Question and Aims of the Research**

The present paper has the general aim to identify the existence of a linkage between the international trade at country level and the containment measures taken by the respective country during the COVID-19 health crisis. Therefore, the research question is the following:

“How is international trade connected with the governmental measures taken to contain the COVID-19 spread, during the pandemics?”

The analysis is conducted for two selected European countries, namely Romania and Poland, and the objectives of the research are: a) to analyse the evolution of the overall containment measures taken in Romania and Poland during the pandemics; b) to identify how the containment measures influence the international trade of countries during the pandemics; and c) to compare Romania and Poland with respect to the influence of their governmental measures during the COVID-19 period on their overall international trade.

### **4. Research Methods**

In order to answer the research question and to reach the above objectives, two countries are included in the analysis, Poland and Romania, as the largest (in terms of population) countries in Central and Eastern Europe that are members of the European Union. The present paper considers two types of analyses: a) first, a descriptive analysis about overall containment measures taken in the countries, during the COVID-19 pandemics and about the evolution of their international trade (total exports and total imports) during the same period of time, and b) second, an inferential analysis that looks to the level of correlation that exists between the exports and imports of the country and the measures taken by authorities to contain the COVID-19 virus spread during the pandemics period. The intensity of the restrictive governmental policies is measured through the Stringency index. The

period of analysis comprises years 2020-2021 as the main years of the COVID-19 pandemics (Tudorache, Nicolescu, 2023).

The indicators analysed are:

- a) the Stringency index calculated on a daily basis by the Oxford Coronavirus Government Response Tracker. The index measures the overall level of strength of the containment measures taken by governments to limit the spread of COVID-19 during the pandemics, based on nine main indicators as presented on the official source: “school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements and international travel controls”. The index takes values from 0 to 100 and the closer the index is to 100, the stronger are the restrictive measures. For this analysis, the index has been computed as a monthly indicator, as a simple average of all daily levels of the index. The source of data for the stringency indexes was the Our world in data database.
- b) the total exports and the total imports of the country, as monthly indicators. The source of data used is the World Trade Organization database.

The correlation analysis was conducted in order to measure the association between the two variables and the extent to which changes in one variable determines changes in the second variable. Pearson coefficient ( $r$ ) is used to measure the direction and the strength of the association between the two variables (Schober et al., 2018). In terms of direction of the association, the positive directions illustrate the movement of the two variables in the same direction and the negative directions illustrate the movement of the variables in opposite directions, while the strength of the association is low when the Pearson coefficient approaches zero and is high when it approaches one (Laerd Statistics, 2020).

The correlation was conducted in the present study and the Pearson coefficient was computed in order to analyse if there is a linear relationship between the evolution of exports and imports and the strictness of the governmental policies implemented to contain the virus during the pandemics in the two countries.

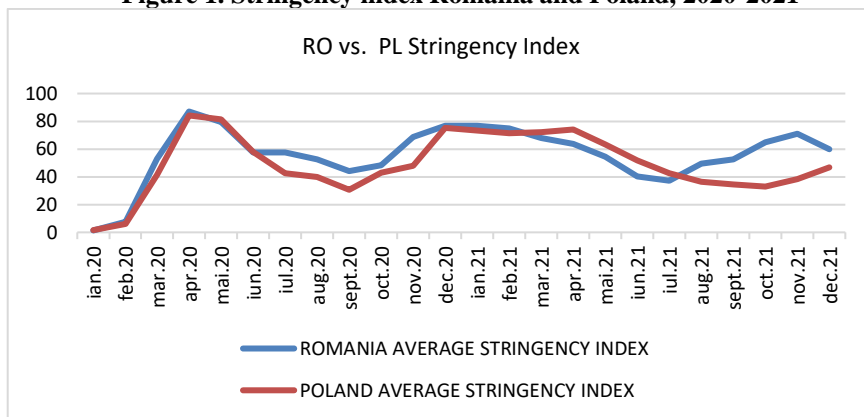
## **5. Findings**

### ***5.1 Descriptive Analysis***

The Stringency index proposed by Oxford Coronavirus Government Response Tracker presents on overall the strictness of the measures taken by authorities to slow down the COVID-19 spread and it is a good tool to follow the evolution of the governmental measures at country level, as well as to compare the containment measures in different countries.

It is known that the strictness of the governmental measures taken to contain the spread of COVID-19 followed the evolution of the virus incidence and of the number of deaths associated to COVID-19 (Cascini et al., 2022), so accordingly the Stringency index also followed the COVID-19 evolutions. Figure 1 presents the evolution of the Stringency indexes in Romania and Poland.

**Figure 1. Stringency index Romania and Poland, 2020-2021**



Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at <https://ourworldindata.org/covid-stringency-index>.

The analysis of the evolution of the Stringency indexes in the two selected countries, as presented in Figure 1, reveal a number of aspects:

- a) the shape of the evolution of the Stringency index in 2020-2021 has waves, similar to the waves of the COVID-19;
- b) the strictest measures were taken in both Romania and Poland in the first wave of the COVID-19 (March-May 2020), when the values of the Stringency indexes reached levels of 80-84 in Poland and 80-87 in Romania;
- c) the pattern of the Stringency index in the two countries was similar over the years 2020-2021, but without having the same levels in the same periods of time. The levels of the containment measures depended in each country of the levels of the COVID-19 spread, which came in waves that manifested differently in various periods of time in different countries (Tudorache, Nicolescu, 2023);
- d) during the whole period 2020-2021, there were certain containment measures implemented in each of the two countries at any time, with the Stringency index not going below 30 (September 2020) in Poland and below 40 (June 2021) in Romania;
- e) on overall, Romania had stricter measures than Poland as: Romania had the highest Stringency index higher than the Polish upper peak (87 compared to 84); Romania had a higher minimum of the Stringency index compared to Poland (40 as compared to 30); there were more periods with stricter measures in Romania than in Poland, and the average two-year Stringency index was higher in Romania than in Poland (56 as compared to 49).

The analysis of the evolution of international trade in the two countries in the period 2020-2021 is presented in Table 1 and in Figure 2. Both similarities and differences can be observed in the evolution of international trade in the two countries in the analysed period.

**Table 1. International trade in Romania and Poland, 2020-2021**

Months/Countries (monthly, mill. \$)	Romania		Poland	
	Exports	Imports	Exports	Imports
January 2020	6282	7761	22486	22384
February 2020	6445	7876	22447	21756
March 2020	5961	8019	21926	22081
April 2020	3159	4960	15428	15712
May 2020	4068	5466	17774	16580
June 2020	5417	6939	22025	19379
July 2020	6324	7878	23009	22365
August 2020	5404	7230	22002	20938
September 2020	7108	8961	26138	24367
October 2020	7331	9482	27731	25707
November 2020	7096	9008	27949	25963
December 2020	6123	8551	24921	24394
January 2021	6520	8018	24941	23441
February 2021	6934	9290	26561	25909
March 2021	7688	10447	29875	29292
April 2021	7374	9531	28652	26895
May 2021	7148	9379	28095	28167
June 2021	7441	9753	29291	28791
July 2021	7445	10108	27555	28302
August 2021	6609	8712	26205	27606
September 2021	7399	9970	29390	29694
October 2021	7519	10446	30146	30530
November 2021	8014	10533	31876	32366
December 2021	7296	10014	28047	31125

Source: World Trade Organization.

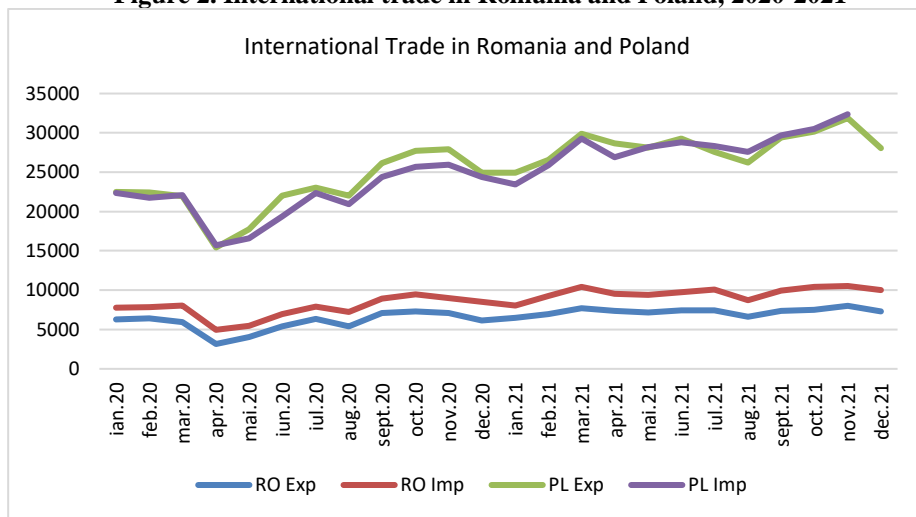
In terms of similarities, it can be observed that:

- a) both countries encountered a sharp decrease in both exports and imports when COVID-19 outbreak;
- b) in both countries, the evolution of exports and imports came in waves during 2020-2021.

In terms of differences, it can be observed that:

- a) Poland had a more intense international trade activity as the monthly values of both exports and imports in Poland were higher than in Romania in 2020-2021;
- b) in Romania imports were higher than exports during the entire analysed period, whereas in Poland, the balance between exports and imports varied, with the tendency of exports being higher than imports in more periods;

**Figure 2. International trade in Romania and Poland, 2020-2021**



Source: Authors' based on World Trade Organization, data available at [https://www.wto.org/english/res\\_e/statis\\_e/merch\\_trade\\_stat\\_e.htm](https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm).

- c) the evolution of international trade in Poland had steeper waves than in Romania during the COVID-19;
- d) in Poland, the international trade had an increasing trend (in spite of the waves), whereas in Romania, international trade was relatively constant (with very smooth almost inexistent waves) during 2020-2021.

### 5.2 Correlation Analysis

Table 2 presents the results of the correlation analysis. The analysis of the association between the evolution of international trade and the containment measures taken during the pandemics proved to be negative, but rather weak. In other words, in both countries, Romania and Poland, a higher level of containment measures is associated with decreases in both exports and imports of the country.

**Table 2. Correlation between the Stringency index and international trade**

Countries	Pearson coefficient Stringency index with exports/1 mill.inh.	Pearson coefficient Stringency index with imports/1 mill. inh.
Romania	-0.23875	-0.11607
Poland	-0.1575	-0.1977

Source: Authors' own research.

These results are consistent with other authors' findings who found, for example, that Spanish exports decreased more in destination countries that adopted stricter containment measures (Lucio et al., 2022). Similarly, Liu et al. (2021) stated that both the demand factors and the containment measures taken by governments

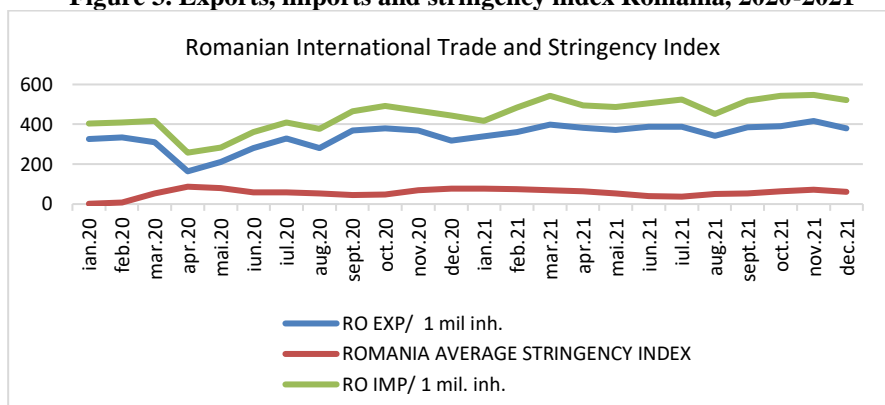
represent better explanations for the trade reduction related to COVID-19, than supply factors or other types of voluntary measures.

However, for Romania and Poland the association is rather weak with values of the correlation coefficient below 0.25 (Laerd Statistics, 2020), illustrating that even though the international trade flows are negatively associated with the COVID-19 restrictions, for the main two years of the COVID-19 pandemics, the intensity of the association is not very strong for the overall period, as opposed to the first wave of the pandemics (second quarter of 2020), when trade flows decreased more in those countries that adopted very stringent containment measures (Lucio et al., 2022).

However, in Romania, the negative association was stronger in the case of exports, illustrating that an increase in the Stringency index is associated with a larger decrease in Romanian exports than in Romanian imports. In case of Poland, the situation was reverse, as the Stringency index was stronger correlated with the Polish exports than the Polish imports.

Figures 3 and 4 also present graphically the evolutions of exports and imports and of the stringency index for both Romania and Poland.

**Figure 3. Exports, imports and stringency index Romania, 2020-2021**



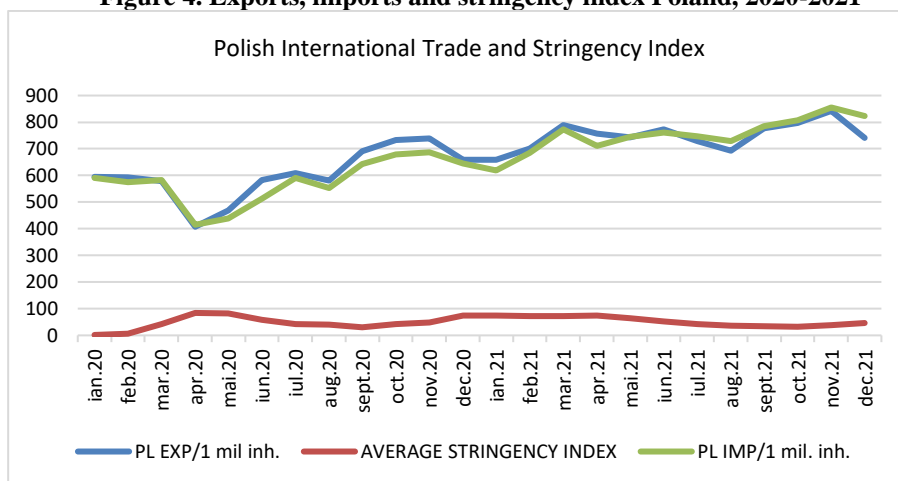
Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at <https://ourworldindata.org/covid-stringency-index> and World Trade Organization, data available at [https://www.wto.org/english/res\\_e/statis\\_e/merch\\_trade\\_stat\\_e.htm](https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm).

From these evolutions it can also be noticed that when the steepest decreases in exports and imports took place in both countries (March-May 2020 – the first wave of COVID-19), the highest levels of the Stringency indexes were met.

This reveals in the case of both countries, in the first wave of the pandemics the sharp decrease of imports and exports took place together with a strong increase in the Stringency index, namely in the strictness of the governmental measures implemented to contain the spread of the COVID-19 virus. Later on, the variation of the governmental measures did not vary so much as international trade varied. The containment measures were kept at certain levels they were not reduced to zero, even in periods in which the COVID-19 incidence decreased.



**Figure 4. Exports, imports and stringency index Poland, 2020-2021**



Source: Authors' based on Oxford Coronavirus Government Response Tracker, data available at <https://ourworldindata.org/covid-stringency-index> and World Trade Organization, data available at [https://www.wto.org/english/res\\_e/statis\\_e/merch\\_trade\\_stat\\_e.htm](https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm).

## 6. Conclusions

This paper analysed the evolution of the containment measures taken by governmental authorities during the COVID-19 pandemics, the evolution of international trade flows, and the way the two variables are linked, in Romania and Poland for the period 2020-2021. The results illustrate that when the restrictive measures were stronger at the beginning of the pandemics, the international trade flows were more negatively affected. At the same time, for the whole analysed period the association between the governmental containment measures and international trade flows was negative and weak in both countries. However, in spite of the fact that similar patterns of the governmental measures were noticed in the two countries, the stringency level of the measures was slightly higher in Romania than in Poland. The international trade flows in Poland had stronger fluctuations during the pandemics, as compared to the Romanian international trade flows, that were flatter. At the same time, in Romania exports seem more affected by the restrictions, while in Poland imports seem more affected by the restrictions. The conclusion is that the governmental restrictions affected the international trade flows during the pandemics, but differently from one country to another due to differences in types of measures, stringency of measures and their durations.

The paper contributes to the literature related to the COVID-19 crisis by bringing more evidence about the relationship between the restrictive measures and their economic impact, with emphasis on international trade flows.

The limitations of the paper are related to the low number of countries considered and the discussion of the restrictive measures as an overall index, while different types of measures might have different influences on the economy and foreign trade.

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