

International Trade Between European Union and Africa: Current Trends and Economic Factors of Intercontinental Business Activity

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Abstract

The importance of international trade and economic openness is widely agreed in business world and governmental policy makers. The active international trade ensures the business development promoting the comparative advantages of different countries, increases consumption and customers satisfaction, strengthens competition, raises the business efficiency, etc. However, the global slowdown of world's economics in 2020 when the COVID-19 pandemic occurred also had the negative impact on international trade development. This research aims to analyse the 2011 – 2020 trends and macroeconomic factors of international trade between European Union (EU-27) and Africa. The research results maintain that the European Union markets are significantly sensitive to the macroeconomic deterioration which has a strong negative impact on industrial production imports from Africa. The regression analysis confirmed that officially predicted economic growth of European Union economy will have positive trends on African production exports to EU-27. The main industries and African countries were highlighted in this research that are expected to have the most benefit from international trade growth with European Union. The impact of main African international trade partner countries' GDP growth on EU-27 exports to Africa was also analysed. The similarities of African countries importing the most EU-27 production to this continent were revealed.

Keywords: Africa, European Union, international business, intercontinental trade, exports, imports.

JEL Classification Codes: C53 E23, F14, F40.

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1. Introduction

Nowadays the international trade performs a very important function in many economies. In the research of Rahman, Shahbaz & Farooq (2015) the main macroeconomic benefits of international trade for exporters and importers were summarized. Countries usually necessitate to import raw materials, intermediate and capital goods to enlarge the industries' production base and to promote export growth if there is a scarcity of these goods domestically. Imports of consumer goods are also required to meet the excess domestic demand. Export trade is crucial to meet the required foreign exchange gap and to increase the import capacity. An increase in import capacity boosts industrialization and overall economic activities, which, in turn, can ensure economic growth (Rahman, Shahbaz & Farooq, 2015). In addition, Pavcnik (2019) accents the microeconomic benefits of international trade provided companies that have access to larger markets, inducing innovations, and lowering the cost-price of production. Consumers, in turn, are benefited from lower prices and access to a broader variety of products.

According to Yakubu, Aboagye, Mensah & Bokpin (2018) the international trade guarantees the movement of goods and services and production factors across borders. On the back of that international trade is predicted to enhance growth via technology, knowledge transfers and heightening competition among businesses. Thus, trade could be an important conduit to economic growth. Given this, many countries have instituted policies to foster cross-border trade between and among nations (Yakubu, Aboagye, Mensah & Bokpin, 2018). However, the instability and unpredictability in the economic scenario influence international trade which is the central pillar for economic growth and shapes the market's competition and uncertainties (Sousa, Martins & Sousa, 2019). The business uncertainties in international trade significantly increased in 2020 global economic slowdown of COVID-19 pandemic.

As a result, the empirical part of this research aims to analyse the international trade changes between European Union and Africa in 2011 – 2020 revealing the current trends and economic factors of intercontinental business activity. As opening of countries to international markets can help improve business performance and speed up the overall economic growth, at first it is important to understand the main international trade accelerating factors that were analysed in chapter of literature review supplementing with the success stories of trading countries.

The remainder of this paper is structured as follows. While section 2 reviews the literature, section gives the methodology. Section 4 presents and discusses the results. Section 5 concludes.

2. Literature review

According to European Commission EU is Africa's first trading partner, however recently the African international trade balance to EU became negative. The explanation of African negative international trade balance causes is based on the results of the researchers that analysed the causality of this phenomenon. According to Moudatsou and Garcia (2022) the main reasons are following: (1) the low share of Africa's exports to the overall world trade; (2) the concentration of exports in few mainly resource based products (agricultural and natural resources) making the African exports sensitive to external demand and price shocks; (4) insufficient inability to compete in global markets; (5) the integration of Africa into world's

value chains through primary and secondary sectors with low technological development opportunities. In addition, Haugen (2019) maintained that logistics was the main bottleneck African exports. The cargo loading, unloading time, and customs clearance at African ports experience the longest delays. Bouët, Laborde, and Traoré (2018) analysed the negotiation of Economic Partnership Agreements (EPAs) that launched in 2000 and aimed to create seven free trade areas between the European Union and African, Caribbean, and Pacific (ACP) countries. The EPAs were supposed to take effect in 2008, however the negotiations took much longer than expected, in part because several elements of the reforms were criticized by ACP governments, particularly those of West Africa. Krapohl and Huut (2020) paid attention to EU external trade policy differentiation between trade partners with different economic potentials and different trade patterns making it difficult to enter the EU market for some countries. Meanwhile the European Commission states that through the preferential trade regimes, more than 90% of African exports enter the EU market of 450 million consumers free of import duties.

The macroeconomic environment also has the significant impact on international trade. Adekunle and Gitau (2013) examined the determinants of trade flow between China and 46 Sub-Saharan African (SSA) countries applying the gravity model. Their results indicated that GDP of SSA countries, GDP of China, FDI, and exchange rate were significant predictors of export to China. In the case of imports, GDP, GDP per capita of SSA countries, FDI, and exchange rates predict the volume of import to the whole SSA. The application of gravity model for Cieslik (2009) allowed to conclude that the differences in capital-labour ratios across country-pairs positively affect the volume of trade, while the sums of capital-labour ratios have a negative impact on the volume of trade. However, since the beginning of 2020 the new phenomenon in economies occurred as sudden macroeconomic disbalances caused by the COVID-19 pandemic and its regulatory measures. Or, Cheng, Yue, and Yuen (2021) maintained that COVID-19 pandemic has stalled the world's economic activities and obscured the future of economics and international trade, concerning that the pandemic resulted in growing protectionist attitudes.

In most countries the governmental pandemic management measures were highly restrictive, what reduced the macroeconomic indicators. Herewith, the governmental financial support measures were introduced during the COVID-19 lockdown making the huge sustentation payments for businesses and households. This new economic environment reduced the real production outputs in many countries and filled the financial systems with borrowed money from sharply increasing public indebtedness. Therefore, the further empirical research of this study aims to analyse the statistical interrelations between macroeconomic environment and EU – Africa intercontinental trade making the statistical projections to post-pandemic recovery period.

3. Methodology

The empirical research aims to analyse the 2011 – 2020 trends and macroeconomic factors of international trade between European Union and Africa. Firstly, the statistical analysis will be performed to highlight the changes of intercontinental trade changes. The data of exports, imports, trade balance will be used. Secondly, the structural analysis will be implemented to

reveal the differences of demand for industrial products in continents. Thirdly, the impact of global economic slowdown on international trade will be estimated. The following analysis will be related to EU-27 macroeconomic factors of demand changes for African industrial production and its statistical forecasting. Finally, the changes of EU-27 industrial production demand in Africa will be analysed interrelating them with GDP growth rates and the research of countries' similarities will be implemented.

The methods of the research consist of structural and dynamics analysis, single and multiple linear regression, statistical forecasting, calculation of mean absolute percentage errors, descriptive statistics, Pearson and canonical correlation, coefficient of determination, distribution and density plotting, Guttman-Lingoes smallest space analysis. The official economics and international trade statistics of EUROSTAT, World Bank and European Commission is the quantitative basis of this research. The detailed statistics of EU-27 international trade with all African countries in EUROSTAT database is available: exports, imports, trade balance, relative share of trade. The aggregated statistics (sum of individual values) was also used for the whole continent of Africa analysing the main intercontinental trade indicators. Similarly, the macroeconomic rates of EU-27 countries have the individual and aggregated manner in the official statistics.

4. Results

In 2011 – 2020 the total extra EU-27 exports was 18.8 trillion EURO, while the total imports of this period was 17.2 trillion EURO. The most important EU-27 intercontinental business partners are located in Asia where the share of exports increased from 28.2% to 29.7% and the share of imports increased from 37.9% to 44.4%. The exports to America also increased from 21.2% to 25.1% as well as imports from 16.4% to 17.9% (Figure 1). However, the proportion of EU-27 international trade with African countries declined in current decade. The share of EU-27 exports to Africa decreased by 1.2% (from 7.7% to 6.5%) and the imports from Africa decreased by 2.0% (from 7.9% to 5.9%).

The total exports of all products from EU-27 to African countries was 1.382 trillion EURO in 2011 – 2020. The amounts of imports were 1.286 trillion EURO at the same period. The total EU-27 trade balance for EU-27 with African countries was 96 billion EURO. During the current decade, the average annual EU-27 exports to Africa was 138.2 billion EURO, while the average value of imports was 128.6 billion EURO. The flows of goods from EU-27 to Africa was more stable than in opposite direction. The standard deviation of EU-27 exports was 7.7 billion EURO, while this indicator of African exports was 19.4 billion EURO. The coefficients of variation were 5.65 and 15.1% accordingly, what indicate, that for the EU-27 exports amounts to Africa the low variation was typical, and conversely, the African exports had medium variation.

The direction of international trade balance essentially changed in 2014. During 2011 – 2013 the trade balance was positive for Africa in average by 12.1 billion EURO, but since 2014 it became positive for European Union in average by 18.9 billion EURO every year (Figure 2). The peak-point of African products exports to EU-27 countries was reached in 2012 when the European Union bought goods for 161.7 billion EURO. Afterwards, the sudden decline of

African exports to EU-27 was observed until 2016. The decline during this period was -60.7 billion EURO (-37.5%). The repeated growth of African products imports to EU-27 was observed in 2006 – 2019 (+35.0%) but the global slowdown of economics in 2020 negatively affected the international trade for both sides. The EU-27 exports to Africa declined by 14.2%, while the goods flow in opposite direction decreased by 25.7%.

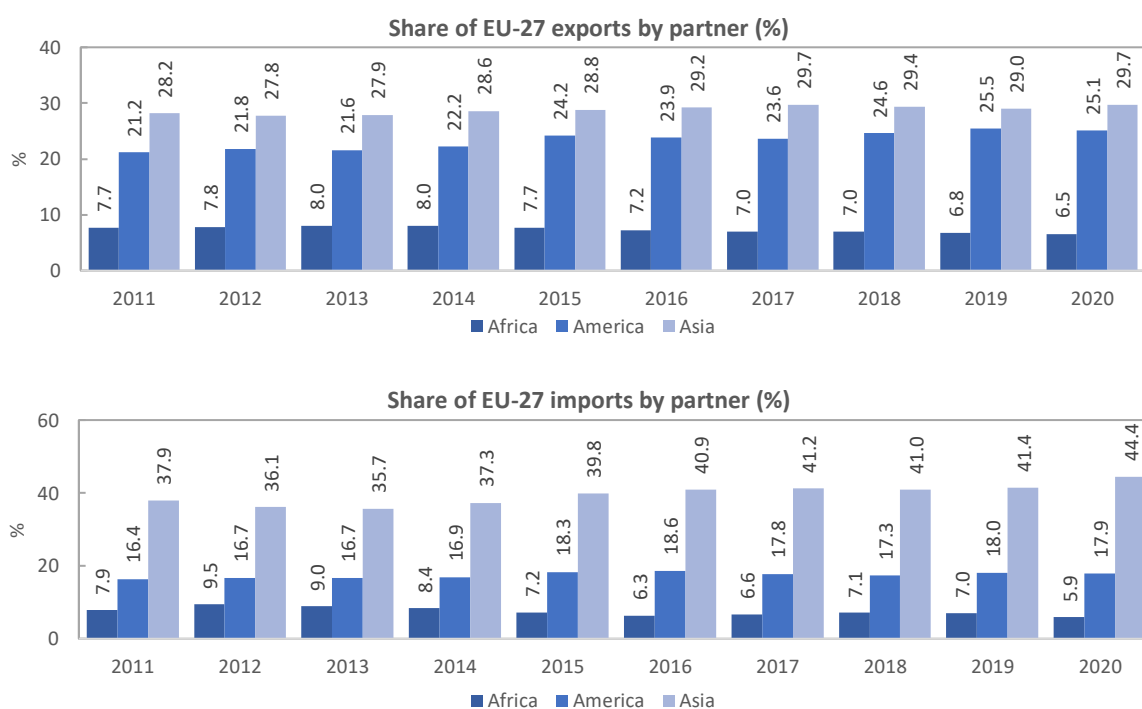


Figure 1: Share of EU-27 exports and imports by intercontinental partners in 2011 – 2020
Source: EUROSTAT

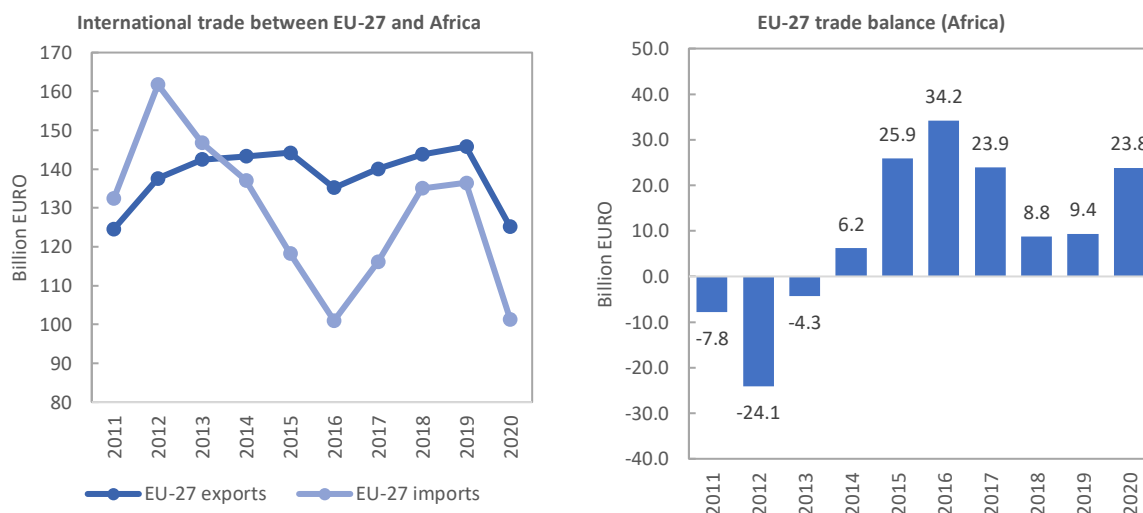


Figure 2: International trade between EU-27 and Africa in 2011 – 2020

Source: EUROSTAT

The most important African international trade partners for EU-27 countries are Algeria, South Africa, Morocco, Nigeria, Egypt, Tunisia, Libya, Angola, Cote d’Ivoire, Ghana, Cameroon, Senegal, Togo, Equatorial Guinea, and Kenya (Figure 3). In 2011 – 2020 the EU-27 exported to these 15 countries 87.0% of goods that were made for African market (for 1.19 trillion EURO). Also, these 15 countries sold for European Union 88.9% of products from African continent (1.14 trillion EURO). The positive relative international trade balance (exports to imports in percentage) the EU-27 had with South Africa (142.7%), Morocco (155.1%), Egypt (230.0%), Tunisia (114.8%), Ghana (103.0%), Senegal (674.8%), Togo (1 997.3%), and Kenya (169.5%). The other 7 African countries exported to European Union more products than imported having their own positive international trade balances.

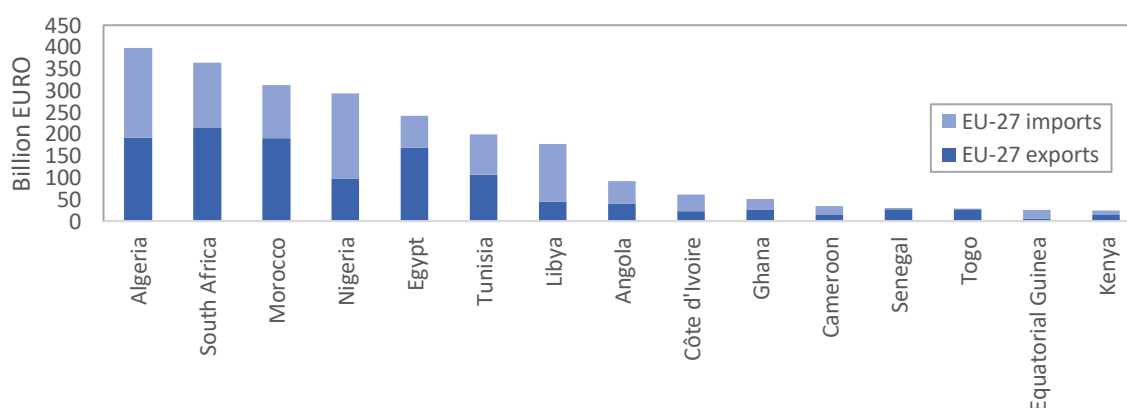


Figure 3: The most important African international trade partners for EU-27 in 2011 – 2020

Source: EUROSTAT

The most active in international trade European Union countries are Germany, Netherlands, and France. These countries together in 2011 – 2020 implemented 49.9% of extra EU-27 international trade (Figure 4). The other European Union countries having the very significant impact on extra EU-27 trade are Italy, Belgium, Spain, Poland, Ireland, Sweden, and Czechia. Their proportions in extra EU-27 international trade are in range from 2.4% to 9.0%. The rest 17 EU countries together implemented 13.7% of trade between European Union and the world.

The most payments in extra EU-27 international trade are being made by US dollar and euro. When exporting the European Union products, the international business partners mostly make payments by euros (50.6%) and in the second place are US dollars (37.9%). Conversely, when the EU countries import the products, the main currency for international payments is US dollar (55.3%), and afterwards follows euro (39.1%). The other national and non-national currencies in extra EU-27 international trade have less significance: 11.6% in exports and 5.75 in imports (Figure 4).

The largest exports market for EU-27 goods in Africa is for machinery and transport equipment (37%). The lesser proportions are in demand for chemicals and related products (14%), mineral fuels, lubricants, and related materials (14%), food, drinks, and tobacco (11%), and raw materials (3%). The other manufactured goods have a proportion of 21% in EU-27 exports to Africa (Figure 5).

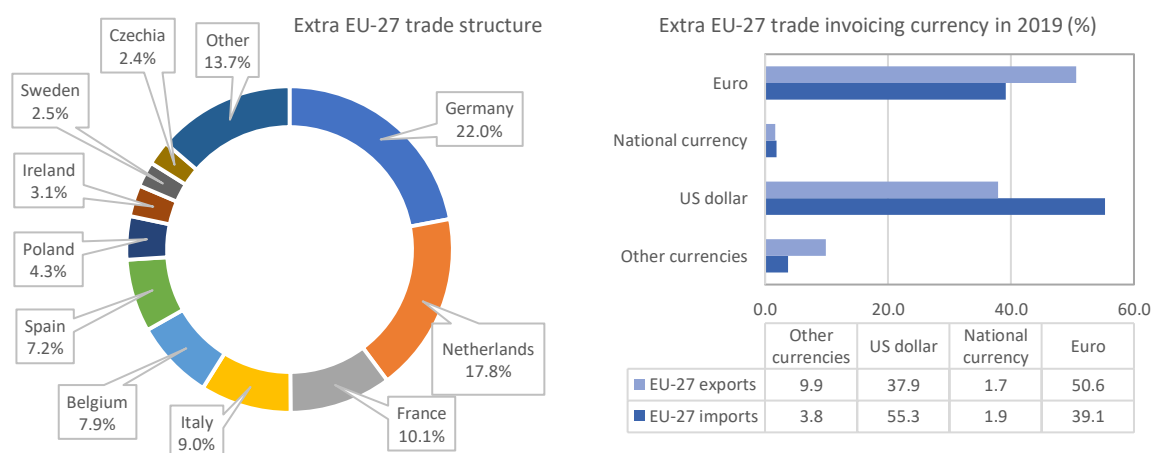


Figure 4: Extra EU-27 trade structure in 2011 – 2020 and invoicing currency in 2019
Source: EUROSTAT

The African countries in European Union have the largest market for mineral fuels, lubricants, and related materials (54%). The significant part in the goods flows from Africa to EU-27 also have food, drinks, and tobacco (12%), and machinery and transport equipment (11%). The proportion of raw materials is 6%, chemicals and related products – 3%, other manufactured goods – 14%.

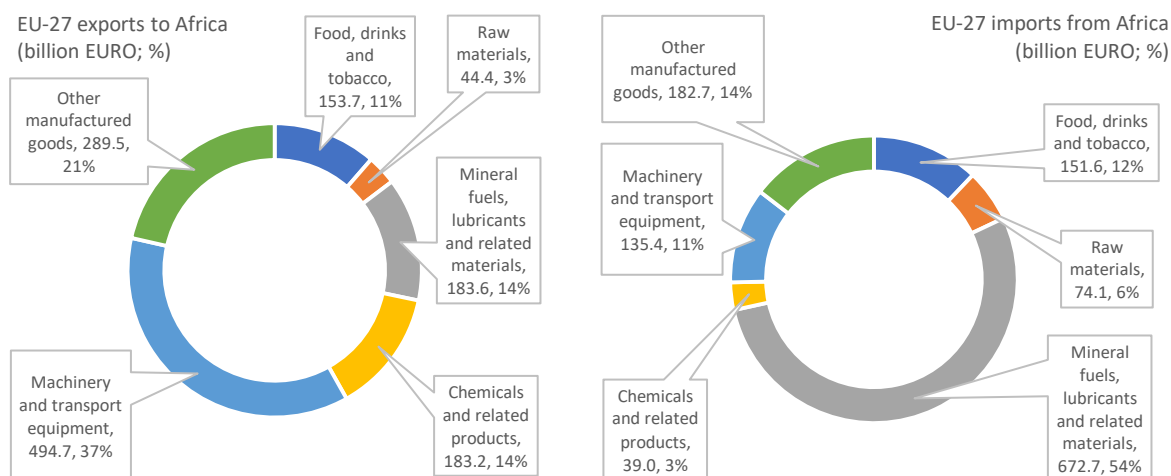


Figure 5: EU-27 and Africa international trade structure in 2011 – 2020
Source: EUROSTAT

The growing activity in business and international trade between European Union and Africa was observed in 2016 – 2019, while the global lockdown of world’s economics in 2020 caused the very significant decline of international trade in both directions (Figure 2). Table 1 indicates the more detailed analysis of growth and decline rates in different product groups separating the growth period 2016 – 2019 and decline period 2019 – 2020.

Table 1: Changes in international trade between EU-27 and Africa

	EU-27 exports to Africa				EU-27 imports from Africa			
	2016 – 2019		2019 – 2020		2016 – 2019		2019 – 2020	
	Million EURO	%	Million EURO	%	Million EURO	%	Million EURO	%
Food, drinks, and tobacco	1 048.9	7.0	775.7	4.8	781.7	4.7	127.4	0.7
Raw materials	453.3	11.1	-233.6	-5.2	2 546.3	40.0	363.3	4.1
Mineral fuels and lubricants	6 132.0	43.7	-6 053.7	-30.0	25 087.1	65.3	-29 202.4	-46.0
Chemicals and related products	1 337.7	7.1	-1 017.8	-5.1	716.7	20.9	-529.3	-12.7
Machinery and transport equipment	1 470.0	2.9	-9 274.6	-18.0	5 471.2	38.2	-3 740.3	-18.9
Other manufactured goods	952.9	3.3	-4 735.7	-15.8	665.6	3.5	-2 382.3	-12.1

The period of 2016 – 2019 was very favourable for the international trade development between European Union and Africa. The growth of exports and imports was observed in both sides. The most significant increase of demand was in the markets of mineral fuels, lubricants, and related materials (43.7% and 65.3%). The second place of growth belongs to the raw materials (11.1% and 40.0%). The significantly growing African markets were in chemical and food industries (7.1% and 7.0% accordingly). The African markets of machinery and other manufactured goods grew by 2.9% and 3.3% (Table 1). The European Union market growth was Machinery (38.2%), chemicals (20.9%), food (4.7%) and other goods (3.5%).

The global economic lockdown in 2020 had the very significant negative impact on international trade between EU-27 and Africa. The only industry with slowed but positive change of international trade in 2020 was food, drinks, and tobacco. In addition, the EU-27 raw material market also slightly grew. All other industries suffered the decline of demand in both continents. The highest decline was in the demand for mineral fuels, lubricants, and related materials (-30.0% and -46.0%). The 2nd and 3rd negative changes were observed in African markets of machinery, transport equipment and other goods (-18.0% and -15.8%). In the same order declining EU-27 markets were for machinery (-18.9%) and chemical products (-12.7%).

Initially 6 aggregated macroeconomic indicators of EU-27 countries were selected as possible factors influencing the demand of African industrial products. The first is gross domestic product at market prices (GDP) which in period 2016 – 2019 grew by 11.3%. The second is final consumption expenditure of households (CEH) which increased by 9.8% causing the higher demand for goods and services. The third indicator is gross fixed capital formation (FCF) which is related to real business investments. During the period of 2016 – 2019 it grew by 19.9% in EU-27 countries. The other two variables are directly related to international trade. The exports (EXP) of goods and services increased by 17.7%, while the imports (IMP) to European Union grew by 20.0%. The sixth indicator is compensation of employees (CEE) which increased by 12.5% during the same period (Figure 6).

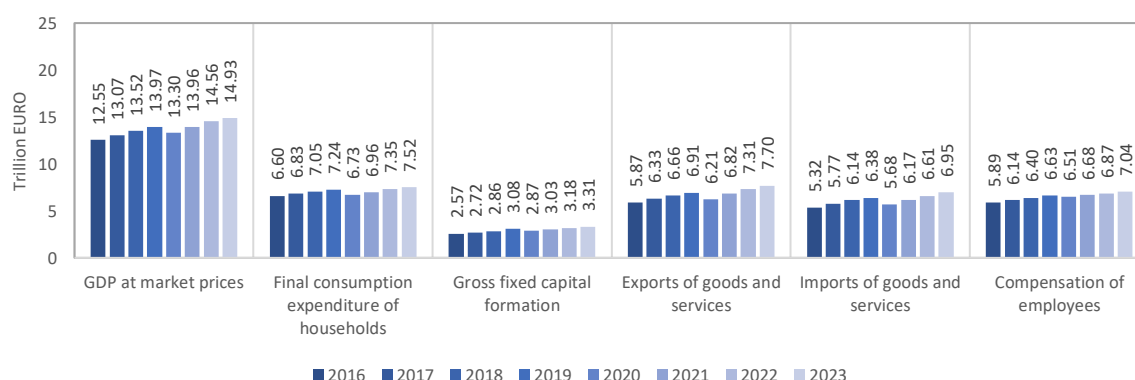


Figure 6: Macroeconomic indicators of EU-27 in 2017 – 2021 and 2022 – 2023 forecasts
Source: EUROSTAT and European Commission

The EU-27 economic downturn in 2020 can be seen from all these 6 indicators. The most affected was European Union international trade where imports decreased by 11.0% and the decline of exports was 10.0%. The final expenditure of EU-27 households fell by 7.1%, the business investments decreased by 6.5% compared to year 2019. The decline of GDP was 4.8%, and the least affected indicator was compensation of employees which declined by 1.8%. The values of analyzed macroeconomic variables were extrapolated for the period 2022 – 2023 using the official economic forecasts of European Commission. The growth of all mentioned indicators is predicted (Figure 6) and the positive impact on international trade between EU-27 and Africa can be expected.

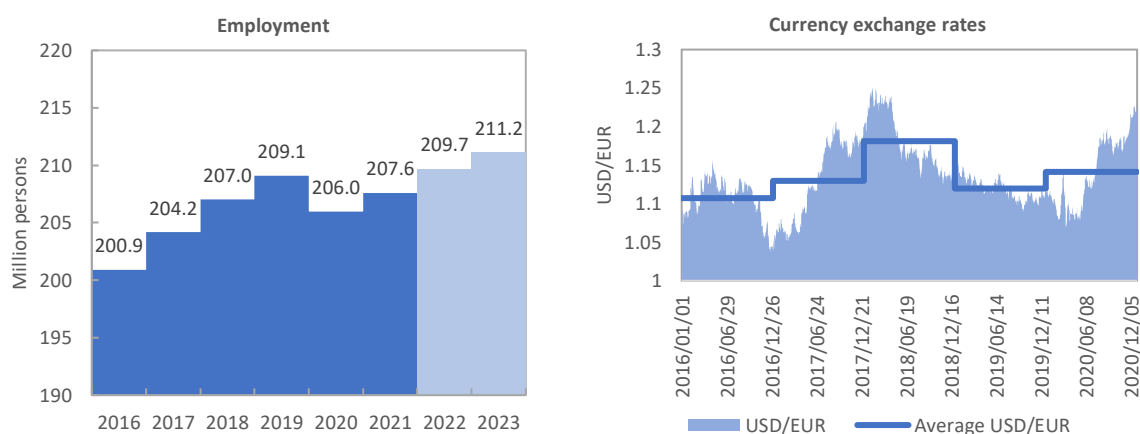


Figure 7: EU-27 employment (actual and forecasts) and USD/EUR exchange rates
Source: European Commission and European Central Bank

Additionally, the EU-27 employment (EMP) and USD/EUR exchange rates were included into the analysis as possible factors of international trade amounts between European Union and Africa. The employment changes (actual and predicted) have the same directions as previously analysed macroeconomic indicators (Figure 7). The USD/EUR exchange rates are relevant to analysis because 55.3% of imports to EU-27 are paid by US dollars. The increasing value of USD makes more expensive products for European Union importers. The average USD/EUR values were calculated for every year of analysed period (Figure 7).

Table 2: EU-27 imports decline from continents in 2020 (compared to 2019)

Asia		America		Africa	
Million EURO	%	Million EURO	%	Million EURO	%
-42 285.7	-5.26	-41 510.2	-11.90	-35 100.7	-25.73

The comparison of EU-27 imports changes from different continents in 2020 has shown that the most significant relative slowdown of international trade was with Africa (-25.73%). The imports from America decreased by 11.90%, while the trade with Asia remained the most active (Table 2).

The very strong correlation ($r > 0.9$) EU-27 imports of products from Africa had with consumption expenditures of EU households (CEH), total exports (EXP) and imports (IMP) of goods and services in period of 2019 – 2020. The EU-27 GDP has also the strong correlation (0.8023). The significant interrelation was observed between EU imports from Africa and EU-27 employment (EMP), gross fixed capital formation (FCF) and compensation of employees (CEE). The lowest correlation had USD/EUR average annual exchange rates (Table 3).

Table 3: Pearson correlation coefficients between EU-27 imports from Africa and 8 factors

CEH	EXP	IMP	GDP	EMP	FCF	CEE	USD/EUR
0.9544	0.9351	0.9329	0.8023	0.7700	0.6808	0.5604	0.4505

The multiple linear regression model was developed for prediction of African products demand in EU-27 analysing the most correlating factors (CEH, EXP and IMP). The determination coefficient of the model $R^2 = 0.919209$. The variables in this model are expressed in billion EURO:

$$\text{EU-27 IMPORTS}_{\text{Africa}} = 0.101863 \times \text{CEH} + 0.046056 \times \text{EXP} - 0.069053 \times \text{IMP} - 474.044197$$

The mean absolute percentage error was calculated to estimate the model’s precision, using the actual values (A_t), predicted values (F_t) and number of periods (n):

$$\text{MAPE} = \frac{1}{n} \times \sum_{t=1}^n \left| \frac{A_t - F_t}{A_t} \right|$$

The statistical predictions using the multiple linear regression model show that the expected growth of EU-27 imports of total industrial products from Africa in 2022 is 14.5%, while in 2023 the predicted growth rate is 13.4%. The mean absolute percentage error of predictions is 2.8% (Table 5). The growing economics of European Union allows expect to reach the 93.7% of 2019 year’s imports from Africa in 2021, 107.3% in 2022, and 121.6% in 2023.

Table 5: Statistical predictions of EU-27 imports from Africa in 2021 – 2023

Billion EURO	Growth rate (%)	Billion EURO	Growth rate (%)	Billion EURO	Growth rate (%)	MAPE (%)
2021	2021	2022	2022	2023	2023	
127.8	+26.2	146.3	+14.5	165.9	+13.4	2.8

The correlation matrix of raw data (Table 6) was used to select the EU-27 macroeconomic variables that have the most significant impact on different products imports from Africa (correlation coefficient $r > 0.8$).

Table 6: Correlation matrix of EU-27 macroeconomic indicators and imports from Africa

	GDP	CEH	FCF	EXP	IMP	CEE	EMP
Food, drinks, and tobacco	0.72	0.43	0.83	0.50	0.51	0.89	0.75
Raw materials	0.73	0.43	0.84	0.50	0.51	0.91	0.76
Mineral fuels and lubricants	0.72	0.91	0.58	0.88	0.88	0.45	0.68
Chemicals and related products	0.81	0.92	0.68	0.93	0.93	0.59	0.79
Machinery and transport equipment	0.97	0.96	0.95	0.96	0.96	0.85	0.94
Other manufactured goods	0.22	0.52	0.03	0.48	0.47	-0.09	0.18

The time series analysis of EU-27 imports from Africa is given in Figure 8. The demand of African food, drinks, and tobacco products in European Union is constantly growing since 2012 with the declined growth rate from 2016. The EU-27 market of raw materials for African exporters is also growing since 2016. The demand of these products did not suffer the decline

due to COVID-19 pandemic. Conversely, the imports of mineral fuels, lubricants, and related materials was decreasing since 2012 with temporary growth in 2017 – 2018. The demand of African chemicals deteriorated twice: in 2016 and 2020. The constant upward trends of machinery, transport equipment, and other manufactured goods were interrupted not only by the beginning of COVID-19 pandemic in 2020, but the imports of these products changed the direction even in 2019. However, the demand all products recovered in 2021.

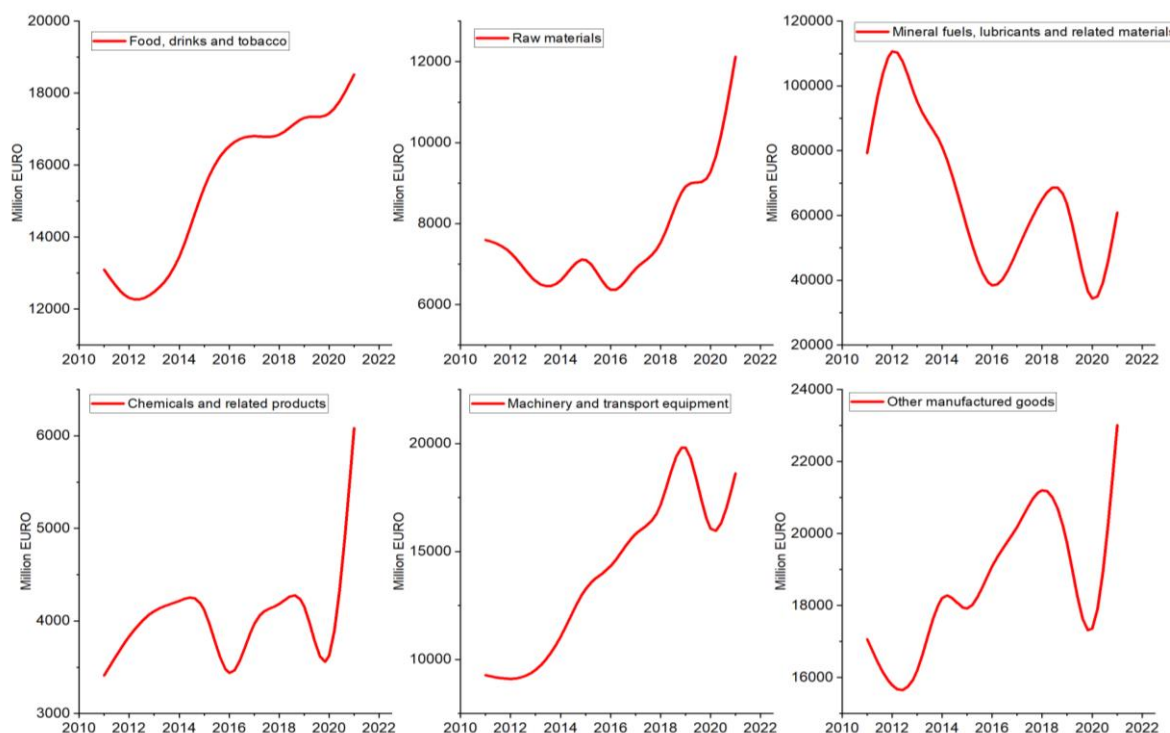


Figure 8: Time-series analysis of EU-27 imports from Africa

Source: EUROSTAT

The dynamics of EU-27 imports in Figure 8 cannot allow to employ the time-series forecasting methods because the shapes of curves are neither cyclical, nor trended. Therefore, the aggregated EU-27 macroeconomic indicators from Table 6 were selected as independent variables forecasting the EU-27 imports of different products from Africa. The heterogeneity of macroeconomic conditions of every EU-27 country determines the different changes of imports, however the aggregated forecasting for the whole European Union was selected. As the main macroeconomic indicator is GDP, the cross-sectional panel data of 2011 – 2021 and official projections are given in Figure 9. In overall EU the European Commission predicted the GDP growth of 4% in 2022 and 2.8% in 2023. The highest GDP growth in 2022 was expected in Malta (6%) and Spain (5.6%), while the least growth was forecasted for Belgium (2.7%) and Denmark (2.8%). In 2023 the most significant GDP growth was expected in Slovakia (5.1%) and Malta (5%), the most restrained increment predicted for Finland (2%) and Sweden (2%).

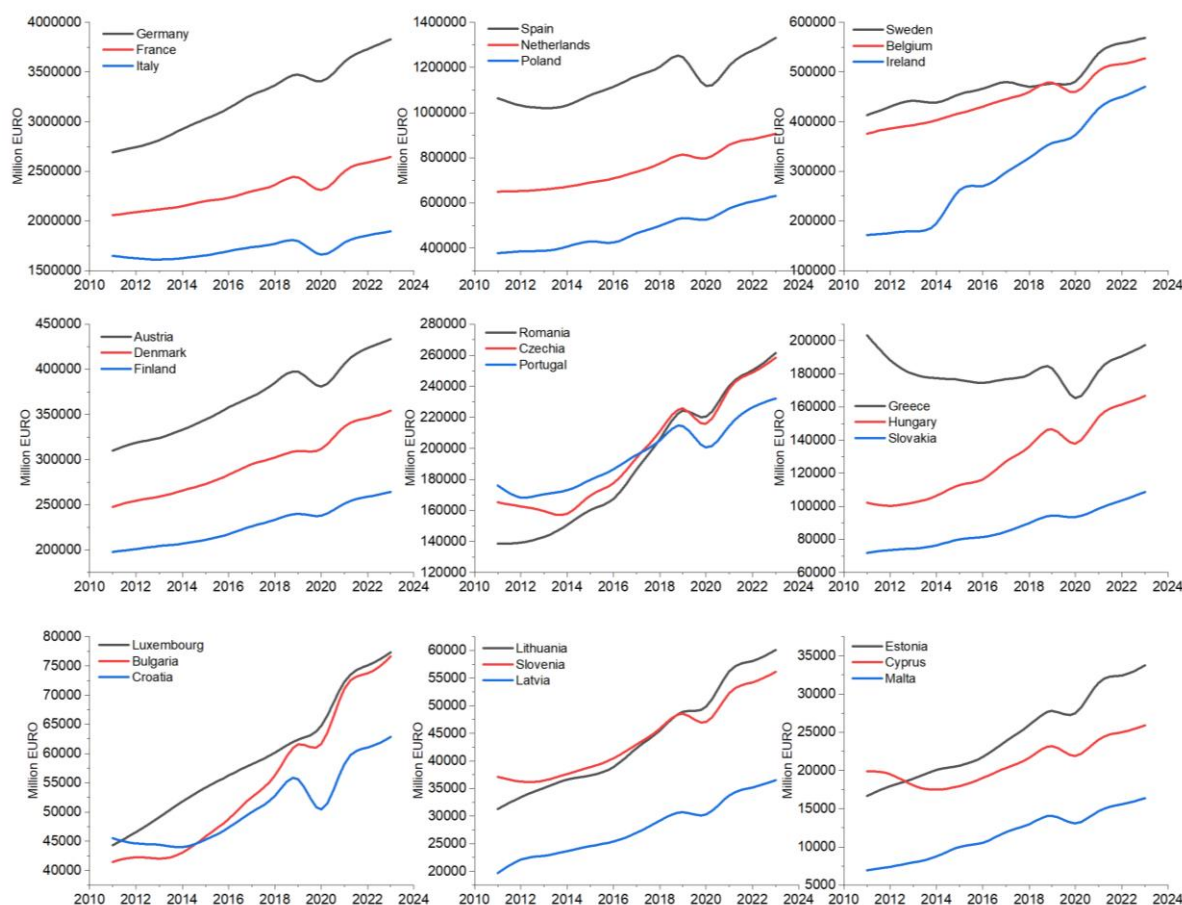


Figure 9: Cross-sectional data of 2011 – 2021 EU-27 GDP and 2022 – 2023 forecasts
 Source: EUROSTAT and European Commission

According to European Commission 2022 autumn forecasts the final consumption expenditure of households in EU-27 was expected to grow by 0.1% in 2022 and 1.5% in 2023. The increase of gross fixed capital formation should be 0.5% and 2.3% respectively. The exports of goods and services was forecasted to grow by 2.1% and 3.6%, while imports by 1.9% and 3.5% in 2022 – 2023. The most significant increase during the post-pandemic recovery was predicted for compensation of employees (5.2% and 3.9%). The least growth was expected for total employment not exceeding 0.4% (Figure 10).

The statistical modelling was implemented to forecast the different products' imports from Africa considering the assumption that the main factors are the most correlating macroeconomic indicators of Table 6. The elasticity coefficients were calculated to evaluate the direct statistical impact of a particular factor on EU-27 imports from Africa in 2020 – 2021. These elasticity coefficients indicate the percentage change of imports relatively to the change of highly correlating macroeconomic variable by 1% during the 1st recovery year after the most restrictive COVID-19 economic lockdown in 2020 (Table 7).

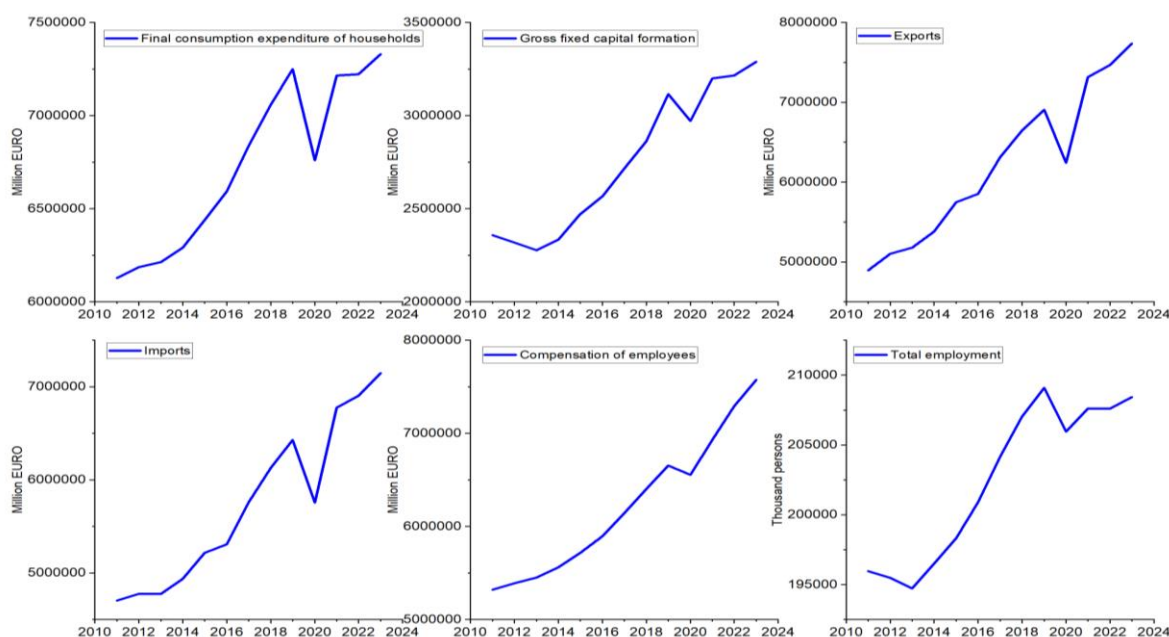


Figure 10: 2011 – 2021 EU-27 macroeconomic indicators and 2022 – 2023 forecasts
 Source: EUROSTAT and European Commission

Table 7: Coefficients of elasticity between EU-27 imports from Africa and macroeconomic variables

Dependent variable	The most correlating factor	Elasticity coefficient (2020 – 2021)
FOOD	CEE	1.0821333
RAW MATERIALS	CEE	5.3364195
MINERALS	CEH	11.501531
CHEMICALS	IMP	3.8275265
MACHINERY	GDP	2.019401

The main statistical forecasting presumption is that during the following post-pandemic years (2022 and 2023) the macroeconomic factors will have the same relative impact on African products imports to EU-27. The predicted values of imports were calculated by multiplying the elasticity coefficients by the official predictions of EU-27 macroeconomic indicators' percentage changes of years 2022 and 2023 (Table 8). The limitation of these predictions is understanding that demand for imported products depend on many other economic factors, however this analysis is based on *ceteris paribus* ruling out the possibility of other factors changing, i.e. the specific causal relation between only two variables is focused.

The most significant growth of EU-27 imports from Africa for the period of 2022 – 2023 is expected in raw materials (27.7% and 20.8% respectively) after the huge decline by 46% in 2020. The African machinery and transport equipment industries will also have very significant

increase of demand in 2022 (8.1%) when the European Union markets recover after the COVID-19 global lockdown in 2020. The growth of demand in chemical products is also significant until 2023 (7.3 – 13.4 percent yearly). According to the predicted changes in European Union macroeconomics, the African industries of food, drinks, tobacco, and raw materials can expect the demand growing by 5.6% and 4.2%. The mineral fuels and lubricants demand growth slowdown to 1.2% in 2022 is expected because the most important economic factor was statistically determined as consumption expenditures of households that in 2022 according to official forecasts will grow only by 0.1%. The expected more rapid growth of EU inhabitants' consumption in 2023 should increase the demand of African mineral fuels and lubricants by 17.3%

Table 8: Statistical forecasts of EU-27 imports from Africa

Industry	2020	2021	Forecast 2022		Forecast 2023		
	Billion EURO	Billion EURO	Growth (%)	Billion EURO	Growth (%)	Billion EURO	Growth (%)
FOOD	17.4	18.5	6.2	19.6	5.6	20.4	4.2
RAW MATERIALS	9.3	12.1	30.6	15.5	27.7	18.7	20.8
MINERALS	34.3	61.0	77.6	61.7	1.2	72.3	17.3
CHEMICALS	3.6	6.1	67.9	6.5	7.3	7.4	13.4
MACHINERY	16.1	18.6	15.9	20.1	8.1	21.2	5.7

The main African exporters to EU are shown in Table 9. The most concentration is in machinery, minerals, and chemicals industries where 5 countries export 83.6% – 97.6% of production.

Table 9: The main African exporters to European Union (2011 – 2020)

FOOD		RAW MATERIALS		MINERALS		CHEMICALS		MACHINERY	
Country	%	Country	%	Country	%	Country	%	Country	%
Côte d'Ivoire	19.0	South Africa	29.3	Algeria	29.5	Egypt	27.0	Morocco	33.8
Morocco	17.2	Morocco	8.7	Nigeria	27.7	South Africa	18.6	South Africa	32.4
South Africa	12.1	Tunisia	6.0	Libya	19.5	Morocco	18.4	Tunisia	26.7
Ghana	8.5	Kenya	5.8	Angola	7.0	Algeria	12.7	Egypt	2.9
Cameroon	4.2	Côte d'Ivoire	5.6	Egypt	4.9	Tunisia	6.9	Liberia	1.8
Other	39.0	Other	44.6	Other	11.4	Other	16.4	Other	2.4
Total	100.0	Total	100.0	Total	100.0	Total	100.0	Total	100.0

The recovering EU-27 market after 2020 economic lockdown of COVID-19 pandemic will have the most significant effect for Algeria, Nigeria, Libya, Angola, and Egypt that are the main exporters to EU-27 of mineral fuels, lubricants, and related materials.

In 2020 the total exports of EU-27 to Africa decreased by 20.7 billion EURO (-14.2%) compared to previous year. The analysis of 15 most important international African trade partners has shown that only 4 countries (Ghana, Kenya, Cote d'Ivoire, and Cameroon) increased the imports of products from European Union. The most significant imports growth

was in Ghana (17.7%). The consumption of European Union products in Kenya, Cote d'Ivoire, and Cameroon increased from 5.2% to 15.6%. The rest 11 largest EU-27 international trade partners in Africa decreased the production demand from 4.7% to 26.2% (Figure 11). The most significant decline of European Union products demand was in South Africa where the EU-27 exports decreased by 5.3 billion EURO (-23.1%).

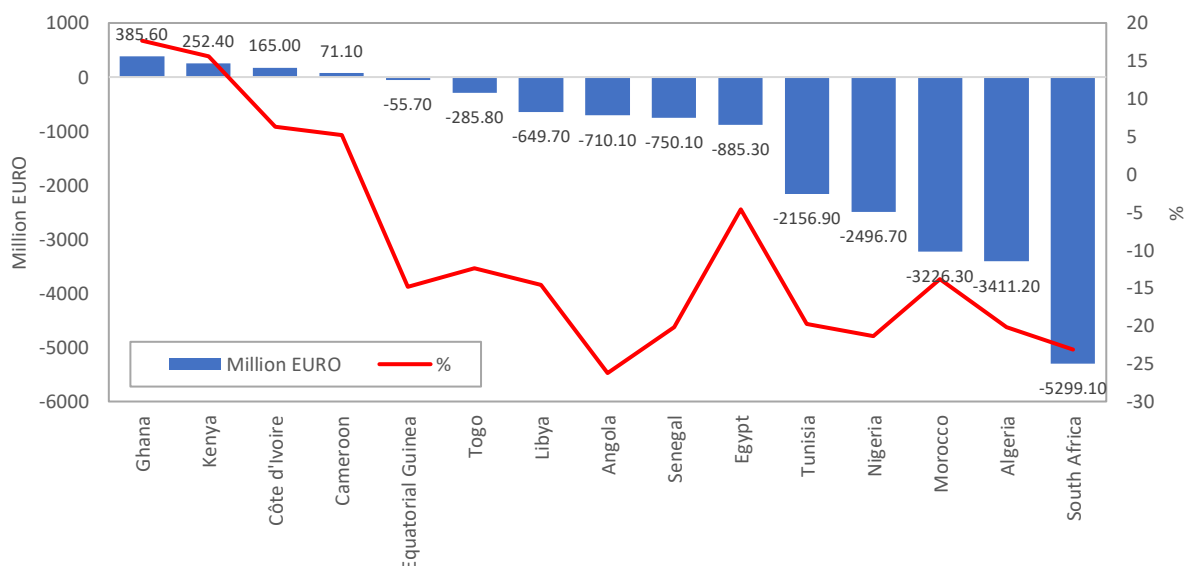


Figure 11: Changes of EU-27 production exports to main African partners in 2020
Source: EUROSTAT

The decline in machinery markets of Africa for EU-27 manufacturers in 2020 was 9.3 billion EURO. The selling amounts of these products in South Africa, Algeria, and Morocco decreased by more than 1 billion EURO in every country. The market of mineral fuels, lubricants, and related materials decreased by 6.1 billion EURO. Mostly sales declined in Nigeria, Algeria, Egypt, Tunisia, and Morocco. The exports of chemical products decreased by more than 1 billion EURO, and the African market of raw materials declined by 233.6 million EURO. The sales of food, drinks, and tobacco in Africa increased by 775.7 million EURO, however the most significant sales downturn for EU-27 manufacturers was in Egypt, South Africa, Angola, Ethiopia, and Libya (Table 10).

Table 10: The most significant decline of EU-27 exports to Africa in 2020 (million EURO)

FOOD		RAW MATERIALS		MINERALS		CHEMICALS		MACHINERY	
Country	ΔEXP	Country	ΔEXP	Country	ΔEXP	Country	ΔEXP	Country	ΔEXP
Egypt	-173.8	Egypt	-76.1	Nigeria	-2 116.4	South Africa	-322.4	South Africa	-3 726.6
South Africa	-148.1	Morocco	-65.2	Algeria	-947.5	Nigeria	-185.7	Algeria	-1 836.2
Angola	-104.0	Algeria	-31.3	Egypt	-895.4	Algeria	-128.1	Morocco	-1 714.9
Ethiopia	-74.9	Angola	-22.2	Tunisia	-763.5	DRC	-119.2	Tunisia	-705.9
Libya	-74.9	Libya	-17.6	Morocco	-502.4	Tunisia	-114.5	Nigeria	-392.7
Total	775.7	Total	-233.6	Total	-6 053.7	Total	-1 017.8	Total	-9 274.6

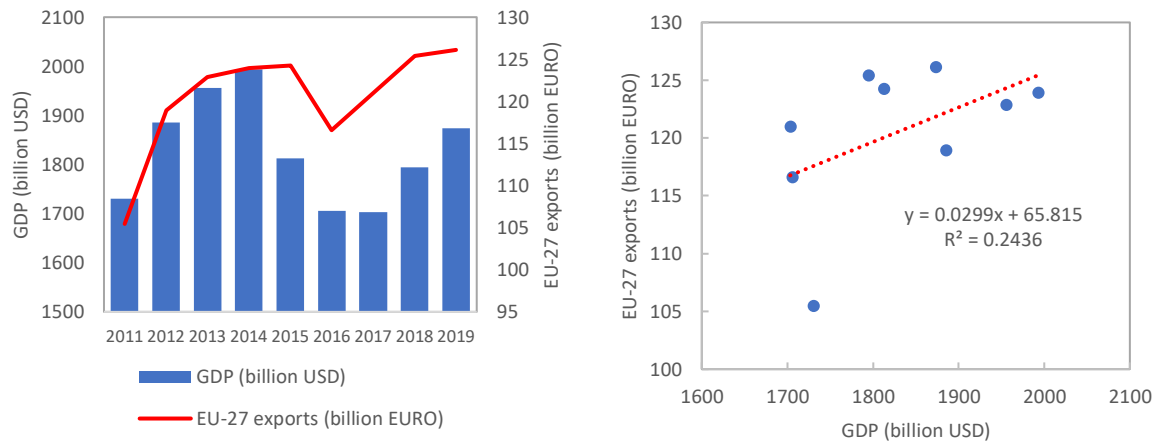


Figure 12: GDP of 15 African countries (main EU-27 partners) and EU-27 exports
Source: Author

The analysis was implemented to estimate how the exports of EU-27 depends on the GDP of main African international trade partners (15 countries). The results have shown that the dynamics of African partners' GDP and EU-27 exports have the similar shapes. However, the correlation coefficient is only 0.47 which indicates, that the estimated interrelation is perceptible but not strong (Figure 12).

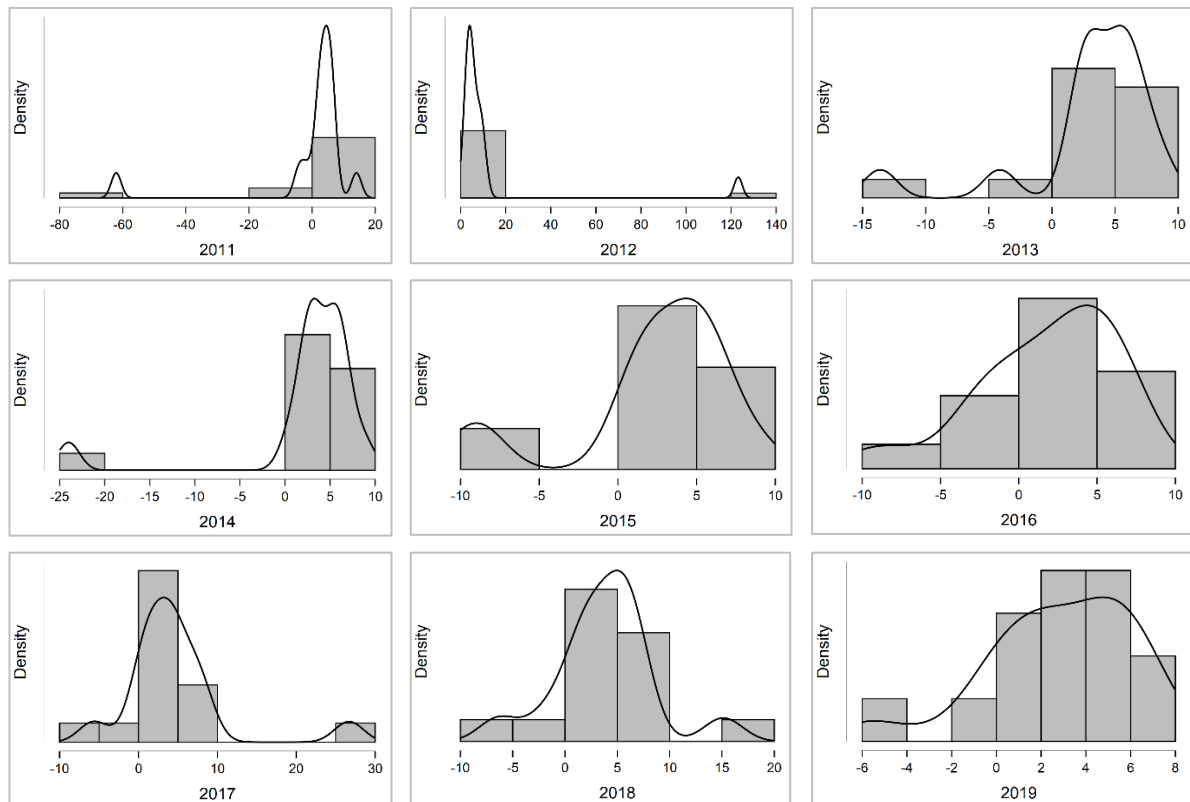


Figure 13: Distribution plots of 15 African countries GDP growth (%) in 2011 – 2019
Source: Author

Canonical analysis was implemented to estimate the correlation between EU-27 exports to Africa and the main African trade partners' annual GDP growth (%). The canonical correlation coefficient is 0.9521 which indicates strong statistical interrelationship. The distribution plots were created for the African countries GDP growth (%) to assess how the GDP changes are typical (Figure 13).

Table 11: Descriptive statistics of EU-27 main African trade partners GDP growth (%)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Valid	14	14	14	14	15	15	14	15	15
Missing	1	1	1	1	0	0	1	0	0
Mean	3.881	5.478	4.200	4.373	2.341	1.828	3.120	3.777	2.732
Median	3.801	4.553	4.745	4.311	3.700	3.200	3.865	4.062	2.536
Std. Deviation	4.291	2.741	3.143	2.248	5.103	4.370	3.611	4.770	3.266
Skewness	0.359	0.658	-1.263	0.165	-1.512	-1.013	-0.853	0.200	-1.111
Kurtosis	2.171	-0.801	3.048	-0.291	1.974	0.943	1.515	2.311	1.549
Range	18.434	8.493	13.023	8.379	17.953	15.996	13.811	21.489	12.055
Minimum	-4.387	2.213	-4.133	0.415	-9.110	-8.816	-5.668	-6.356	-5.576
Maximum	14.047	10.707	8.889	8.794	8.843	7.179	8.143	15.133	6.478
25th percentile	2.048	3.549	2.806	2.902	1.194	-0.609	1.329	1.561	0.922
50th percentile	3.801	4.553	4.745	4.311	3.700	3.200	3.865	4.062	2.536
75th percentile	5.908	7.871	6.054	5.911	5.685	5.104	4.694	6.291	5.352

The analysis results have shown that Libya can be considered as the outlier in the group of main African international trade partners according to annual GDP growth rates in years 2011 – 2014 and 2017. The GDP growth of Libya in period of 2011 – 2019 varied in range from -62.1% to 123.1%, while the range of other 14 countries was [-9.1%; 14.1%]. To obtain the more typical average GDP growth rates of main African trade partners, Libya was excluded from the calculation of descriptive statistics indicators in 2011 – 2014 and 2017 (Table 11).

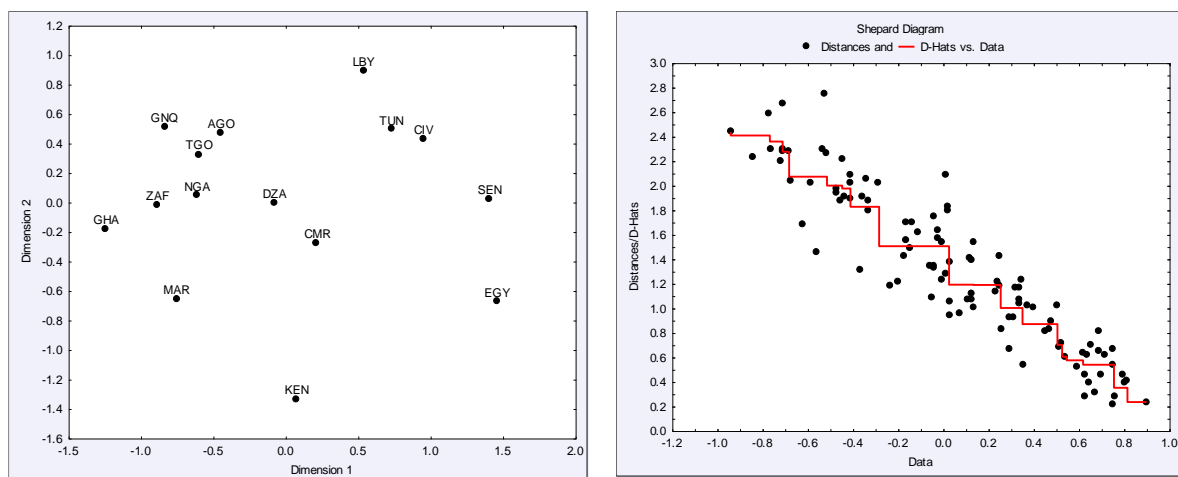


Figure 14: Guttman-Lingoes smallest space analysis results

Source: Author

The descriptive statistics of GDP growth rates indicates that in 2016 the economic growth of main African trade partners was the least (in average 1.8%). The slowing growth was seen in 2015 (2.3%) after the more intensive average GDP growth period of 2012 – 2014. The similar situation was in 2019, when the average GDP growth also slowed before the significant EU-27 exports decline in 2020. The values of median reflect these changes as well. The lower standard deviation values in 2016 and 2019 compared to previous years, show that the slowing of GDP growth is more typical in analysed group of countries than in economic expansion periods. The skewness in these years also obtained negative values. The kurtosis in most analysed years was positive confirming the relatively narrow distributions of GDP growth rates. The dynamics of structural averages (median and percentiles) have the similar shape as EU-27 exports to African countries.

Guttman-Lingoes smallest space analysis (SSA) was implemented to locate the main EU-27 trade partners in 2-dimensional space according to their similarities in GDP growth rates (Figure 14). Most points in Shepard diagram are clustered around the step-line. Thus, it can be concluded that this two-dimensional configuration is adequate for describing the similarities between countries. As this research has shown that the GDP changes have an impact on the EU-27 production demand in Africa, the European Union exporters facing with the demand changes for their production in a particular African country, can expect the very similar demand changes in other countries that are near to it in 2-dimensional space of Figure 11. The relative distances allow visualize the expected similarities and dissimilarities of possible sales changes for exporters when the GDP growth rates of main 15 African international trade partners vary in time.

5. Conclusions

The statistical analysis results of period of 2011 – 2020 have shown that the proportion of EU-27 international trade with African countries declined. The share of EU-27 exports to Africa decreased by 1.2% and the imports from Africa decreased by 2.0%. The flows of goods from EU-27 to Africa was more stable than in opposite direction. The maximal quantity of African products exports to EU-27 countries was reached in 2012. Afterwards, the continuous decline of African exports to EU-27 was observed until 2016. The repeated growth of African products imports to EU-27 was observed in 2006 – 2019 but the global slowdown of economics in 2020 negatively affected the international trade for both sides.

The most important African international trade partners for EU-27 are 15 countries: Algeria, South Africa, Morocco, Nigeria, Egypt, Tunisia, Libya, Angola, Cote d'Ivoire, Ghana, Cameroon, Senegal, Togo, Equatorial Guinea, and Kenya where 87.0% – 88.9% of intercontinental trade is being performed. The most active in international trade European Union countries are Germany, Netherlands, and France.

The largest exports market for EU-27 goods in Africa is for machinery and transport equipment. The lesser proportions are in demand for chemicals and related products, mineral fuels, lubricants, and related materials, food, drinks, and tobacco. The African countries in European Union have the largest market for mineral fuels, lubricants, and related materials (more than 50% of total exports).

The period of 2016 – 2019 was very favourable for the international trade development between European Union and Africa. The growth of exports and imports was observed in both sides, but the global economic lockdown in 2020 had the very significant negative impact on intercontinental products flows. The only industry with slowed but positive change of international trade in 2020 was food, drinks, and tobacco. In addition, the EU-27 raw material market also slightly grew. All other industries suffered the decline of demand in both continents. The highest decline was in the demand for mineral fuels, lubricants, and related materials. The comparison of EU-27 imports changes from different continents in 2020 has shown that the most significant relative slowdown of international trade was with Africa (-25.73%).

In 2020 COVID-19 pandemic the total exports of EU-27 to Africa decreased by 14.2%. The analysis of 15 most important international African trade partners has shown that only 4 countries (Ghana, Kenya, Cote d'Ivoire, and Cameroon) increased the imports of products from European Union. The outstanding positive imports growth was in Ghana (+17.7%).

The analysis was implemented to estimate how the exports of EU-27 depends on the GDP of main African international trade partners. The results have shown that the dynamics of African partners' GDP and EU-27 exports have the similar shapes, but the correlation is not strong. However, the canonical correlation coefficient affirmed the strong statistical interrelationship between EU-27 exports to Africa and the main African trade partners' annual GDP growth rates. The following Guttman-Lingoes smallest space analysis was implemented to locate the main EU-27 trade partners in two-dimensional space according to their similarities in GDP growth and expected changes of production imports from EU-27 countries.

Seven aggregated macroeconomic indicators of EU-27 countries were selected as possible factors influencing the demand of African industrial products in European Union: GDP, final consumption expenditure of households, gross fixed capital formation, exports, imports, compensation of employees, and employment. Their statistical significance on imports from Africa was proved in this research. Additionally, the USD/EUR exchange rates were included into the analysis as possible factors of international trade amounts between European Union and Africa.

The multiple linear regression model was developed for prediction of African products demand in EU-27 analysing the most correlating macroeconomic factors. The values of analyzed macroeconomic variables were extrapolated for the period 2021 – 2023 using the official economic forecasts of European Commission. The growth of all mentioned indicators is predicted and the positive impact on international trade between EU-27 and Africa can be expected. The statistical predictions show that the expected growth of EU-27 imports of total industrial products from Africa in 2021 is 26.2%, while in 2022 the predicted growth rate is 14.5% and in 2023 is 13.4%.

Recovering EU economies after the COVID-19 restrictions in 2021 demonstrated the highly increased business activity in intercontinental trade. Following this, the statistical forecasting of African products imports to European Union was implemented considering the most correlating macroeconomic variables. The most significant growth of EU-27 imports from

Africa for the period of 2022 – 2023 is expected in raw materials increasing the exports of South Africa, Morocco, Tunisia, Kenya, and Côte d'Ivoire. The first three mentioned countries also are expected to increase the exports of machinery and transport equipment. Together Egypt and Algeria will grow the exports chemical products. The recovering EU-27 market after 2020 economic lockdown will also have the significant effect for Algeria, Nigeria, Libya, Angola, and Egypt that are the main exporters to EU-27 of mineral fuels, lubricants, and related materials.

Following the positively changed trends of intercontinental trade during the post-pandemic period the recovery of active partnership between EU-27 and African businesses should be expected. The renewed business models directed towards these different continents should allow experience all benefits of international trade that were considered a decade ago. The economic shock of pandemic stimulated the sudden growth of African exports to EU-27. The macroeconomic factors related to recovering European markets create the new possibilities for African entrepreneurs to strengthen their positions competing with other continents creating new business relationships in Europe that were interrupted during the pandemic. The macroeconomic growth increases the activity of business enterprises looking for new contractors, so the African businesses have the new possibilities to realize their initiatives continuing the growth of exports to European Union.

References

- Adekunle, B., & Gitau, C. M. W. (2013). Illusion or reality: Understanding the trade flow between China and Sub-Saharan Africa: *Journal of African Business*, 14(2), 117-126.
- Bouët, A., Laborde, D., and Traoré, F. (2018). The European Union – West Africa Economic Partnership Agreement: Small impact and new questions: *The Journal of International Trade & Economic Development*, 27(1), 25-53.
- Cieslik, A. (2009). Bilateral trade volumes, the gravity equation and factor proportions: *The Journal of International Trade & Economic Development*, 18(1), 37-59.
- Haugen, H. Ø. (2019). China-Africa exports: Governance through mobility and sojourning: *Journal of Contemporary Asia*, 49(2), 294-312.
- Krapohl, S., & Huut, S. V. (2020). A missed opportunity for regionalism: The disparate behaviour of African countries in the EPA-negotiations with the EU: *Journal of European Integration*, 42(4), 565-582.
- Moudatsou, A. K., & Garcia, A. S. (2022). International trade and growth limitations: The case of Africa: *African Journal of Economic Review*, 10(3), 63-88.

- Or, N. H. K., Cheng, E. W., Yue, R. P. H., & Yuen, S. W. H. (2021). Risk perceptions, anxiety and the future of international trade: A cross-national study of public trade preferences in Asia under COVID-19: *Journal of Elections, Public Opinion and Parties*, 31(1), 26-40.
- Pavcnik, N. (2019). The winners and losers from international trade: *Survival*, 61(2), 97-100.
- Rahman, M. M., Shahbaz, M., & Farooq, A. (2015). Financial development, international trade, and economic growth in Australia: New evidence from multivariate framework analysis: *Journal of Asia-Pacific Business*, 16(1), 21-43.
- Sousa, M., J., Martins, J. M., & Sousa, M. (2019). Organisational innovation facilitators as drivers for international trade between China and European Union: *Transnational Corporations Review*, 11(4), 360-372.
- Yakubu, A. S., Aboagye, A. Q. Q., Mensah, L., & Bokpin, G. A. (2018). Effect of financial development on international trade in Africa: Does measure of finance matter? *The Journal of International Trade & Economic Development*, 27(8), 917-936.