Assessing the factors affecting the country allocation of Official Development Assistance flows to the health sector from the G7 countries to developing European countries.

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1. Introduction.

Official Development Assistance (ODA) is an important instrument for promoting economic development and welfare of developing countries. With limited domestic resources many low- and middle-income countries rely on external financing to implement projects in critical sectors. ODA can support a wide range of activities, including such spheres as infrastructure, education, health, agriculture, environmental protection and humanitarian aid.

This research focuses on assessing the factors affecting the country allocation of Official Development Assistance flows to the health sector from the G7 countries to developing European countries according to the OECD classification. The health sector occupies a special place in the architecture of international aid. It affects not only mortality rates and quality of life, but also long-term economic growth by increasing labor productivity, building human capital and reducing the social problems associated with illness and disability. Furthermore, this sector plays an important role in both the G7 and developing countries. Nowadays, the key demographic trend in the G7 countries is the tendency of population aging, the average age of the population is growing due to increased life expectancy and declining birth rates. This creates additional burdens on the healthcare system causing the need to increase investment flows in medicine. At the same time, in developing countries healthcare improvement is important for cutting poverty. In addition, a healthy population is a higher-quality workforce which has a positive effect on the productivity and economic growth of states. Finally, not only the internal demographic and socio-economic characteristics of countries affect Official Development Assistance flows to the health sector, but also external factors including, for example, the 2020 Covid-19 pandemic.

This topic has high scientific and applied significance. There are many scientific articles that study Official Development Assistance flows in general without focusing on sector specifics. However, the uniqueness of this study lies not only in the focusing on the healthcare sector which still has high socio-economic importance. This paper analyses the interaction of two groups of countries that are objectively interested in the development of healthcare, namely, the G7 and developing European countries, which makes it possible to study mutual motivation. Talking about the practical significance of the study, the results allow improving the mechanism of making decisions on the distribution of aid. On the one hand, the transparency and accountability of donor countries increases, and on the other hand, recipient countries can better understand what internal and external factors enhance their attractiveness as receivers of health

aid. The findings of the study can also be used by international organizations to develop recommendations on targeted financing.

Hence, the research question of the paper is formulated as follows: “What factors have a significant impact on the distribution of Official Development Assistance flows to the health sector from G7 countries to developing European countries?”

2. Hypotheses.

This paper puts forward two main hypotheses that are subject to further testing. The hypotheses are formulated as follows:

H1: The recipient countries with lower socio-economic indicators attract more Official Development Assistance flows to the health sector.

H2: An increase in the donor countries health indicators has a greater absolute effect on the Official Development Assistance flows to the health sector than similar changes in the recipient countries health indicators.

3. Review of the relevant literature.

In the scientific literature there are two main directions of research on the distribution of the Official Development Assistance flows. The papers in the first direction are aimed at studying the allocation of aid by country, namely, identifying the specific characteristics of recipient countries that have a significant impact on the attraction of the ODA flows. The second line of research on this issue emerged later. The scientific articles in the second direction began to focus on studying the distribution of the ODA flows across sectors since considering the topic from this point of view is more important for achieving the real goals of aid development and increasing the effectiveness of its impact.

3.1 Distribution of aid by country.

Considering the first scientific direction, in the article *Eric Neumayer (2003, P. 134-147)* the author examines what political, economic and cultural factors influence the likelihood of receiving aid from Arab countries and Arab multilateral agencies. In many other studies in this scientific area the sample initially consists only of the recipient countries, and the fact that not all countries receive aid is not taken into account. This assumption introduces the problem of selection bias in the results obtained. In order to solve this problem, the author of the article uses Heckman's two-stage method. The idea of this approach is that at the first stage the probability of being selected is estimated, namely, it is determined which countries are to receive aid using logit or probit models. At the second step, the value of the ODA flows directed to the recipient country selected at the first step is assessed, the ordinary least squares is used for the estimation.

The results of the study confirm the high importance of Arab origin in the distribution of the ODA flows. At the same time, non-Arab Islamic countries are also more likely to receive aid, but in the second step of the assessment, namely, after selection, such countries receive more aid only from Arab donor countries, not from Arab multilateral agencies. The opposite is true for countries with voting patterns similar to Saudi Arabia where after selection more aid comes from Arab multilateral agencies. Furthermore, the ODA flows are more likely to be directed to poorer and sub-Saharan African countries and to countries that do not maintain any diplomatic relations with Israel. Hence, national solidarity, poor economic and social performance and geopolitical interests play an important role in the allocation of the ODA flows from the Arab countries and Arab multilateral agencies.

Another one article in this scientific area that is worth consideration is *Alfonso Carfora et al. (2021).* Here the authors aim to find out what factors influence the allocation of the ODA

flows focusing on the energy and environment sectors. As a main part of the analysis, the authors estimate a panel regression, the sample consists of 85 countries and the time period under consideration is 1995-2015. The assessment is based on three assumptions:

1. The elasticity of vulnerability to economic growth is diminishing;

2. Country's vulnerability declines as its level of economic development rises;

3. Donors, which are developed countries, allocate funds based on the recipient countries' level of economic development.

The main regression equation to be estimated in this paper is as follows:

$$\Delta ODA_{i,t} = c + \alpha \Delta ODA_{i,t-1} + \beta_1 \Delta VI_{i,t-1} + \beta_2 \Delta HDI_{i,t-1} + \beta_3 \Delta CO_{2,i,t-1} + \beta_4 \Delta EI_{i,t-1} + \beta_5 \Delta SH\_REN\_NH_{i,t-1} + \beta_6 \Delta SH\_Fossil_{i,t-1} + \beta_7 \Delta E\_Rate_{i,t-1} + \beta_8 \Delta Lnelcons_{i,t-1} + \beta_9 \Delta VI^2_{i,t-1} + \beta_{10} \Delta SH\_Fossil^2_{i,t-1} + u_{i,t},$$

where $ODA_{i,t}$ stands for the received ODA flows, $ODA_{i,t-1}$ is the first lag of the dependent variable, $VI_{i,t-1}$ stands for the vulnerability index with a one-year lag, $HDI_{i,t-1}$ stands for the human development index with a one-year lag, $CO_{2,i,t-1}$ is the value of the per capita carbon emissions with a one-year lag, $EI_{i,t-1}$ stands for the energy intensity with a one-year lag, $SH\_REN\_NH_{i,t-1}$ stands for the shares of non-hydro renewable generation with a one-year lag, $SH\_Fossil_{i,t-1}$ stands for the shares of fossil generation with a one-year lag, $E\_Rate_{i,t-1}$ is the electrification rate with a one-year lag, $Lnelcons_{i,t-1}$ the logarithm of the per capita electricity consumption with a one-year lag. Also, the squares of two regressors are taken, namely, $VI_{i,t-1}$ and $SH\_Fossil_{i,t-1}$.

The main conclusion that can be drawn from the results of the assessment is that donors give priority to the most vulnerable countries when deciding on the distribution of aid. At the same time, the value of the ODA flows decreases if the recipient country increases its social well-being or if the recipient does not reduce vulnerability after receiving assistance from the donor. Hence, the ability to successfully use the aid received is also critical. Finally, the prevalence of renewable energy also increases the chances of attracting aid.

All in all, the results of both studies show that recipient countries with lower socioeconomic indicators attract more ODA flows. This finding is consistent with the first hypothesis of this paper.

3.2 Distribution of aid by sector.

Considering the second scientific direction, in the article *Rainer Thiele et al. (2006)* the authors try to find out whether the sectoral distribution of donor aid is consistent with the stated aims of achieving the Millennium Development Goals. In order to conduct the necessary analysis, at the first stage, the authors select special indicators reflecting the situation of the recipient countries in 2000, and the indicators are selected in such a way that the greater its value, the higher the need for assistance. At the second stage, various categories of aid by sector are selected based on the principle of greatest relevance for achieving the Millennium Development Goals. Furthermore, in addition to the MDGs, the authors also consider some more traditional aid goals such as improvement of the infrastructure and agricultural development. Correlation analysis is then used to assess whether the allocation of general and sectoral aid by donors corresponds to the need indicators, with a sample of 140 recipient countries.

The key result of the study is that the sectoral distribution of ODA flows is not fully consistent with the Millennium Development Goals. On the one hand, some health-related goals such as combating HIV/AIDS attract enough aid, but on the other hand, some education-related aims such as completion of a full course of primary education by all children are deprived of assistance flows. Hence, the correlation between the need indicators and the aid allocation is insignificant.

Since the Millennium Development Goals do not explain the sectoral distribution of Official Development Assistance flows, it is worth looking for the other principles of aid allocation. In another article *Hidefumi Kasuga (2008)* the author examines whether the distribution of aid flows within the recipient countries is consistent with their development priorities. In the first part of the study, the author analyses whether the sectoral allocation of aid from the donor countries is related to the needs of the recipient countries. The assessment here is carried out on the basis of rank correlation calculations. In the second part of the study, the author uses the Tobit model to test whether the ratio of investments in the infrastructure and social projects depends on the recipient's priorities.

As a result, it was found that allocation of the ODA flows by sector does not correspond to the development priorities of the recipients. The author of the article believes that poor bureaucracy and corruption in the recipient countries impede efficient inter-sectoral aid distribution. Hence, based on the results obtained, two important assumptions can be made. First, it is reasonable to assume that the inter-sectoral allocation for a recipient country depends more on the quality of its government while the inter-recipient allocation is determined solely

by donors. Second, it can be supposed that donor countries are guided by their own principles when allocating aid.

All in all, the results of the literature review in this scientific direction are consistent with the second hypothesis of this paper.

4. Empirical analysis of allocation factors of ODA flows.

4.1 Methodology and sample description.

In this research paper a regression model on panel data is constructed. The sample includes 7 aid donor countries and 13 aid recipient countries. Donors are the G7 member countries, namely, Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. Recipients are the European countries categorised as developing countries according to the OECD classification, namely, Albania, Belarus, Bosnia y Herzegovina, Croatia, Cyprus, Malta, Moldova, Montenegro, North Macedonia, Serbia, Slovenia, Turkey and Ukraine. The period under consideration is from 1995 to 2023. The panel regression model is estimated taking into account country fixed effects. In this case, the unit of observation is not one country, but a pair of countries, consequently, a fixed effects model is estimated for each pair. In this paper, preference is given to using fixed effects for a pair of countries rather than for donor or recipient separately since the model assumes that both participants in the pair influence the outcome of aid distribution.

4.2 Overview of data and variables.

The value of the Official Development Assistance flows from the donor country to the recipient country is a dependent variable. Data on this indicator are taken from the Organisation for Economic Co-operation and Development (OECD).

The regressors of the model are 10 indicators each of which is taken twice reflecting the characteristics of the donor country and the recipient country separately. The first five regressors reflect the socio-economic development of the country under consideration, the following indicators are included in the model: real GDP der capita, population, poverty rate, inflation and interest rate. Real GDP per capita is used as a measure of the average income level and the level of economic development of the country while population shows the size of the country and the potential volume of labour force and healthcare needs. Poverty rate is a percentage of the population living below a defined poverty line and it characterizes the socio-economic situation of the population and the level of vulnerability. Finally, inflation reflects the macroeconomic stability and the development of financial management while interest rate is an

indicator of the financial conditions and the availability of resources in the economy. The data source is the World Bank database.

The next five regressors reflect the characteristics of the healthcare sector in the countries under consideration, the following indicators are included in the model: life expectancy at birth, infant mortality rate, old age dependency ratio, young age dependency ratio and incidence of tuberculosis. Life expectancy at birth is used as an overall indicator of the population health and the level of healthcare development. Infant mortality rate is calculated as the number of deaths per 1,000 live births, it is one of the most sensitive and accurate indicators of the quality of medical services and the level of social development. Old age dependency ratio is the number of individuals aged 64 and older per 100 people from the working-age population, namely, those aged 15-64. Young age dependency ratio is the number of individuals aged 15 and younger per 100 people from the working-age population, namely, those aged 15-64. Both of these indicators reflect the magnitude of the burden on the working population and the healthcare system in the country under consideration. Finally, incidence of tuberculosis is the estimated number of new and relapse tuberculosis cases arising in a given year which reflects the quality of prevention, diagnosis and treatment of infectious diseases. Also, the data source is the World Bank database.

4.3 Regression equation.

The main regression equation has the following form:

$$oda\_flows_{ijt} = \beta_0 + \beta_1 donor\_gdp_{it} + \beta_2 recipient\_gdp_{jt} + \beta_3 donor\_pop_{it} + \beta_4 recipient\_pop_{jt} + \beta_5 donor\_poverty_{it} + \beta_6 recipient\_poverty_{jt} + \beta_7 donor\_inflation_{it} + \beta_8 recipient\_inflation_{jt} + \beta_9 donor\_int\_rate_{it} + \beta_{10} recipient\_int\_rate_{jt} + \beta_{11} donor\_life\_exp_{it} + \beta_{12} recipient\_life\_exp_{jt} + \beta_{13} donor\_mortality_{it} + \beta_{14} recipient\_mortality_{jt} + \beta_{15} donor\_old\_depend_{it} + \beta_{16} recipient\_old\_depend_{jt} + \beta_{17} donor\_young\_depend_{it} + \beta_{18} recipient\_young\_depend_{jt} + \beta_{19} donor\_tuberc_{it} + \beta_{20} recipient\_tuberc_{jt} + \varepsilon_{ijt},$$

where oda_flows_{ijt} stands for the Official Development Assistance flows from the donor country i to the recipient country j at time t, $donor\_gdp_{it}$ is the real GDP der capita in the donor country i at time t, $recipient\_gdp_{jt}$ is the real GDP der capita in the recipient country j at time t, $donor\_pop_{it}$ stands for the population of the donor country i at time t, $recipient\_pop_{jt}$ stands for the population of the recipient country j at time t, $donor\_poverty_{it}$ is the poverty rate in the donor country i at time t, $recipient\_poverty_{jt}$ is the poverty rate in

the recipient country j at time t, $donor\_inflation_{it}$ is the inflation rate in the donor country i at time t, $recipient\_inflation_{jt}$ is the inflation rate in the recipient country j at time t, $donor\_int\_rate_{it}$ stands for the interest rate in the donor country i at time t, $recipient\_int\_rate_{jt}$ stands for the interest rate in the recipient country j at time t, $donor\_life\_exp_{it}$ stands for the life expectancy at birth in the donor country i at time t, $recipient\_life\_exp_{jt}$ stands for the life expectancy at birth in the recipient country j at time t, $donor\_mortality_{it}$ is the infant mortality rate in the donor country i at time t, $recipient\_mortality_{jt}$ is the infant mortality rate in the recipient country j at time t, $donor\_old\_depend_{it}$ is the old age dependency ratio in the donor country i at time t, $recipient\_old\_depend_{jt}$ is the old age dependency ratio in the recipient country j at time t, $donor\_young\_depend_{it}$ is the young age dependency ratio in the donor country i at time t, $recipient\_young\_depend_{jt}$ is the young age dependency ratio in the recipient country j at time t, $donor\_tuberc_{it}$ stands for the incidence of tuberculosis in the donor country i at time t, $recipient\_tuberc_{jt}$ stands for the incidence of tuberculosis in the recipient country j at time t, ε_{ijt} is the residual term of the regression.

Variable	Obs	Mean	Std. Dev.	Min	Max
oda_flows	2,639	0.4576	2.7749	0.0000	59.0687
donor_gdp	2,639	0.0390	0.0107	0.0202	0.0828
recipient_gdp	2,639	0.0092	0.0088	0.0000	0.0404
donor_pop	2,639	105,000,000	86,200,000	29,300,000	335,000,000
recipient_pop	2,639	12,100,000	21,300,000	377,419	85,300,000
donor_poverty	2,639	2.3172	6.2095	0.0000	20.6000
recipient_poverty	2,639	7.0034	9.3108	0.0000	41.9000
donor_inflation	2,639	1.7338	1.7884	-2.3249	11.4890
recipient_inflation	2,639	14.9726	46.7183	-9.8987	661.5041
donor_int_rate	2,639	1.6351	2.1722	-4.3012	8.0917
recipient_int_rate	2,639	1.3436	9.1837	-63.8873	37.9287
donor_life_exp	2,639	80.3018	2.0545	75.6219	84.5600
recipient_life_exp	2,639	74.9768	3.9062	66.2180	83.5073
donor_mortality	2,639	4.2448	1.3527	1.8000	7.9000
recipient_mortality	2,639	9.3387	6.9069	1.8000	44.2000
donor_old_depend	2,639	27.5203	7.0567	17.6834	50.2847
recipient_old_depend	2,639	20.3212	5.8270	8.2341	36.1884

donor_young_depend	2,639	25.1428	3.7852	19.0840	33.1168
recipient_young_depend	2,639	27.6032	7.0220	19.4499	53.8639
donor_tuberc	2,639	7.5931	6.3173	0.0000	36.0000
recipient_tuberc	2,639	29.2796	34.8852	0.0000	142.0000

Table 1. Descriptive statistics.

The Table 1 above presents some descriptive statistics of the model's variables. There are several interesting details that can be highlighted from this table. First, the average value of the Official Development Assistance flows is approximately 0.46 million USD while the maximum value reaches 59.07 million USD. Such statistics indicate a skewed distribution: most observations have low values, but there are outliers in the data. Moreover, there is a significant difference between the socio-economic indicators of the donor and recipient countries: the average value of the real GDP per capita in the donor countries is approximately 4 times higher than this value in the recipient countries, the mean population is approximately 8 times higher in the donor countries than in the recipient countries, the average poverty rate in the recipient countries is 3 times higher than in the donor countries. Such statistics highlight the differences in scale between donors and recipients of aid and also indicate the noticeable poverty of the recipient countries compared to the donor countries which is consistent with the logic of the direction of the ODA flows. In addition, the mean inflation rate across the recipient countries is nearly 15% whereas in the donor countries the average rate is only 1.7% which indicates a difference in the macroeconomic stability. Furthermore, it is interesting to note that based on the average values, the old age dependency ratio is higher in the donor countries while the young age dependency ratio is higher in the recipient countries. This difference in indicators is explained by the fact that developed countries have already undergone a demographic transition and their population is characterized by low birth rates and low mortality. At the same time, developing countries are at an early stage of the demographic transition where the birth rate is still high, but mortality has already begun to decline. Finally, the average tuberculosis incidence rate is 4 times higher in the recipient countries compared to the donor countries which indicates the presence of social and medical problems among aid recipients.

Some descriptive statistics on the Official Development Assistance flows from the G7 countries to developing European countries are also presented in the graphs located in the Appendix B at the end of the paper.

4.4 Overview of model evaluation results.

The main regression equation was assessed in several steps. In the first step, fixed effects estimates were obtained, then a 1-year lag was added and in the last step the lag was increased to 5 years.

4.4.1 Fixed effects model.

Considering the first step of the panel data regression estimation in more detail, initially the model was assessed by two methods which are fixed effects and random effects. Then, in order to determine which estimation method is better, the corresponding test was carried out, namely, the Hausman test. The null hypothesis of the Hausman test is that the individual effects are uncorrelated with the explanatory variables, and, therefore, the random effects model provides more efficient estimates. In our case, the p-value is small, that is why the null hypothesis is rejected and, consequently, the fixed effects model is preferable. The results obtained during the estimation of the panel data regression using the fixed effects method are presented in the Table 2 below.

Variable	Coef.	Std. Err.	P>|t|	
donor_gdp	25.146	12.713	0.048	**
recipient_gdp	-9.777	21.098	0.643	
donor_pop	0.000	0.000	0.893	
recipient_pop	0.000	0.000	0.000	***
donor_poverty	0.027	0.013	0.039	**
recipient_poverty	0.001	0.006	0.905	
donor_inflation	0.133	0.042	0.002	***
recipient_inflation	-0.002	0.002	0.244	
donor_int_rate	0.076	0.045	0.092	*
recipient_int_rate	-0.018	0.009	0.050	**
donor_life_exp	-0.672	0.122	0.000	***
recipient_life_exp	0.317	0.065	0.000	***
donor_mortality	-0.195	0.222	0.381	
recipient_mortality	-0.143	0.029	0.000	***
donor_old_depend	0.023	0.021	0.272	
recipient_old_depend	-0.048	0.029	0.099	*
donor_young_depend	0.068	0.084	0.418	
recipient_young_depend	0.036	0.022	0.100	*

donor_tuberc	-0.005	0.013	0.724	
recipient_tuberc	-0.001	0.003	0.753	
const	31.808	10.316	0.002	***

Table 2. Estimates of the fixed effects model.

According to the assessment results, the most statistically significant are the estimates of the coefficients of the following variables: the population of the recipient country, the inflation rate in the donor country, the life expectancy at birth both in the donor and recipient countries and the mortality rate in the recipient country. In particular, the population of the recipient country has no impact on the distribution of aid. At the same time, a 1% increase in the donor country's inflation rate leads to a growth in the ODA flows by 0.133 million USD whereas a 1-year rise in the life expectancy at birth in the donor country has the opposite effect and reduces the aid flows by 0.672 million USD. Moreover, a 1-year growth in the life expectancy at birth in the recipient country leads to an increase in the ODA flows by 0.317 million USD while a rise in the recipient's country infant mortality rate of one death per 1,000 live births has the opposite effect and results in a decrease in the aid flows of 0.143 million USD. Based on these assessments, it can be concluded that the aid donors prefer to invest in the countries with existing progress in health care as this increases the effectiveness of investments. At the same time, an increase in the life expectancy at birth in the donor countries has a negative effect on the amount of aid flows, and the absolute value of this effect is twice as large as the positive effect of an increase in the same indicator in the recipient countries. Rising life expectancy in the donor countries creates budgetary pressures related to domestic social obligations which leads to a reduction in the international aid. This ratio of indicators signals that the internal demographic needs of donors have priority over external humanitarian motives.

The following three coefficient estimates are statistically significant at the standard 5% significance level: the real GDP per capita in the donor country, the poverty rate in the donor country and the interest rate in the recipient country. In particular, a 1-dollar growth in the real GDP per capita leads to a sharp rise in the aid flows by approximately 25.2 million USD while for every 1% increase in the donor's poverty rate the ODA flows rise by 0.027 million USD. At the same time, the interest rate growth in the recipient country has a negative impact on the assistance flows, namely, a 1% increase reduces the aid flows by 0.018 million USD. Based on the analysed statistics, it can be concluded that the richer the donor country, the more investments it directs to the aid. In addition, an increase in the interest rate in the recipient country which is often a sign of macroeconomic instability reduces donor confidence and leads to a decline in the volume of the incoming flows of ODA.

Finally, there are three indicators whose coefficients show weak statistical significance, namely, at the 10% significance level: the interest rate in the donor country, the old age dependency ratio in the recipient country and the young age dependency ratio in the recipient country. A 1% increase in the donor's interest rate results in a growth of the ODA flows by 0.076 million USD. At the same time, the old age dependency rate in the recipient country has a negative effect on the aid flows whereas the recipient's young age dependency rate has a positive impact on the dependent variable, namely, an increase in the ratio by 1% leads to a 0.048-million USD decrease in the aid flows and a rise of this indicator by 0.036 million USD respectively. Hence, the aid distribution is related to the characteristics of the demographic transition of both the donor and recipient countries.

Considering the results of the assessments, at this stage of the analysis the second hypothesis is confirmed, the characteristics of the health sector in donor countries have a stronger absolute effect on the flows of Official Development Assistance. However, the first hypothesis is not confirmed, the results of the assessments indicate that donors direct less aid to economically unstable countries and, at the same time, increase aid when the recipient country shows progress in the health indicators.

4.4.2 Fixed effects model with a one-year lag.

In the second step of the research, a one-year lag was added to the fixed effects model. In addition, Akaike's information criterion and Bayesian information criterion values were calculated, a decrease in the criteria values indicates an increase in the quality of the model when adding a one-year lag. The results of the assessment are presented in the Table 3 below.

Variable	Coef.	Std. Err.	P>|t|	
donor_gdp	30.992	14.074	0.028	**
recipient_gdp	-14.861	22.562	0.510	
donor_pop	0.000	0.000	0.833	
recipient_pop	-0.000	0.000	0.000	***
donor_poverty	0.014	0.014	0.330	
recipient_poverty	0.001	0.007	0.909	
donor_inflation	0.156	0.047	0.001	***
recipient_inflation	-0.006	0.002	0.001	***
donor_int_rate	0.109	0.047	0.020	**
recipient_int_rate	-0.041	0.009	0.000	***
donor_life_exp	-0.589	0.127	0.000	***

recipient_life_exp	0.272	0.067	0.000	***
donor_mortality	-0.423	0.236	0.073	*
recipient_mortality	-0.130	0.031	0.000	***
donor_old_depend	0.023	0.022	0.302	
recipient_old_depend	-0.062	0.031	0.043	**
donor_young_depend	0.055	0.089	0.539	
recipient_young_depend	0.065	0.023	0.004	***
donor_tuberc	0.001	0.013	0.992	
recipient_tuberc	-0.005	0.003	0.140	
const	28.394	10.706	0.008	**

Table 3. Estimates of the fixed effects model with a one-year lag.

It is interesting to note that when a one-year lag is added, the estimates of the coefficients for the inflation and interest rate variables both in the donor and recipient countries become highly or standardly statistically significant. At the same time, an increase in these indicators in the donor countries has a positive impact on the ODA flows while in the case of the recipient countries this effect is negative. In particular, a 1% increase in the inflation and interest rates in the donor countries leads to a growth in the aid flows by 0.156 million USD and 0.109 million USD respectively while the same change in these indicators in the recipient countries results in a decrease in the aid flows by 0.006 million USD and 0.041 million USD correspondingly. Hence, the assessment results again show that donors prefer not to finance the health care in the countries with the signs of domestic macroeconomic instability.

Moreover, the estimates for the following health sector indicators have high or standard statistical significance: the life expectancy at birth in the donor and recipient countries, the infant mortality rate in the recipient country, the old age dependency ratio in the recipient country and the young age dependency ratio in the recipient country. More specifically, a 1-year rise in the life expectancy at birth in the donor country reduces the aid flows by 0.589 million USD while the growth of this indicator in the recipient country leads to an increase in the ODA flows by 0.272 million USD. Thus, the effect is the same as in the fixed effects model without lag, but the absolute value has declined. At the same time, the infant mortality rate in the recipient country again has a negative impact on the ODA flows, namely, a rise of one death per 1,000 live births results in a decrease in the aid flows of 0.130 million USD. These statistics are still consistent with the results of the model without lag and the absolute value of the estimate is smaller again. Finally, the recipient's old age and young age dependency rates also behave the same as in the model without lag, but a rise in the absolute value is observed. In

particular, increase in the ratio by 1% leads to a 0.062-million USD decrease in the aid flows and a rise of this indicator by 0.065 million USD.

All in all, the evaluation results again show that the aid donors are more willing to invest in the countries with notable progress in the health sector. At the same time, the absolute values of the coefficient estimates for the donor countries variables are several times higher than these values for the recipient countries which indicates that the needs and interests of donors have priority in the distribution of assistance. Finally, demographic trends, namely, the fact that in developed countries the burden of the elderly on the system is greater while in developing countries the burden of the young is more significant due to the demographic transition, also play a significant role in the aid allocation and the absolute effect increases over time.

4.4.3 Fixed effects model with a five-year lag.

After adding a one-year lag several coefficient estimates became significant, therefore, in the third step of the research a five-year lag was added in order to track the dynamics of changes in the assessments. Moreover, Akaike's information criterion and Bayesian information criterion values were calculated again and, as in the previous time, the values of the criteria decreased which indicated an improvement in the quality of the model after adding a five-year lag. The results of the assessments are presented in the Table 4 from the Appendix A.

The evaluation results again show that donors prefer not to direct the ODA flows to the health sector in the countries with the signs of domestic macroeconomic instability. After adding a five-year lag the estimates of the coefficients for the inflation and interest rate variables in the donor countries remained positive while in the recipient countries they remained negative. However, the absolute values of these indicators for the donor countries became higher and for the recipient countries they became lower. Hence, in the long-term donors' reluctance to invest in the economically unstable countries remains, but the effect becomes weaker. Consequently, such statistics may signal that donors are adapting to the macroeconomic instability over time.

The absolute values of the estimates of the coefficients of the donor's life expectancy at birth and the recipient's mortality rate tend to decrease with the addition of a lag and its subsequent increase. The impact of these indicators on the ODA flows also remains negative. However, the absolute values of the estimates of the coefficients of the recipient's life expectancy at birth and the donor's mortality rate boosted with the addition of a five-year lag. The effect for the life expectancy at birth for the recipient countries continued to be positive whereas the effect for the mortality rate in the donor countries remained negative. It is also interesting to note that the estimation of the recipient's life expectancy at birth first decreased

after adding a one-year lag and then sharply increased by two times with an increase in the lag to five years. Based on these results, it can be concluded that if the recipient countries show a long-term progress in the health sector, this significantly stimulates donors to direct their aid. However, the effect of the donor indicators remains strongly negative indicating that the donor countries focus heavily on the characteristics of their own health sector when making decisions about the allocation of the ODA flows.

Finally, the recipient's old age dependency ratio still has a negative impact on the ODA flows whereas the recipient's young age dependency ratio influences on the aid flows in a positive way which means that the nature of the relationships between these indicators and the dependent variable remain the same with the addition of a five-year lag. However, there is a tendency for the estimates of the coefficients of these regressors to increase both after adding a one-year lag and with an increase in the lag to five years. Thus, the demographic context remains important over time. It can be assumed that for the donor countries, which are G7 countries and are in the later stages of the demographic transition, the burden caused by the elderly population is perceived as a more serious problem while the burden caused by the young population is associated with the presence of development potential and, therefore, stimulates the aid flows.

All in all, the first hypothesis is not confirmed at any stage of the research: donors prefer not to direct the Official Development Assistance flows to the developing recipient countries with an unstable economic situation. At the same time, the second hypothesis is partially confirmed since the estimates of the coefficients of the regressors responsible for the health sector in the donor countries have a significantly higher absolute value than in the recipient countries which means that the effect of the donor countries' indicators on the dependent variable is stronger.

5. Conclusion.

This paper was focused on assessing the factors affecting the country allocation of the Official Development Assistance flows to the health sector from the G7 countries to developing European countries. This topic is of great interest for research because the aid flows to the health sector have an impact not only on social aspects such as the quality of life, but also long-term economic growth by enhancing labor productivity, developing human capital and mitigating social issues related to illness and disability. The research aims to test two hypotheses formulated on the basis of the relevant literature reviewed. The first hypothesis is that the recipient countries with lower socio-economic indicators attract more ODA flows to the health sector. The second hypothesis is that an increase in the health indicators in the donor countries have a larger absolute impact on the ODA flows to the health sector than similar changes in the health indicators in the recipient countries.

As the main part of the study, a panel data regression was constructed, the assessment was carried out using the fixed effects method with the subsequent addition of one-year and five-year lags. According to the results of the model evaluation, the first hypothesis is not confirmed while the second hypothesis appears to have partial empirical support. Donors tend not to direct aid to the countries with unfavourable macroeconomic conditions, but in the long term there is a tendency to adapt to this economic instability of the recipients. Moreover, the donor countries are more likely to allocate more assistance to the countries that have made a long-term sustainable progress in the health sector. Hence, such statistics contradict the first hypothesis and show that the recipient countries with higher socio-economic indicators attract more Official Development Assistance flows to the health sector. However, according to the results of the assessment, variables characterizing the health sector in the donor countries have a noticeably stronger effect on the distribution of the aid flows than the indicators of the recipient countries which provides a support for the second hypothesis. In addition, the demographic characteristics of the donor countries also influence their decisions on the assistance allocation. Donors tend to allocate more ODA flows to the countries with a burden caused by a young population viewing this as the potential for further demographic and economic development, for example, moving to a new stage of the demographic transition or an increase in the number of working-age population and, consequently, in the labour supply. At the same time, the burden associated with an aging population is a critical issue in the donor countries which may lead them to view the recipient countries facing similar demographic challenges as less attractive candidates for receiving the aid.

In conclusion, the findings indicate that the allocation of aid does not fully correspond to the theoretical objectives of Official Development Assistance. Instead of aiding European countries with low health indicators, G7 members direct more assistance to developing European countries that are characterized by sustainable progress and have favourable macroeconomic indicators. Moreover, aid allocation decisions are dictated more by the donors' internal motives than by external demands. The findings of the study highlight the deviations from the theoretical framework and offer recommendations for the recipient countries on how to enhance their attractiveness in securing the Official Development Assistance flows.

6. References.

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7. Appendix.

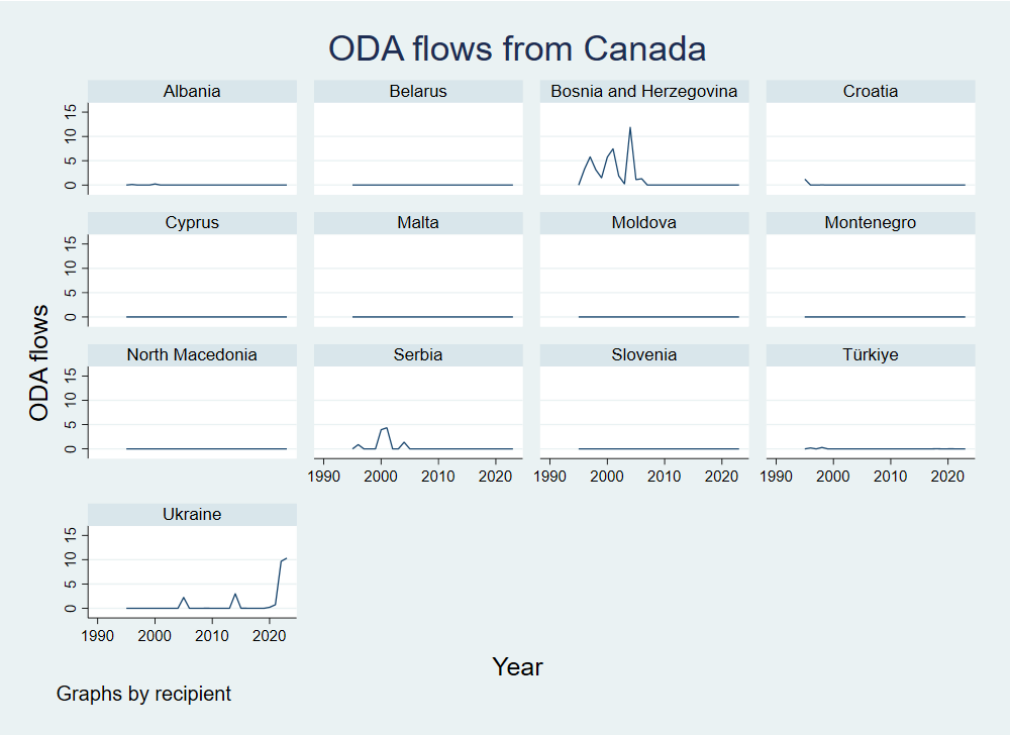
Appendix A.

Variable	Coef.	Std. Err.	P>|t|	
donor_gdp	12.728	16.668	0.445	
recipient_gdp	-51.890	28.718	0.071	*
donor_pop	0.000	0.000	0.434	
recipient_pop	-0.000	0.000	0.013	**
donor_poverty	-0.040	0.020	0.044	**
recipient_poverty	-0.001	0.008	0.862	
donor_inflation	0.192	0.061	0.002	***
recipient_inflation	-0.004	0.002	0.016	**
donor_int_rate	0.169	0.054	0.002	***
recipient_int_rate	-0.027	0.010	0.007	***
donor_life_exp	-0.523	0.187	0.005	***
recipient_life_exp	0.595	0.088	0.000	***
donor_mortality	-0.755	0.316	0.017	**
recipient_mortality	-0.101	0.041	0.013	**
donor_old_depend	-0.004	0.028	0.883	

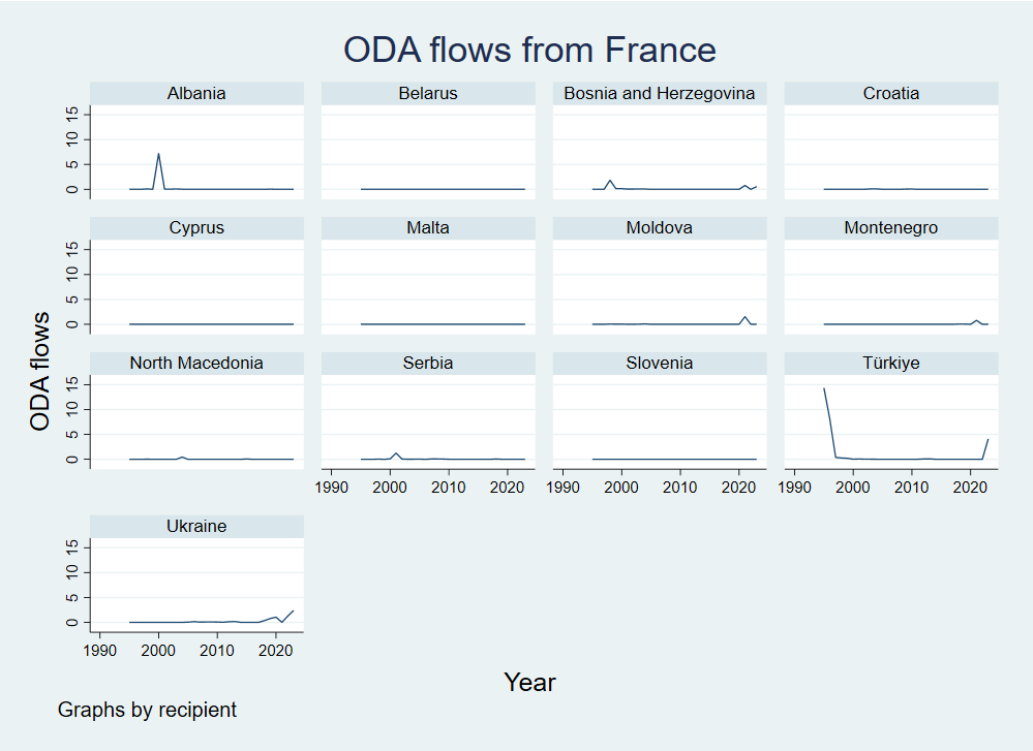
recipient_old_depend	-0.093	0.044	0.034	**
donor_young_depend	-0.027	0.101	0.787	
recipient_young_depend	0.121	0.029	0.000	***
donor_tuberc	-0.008	0.015	0.571	
recipient_tuberc	-0.002	0.004	0.654	
const	1.731	15.753	0.912	

A.1. Table 4. Estimates of the fixed effects model with a one-year lag.

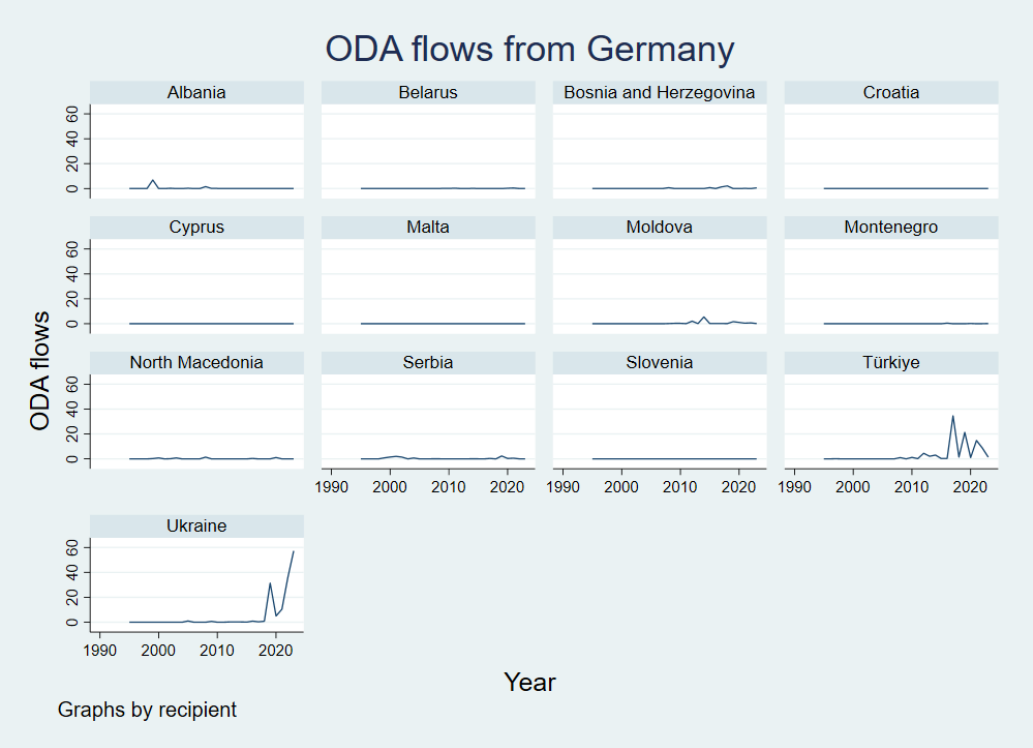
Appendix B.



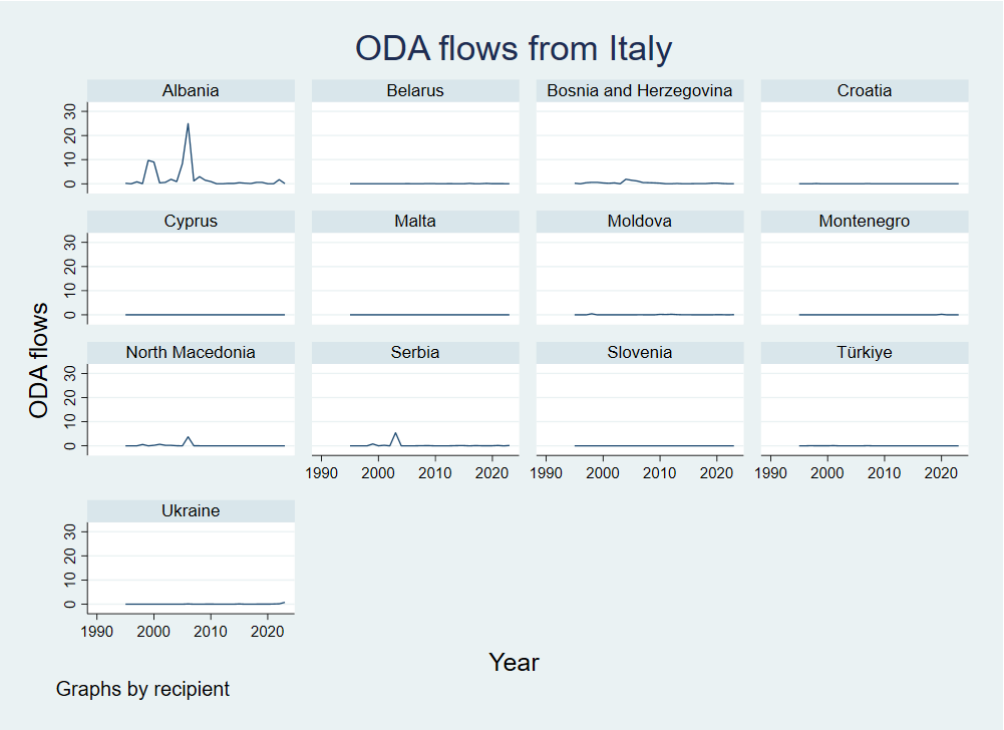
B.1. Figure 1. The ODA flows from Canada to the recipient countries under consideration, 1995-2023, million USD.



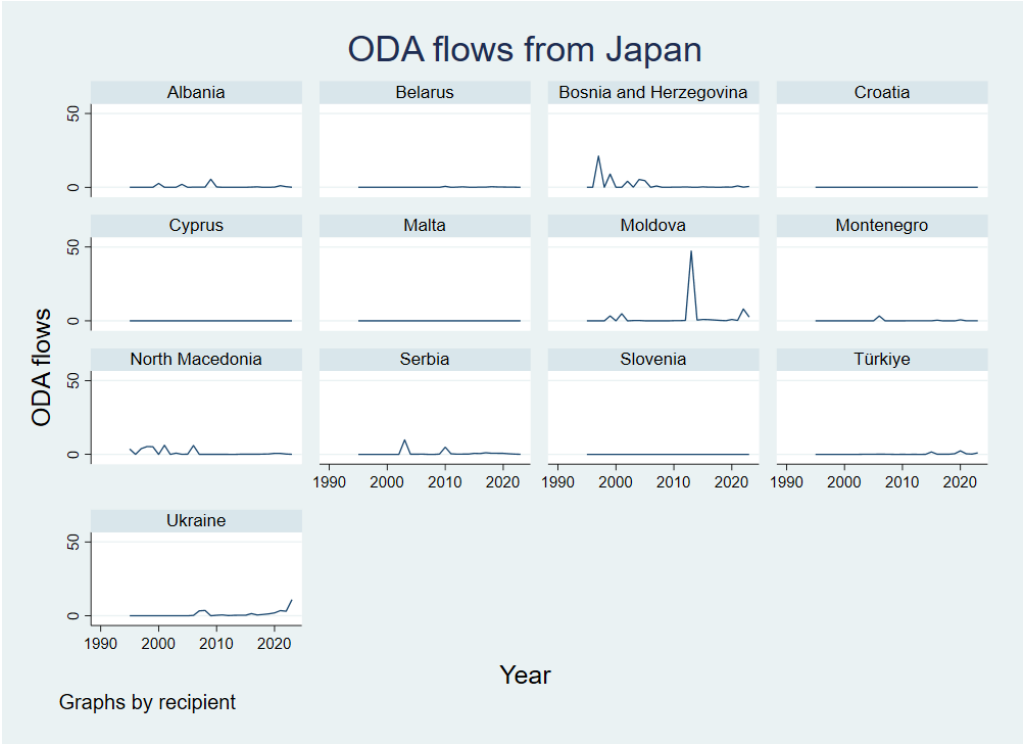
B.2. Figure 2. The ODA flows from France to the recipient countries under consideration, 1995-2023, million USD.



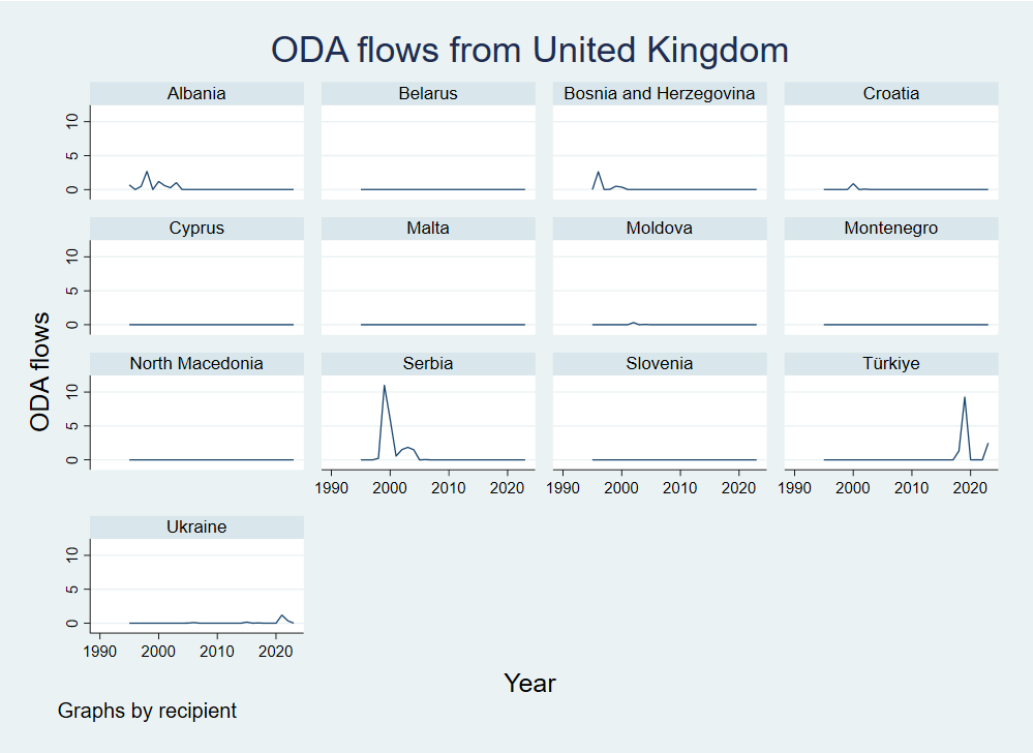
B.3. Figure 3. The ODA flows from Germany to the recipient countries under consideration, 1995-2023, million USD.



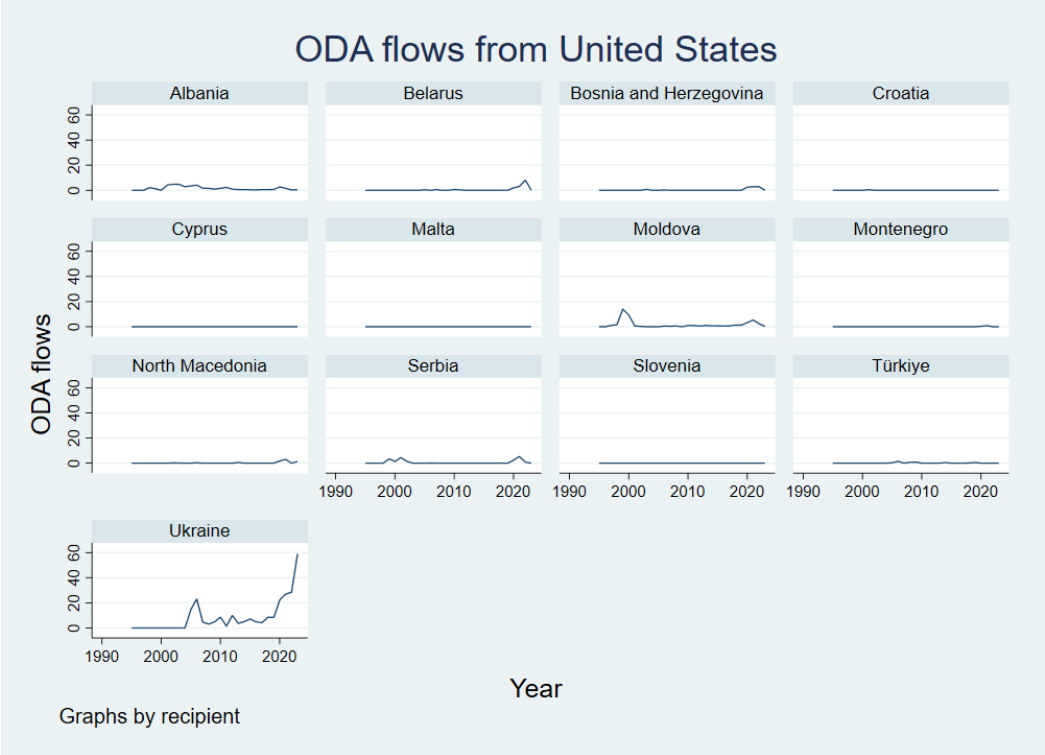
B.4. Figure 4. The ODA flows from Italy to the recipient countries under consideration, 1995-2023, million USD.



B.5. Figure 5. The ODA flows from Japan to the recipient countries under consideration, 1995-2023, million USD.



B.6. Figure 6. The ODA flows from the United Kingdom to the recipient countries under consideration, 1995-2023, million USD.



B.7. Figure 7. The ODA flows from the United States to the recipient countries under consideration, 1995-2023, million USD.