An Impact of International Capital Flows on European Union Countries' Savings, Investments, Consumption, and Current Accounts in the Frame of Pandemic

Laura Vilutiene and Daiva Dumciuviene

Abstract-An increasing number of cases and deaths of the new COVID-19 virus has raised the debates can it be the new periodical pandemic in the world. The main aim of this paper is to present the theoretical aspects of the effect of pandemics on a countries' economies and to analyse the affected international capital flows potential impact on European Union (EU) countries' economies: how it can influence the changes in countries' domestic savings, investments, consumption, and current accounts. During the investigation, the newest studies on the effect of pandemics to countries' economies were reviewed and systemized, 27 EU countries' main indicators were collected, and computed coefficients, which represent the change associated with a variation in countries' foreign capital flows, equal to forecast GDP decrease, were analysed. Analyses conducted shows that this pandemic has the impact on EU countries' economies. Main findings are that gross capital flows and foreign direct investments, affected by COVID-19 pandemic, has a negative impact on countries' domestic savings, investments, consumption, and current account, especially in developing countries. While affected short-term flows portfolio flows have a positive impact on developing countries' consumption. More detailed results are provided at the end of this paper.

Index Terms—International capital flows, impact, pandemics, COVID-19, European Union, countries' economies.

I. INTRODUCTION

The newest pandemic in the world was caused by the SARS-CoV-2 virus (COVID-19). This outbreak started in December 2019 in Wuhan city of China. Less than a month later, the virus had spread around the world, thus halting the pace of life in all countries and their economic cycle. Initially, the epicentre of the outbreak was China, but in accordance of statistic around 17 countries had more than 20.000 cases in April, and most effected countries were the USA, Spain, Italy, France, Germany, UK, in these countries there were fixed more than 100.000 cases in April 2020. While some countries have been able to effectively treat reported cases, it is uncertain where and when new cases will emerge. Amidst the significant public health risk COVID-19 poses to the world, the World Health Organization (WHO) has declared a public health emergency of international concern to coordinate international responses to the disease [1]. It is, however, currently debated whether COVID-19 could potentially

escalate to a global pandemic. Almost all countries have declared a strict quarantine location, which means, that the economies are constrained. Also, the slowing down of the Chinese economy with interruptions to production, the functioning of global supply chains has been disrupted. Companies across the world, dependent upon inputs from China have started experiencing contractions in production. Transport being limited and even restricted among countries has further slowed down global economic activities. Uncertainty led to the changes in consuming and consumption also. According to the banks' prognoses, the International Monetary Fund expects China to slow down by 0.4 percentage points compared to its initial growth target to 5.6 percent, also slowing down global growth by 0.1 percentage points.

Existing literature analyses show that the impact of pandemics is not analysed on all regions' economies, and there are few studies of economic costs of large-scale outbreaks of infectious diseases. There is no one model for such a situation's evaluation. Most of the analyses are based on predictions, some of the jobs that disappear during the lockdown will not reappear when it is lifted, so it is hard to evaluate the real impact of pandemics, but the viruses repeat and hit the countries' economies with all its might. To fill this gap, the **scientific problem** is formulated: what is the impact of international capital flows, affected by the COVID-19 virus, on countries' domestic savings, investments, consumption, and current accounts.

The object of this article is a countries' international capital flows, affected by the COVID-19 virus. The **main aim** of this paper is to present the theoretical aspects of the effect of pandemics on a countries' economies and to analyse the affected international capital flows potential impact on European Union (EU) countries' economies: how it can influence the changes in countries' domestic savings, investments, consumption, and current accounts. 27 EU countries were investigated. Analysed period of the data variates in 2008-2020, depending of the selected type of data, presented further in the paper. The novelty of this paper is that during the investigation countries were analysed throw the dynamic of several areas: domestic savings, investments, consumption, and current account in one place. Countries were divided into clusters too.

This made research shows that affected by the COVID-19 virus international capital flows have the impact on a countries' economies. A wide evaluation and control of a countries' international capital flows should be performed, by seeking to obtain a broad view and make the right

Manuscript received April 9, 2021; revised December 22, 2021.

The authors are with the Kaunas University of Technology, LT-53343 Lithuania (e-mail: laura.vilutiene@ktu.lt, daiva.dumciuviene@ktu.lt).

decisions in the countries' economies development.

This paper is structured as follows: firstly the existing literature on the effect of pandemics to countries' economies, provided. Then the applicable models for evaluation are presented. The third part of the paper provides the methods and analyse of international capital flows impact on domestic savings, investments, consumption, and current account in European Union countries. Concludes the paper summarizing the main findings.

II. THEORETICAL BACKGROUND AND RELEVANT LITERATURE

During the past 300 years have been caused several pandemics. The highest ones, which left a trace in the countries' economies were Black Death in the mid-14th century and Spanish influenza in 1918-19. Potter identified about 10 pandemics in the past 300 years [2]. However, he did not find a regular periodic pattern within these diseases, so he concluded that there is no rule that such a disaster can repeat in the future. Kilbourne provided that there were raised three pandemics in the 20th century: Spanish influenza 1918, Asian influenza 1957, and Hong Kong influenza 1968 [3].

Assumptions concerning overall population mortality are on the high side compared to the evidence from the Spanish influenza of 1918-1910, for which Patterson and Pyle estimated an average mortality rate in Europe of about 0.5 percent [4]. McKibbin and Sidorenko agreed, that from past evidence, we know that pandemics do not extend over long periods. Most of the effect is confined to a period of about three to four months [5]. Looking at this year's situation, it seems, that countries also will untangle from the COVID-19 virus during the mentioned period. Thus, we assume that the pandemic will only last for one quarter.

Kilbourne analysed the impact of influenza. In his opinion the principal impact of influenza is not mortality, but morbidity – which is enormous – leading to absenteeism, school closing, declining production and crowded hospital emergency rooms. This is the short term impact and it depends on the nature of the influenza outbreak [3]. Meltzer analysed effects of the influenza pandemic on the US economy. He found that the impact on the US economy is] around 73.1 – 166.5 billion USD [6]. Different from the [3], Meltzer got 83 % of total economic loss attributed to mortality, not for morbidity, but here was included long term impact on foregone earnings from death, which also raises the mortality costs [6].

There is no consensus about the macroeconomic impact of previous pandemics and other major diseases, like SARS or HIV / AIDS. Most of the made analyses relate to the impact on loss of production and economic growth. The research results and made conclusions are highly influenced by used models and the availability of data, and researchers have not made conclusions about long-term effects. It can be found objections in the made research. Brainerd and Siegler analysed effect of Spanish influenza. These authors concluded that this pandemic in the US increased economic growth in 1920 [7]. While Almond and Mazumder found that Spanish influenza had very long-term negative effects [8].

Young's analyses showed that the AIDS epidemic in South Africa will increase net future per capita consumption [9]. At the same time, Bell and Gersbach found strong negative effects of the AIDS epidemic [10]. As can be seen, there is no one opinion on how epidemics can affect countries' economies and regarding Lars and Werner made studies give valuable information about the proper assumptions to make when "guesstimating" the macroeconomic impact of future pandemics [11]. Haacker concluded, that the HIV/AIDS virus affects households, businesses, and governments - through changed labour supply decisions; efficiency of labour and household incomes; increased business costs and foregone investment in staff training by firms; and increased public expenditure on health care and support of disabled and children orphaned by AIDS, by the public sector [12].

McKibbin and Roshen agreed that the effects of AIDS are long-term but there are clear prevention measures that minimize the risks of acquiring HIV, and there are documented successes in implementing prevention and education programs, both in developed and in the developing world. Treatment is also available, with modern antiretroviral therapies extending the life expectancy and improving the quality of life of HIV patients by many years if not decades [13].

Made studies of the SARS epidemic impact on countries' economies in 2003, show a significant effect in a decrease in consumption, an increase in business operating costs. Shocks to countries' economies were raised according to the degree of the countries' exposure. Lee and McKibbin agreed, that despite a relatively small number of cases and deaths, the global costs were significant and not limited to the directly affected countries [14]. SARS epidemic impact was also analysed by other authors in different areas [15]-[18].

Made existing literate review shows, that the impact of pandemics is not analysed on all regions' economies and, there are few studies of economic costs of large-scale outbreaks of infectious diseases.

III. APPLICATION OF MACROECONOMIC MODELS

Most of the made analyses combine two sets of models. The first one: concerns of the spread and impact of the pandemic from a medical/health side, and the second one: includes the choice of economic model or technique, to evaluate the effects on countries' economies. The results may depend on the choice of these two sets of models.

Authors [19]-[22] used the growth model and the cross-sectional approach to estimate the macroeconomic effects of infectious diseases. Authors [16] and [10] analysed the impact of AIDS by using computable general equilibrium macroeconomic models. Other analyses [23] applied a static single-country closed economy 10-sector CGE model of the UK, to analyse the macroeconomic effects of antimicrobial resistance. Lee and McKibbin concluded, that epidemics have significant effects on economies through large reductions in consumption of various goods and services, increase in business operating costs, and re-evaluation of country risk reflected in increased risk premiums. Shocks to other economies are transmitted according to the degree of the countries' exposure, or susceptibility, to the disease.

Lessons from the SARS epidemic in 2003 demonstrate that despite a relatively small number of cases and deaths, the global costs are significant and not limited to the directly affected countries [14].

Authors used the Oxford economic forecasting model, to evaluate the potential impact of a pandemic of avian influenza strain in Asia. These authors agreed on a mild pandemic with a 20% attack rate and a 0.5% case fatality rate [24]. They got that consumption shock was 3% through social distancing and a morbidity effect. Authors concluded, that open economies are more vulnerable to international shocks. Economies that are large exporters of services suffer the most [24].

One more study was done by the US Congressional Budget Office. They evaluated 2 scenarios in the United States. First scenario: a mild one, with a 20 % attack rate and a 0.1 % case fatality rate, and the second scenario: severe, with a 30 % attack rate and 2.5 % case fatality rate. They found a GDP decrease of 1.5 % in the mild scenario and 5 % in the severe scenario [25].

McKibbin and Sidorenko used the G-Cube model, to find the impact of pandemic influenza on the global economy through a range of scenarios (mild, moderate, severe, and ultra). Authors concluded that "even a mild pandemic has significant consequences for global economic output. The mild scenario is estimated to cost the world 1.4 million lives and close to 0.8 % of GDP (approx. 330 billion USD) in lost economic output. As the scale of the pandemic increases, so do the economic costs [5]. A massive global economic slowdown occurs in the "ultra" scenario with over 142.2 million people killed and a GDP loss of 4.4 trillion USD. The composition of the slowdown differs sharply across countries with a major shift of global capital from affected economies to the less affected safe-haven economies of North America and Europe.

Lars and Werner argued, that there is no study of the potential consequences of an avian flu pandemic on the EU Member States' economies. To fill this gap, they estimated the likely macroeconomic effects of a pandemic using a quarterly macro-model for the EU-25 as one single economic entity [11].

From the made literature analyses on the application of macroeconomic models, to evaluate the impact of pandemics on countries' economies, can be concluded, that there is no created one model for such a situation's evaluation. Most of the analyses are based on predictions.

IV. ANALYSE OF INTERNATIONAL CAPITAL FLOWS' IMPACT IN EUROPEAN UNION COUNTRIES

In this section, will be provided the analyse of the impact of affected by COVID-19 virus international capital flows, on EU countries' domestic savings, investments, consumption, and current account.

A. Methods

During the investigation, the newest studies on international capital flows, pandemics, and effect of it to countries' economies were reviewed and systemised.

Research gap: 27 European Union (EU) countries' – Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic,

Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden data were collected and computed. Such a selection of the countries related to these reasons:

- 1) These countries located in one region.
- 2) All countries are affected by the COVID-19 virus.
- 3) By seeking to avoid economic crises in the region.

The evaluation of the EU region could show the existing economic situation for the rest of the world. The collected type of information is provided in Table I.

TABLE I: TYPE OF ANALYSED DATA

Type of data	Unit	Frequency	Range	Source
Gross Capital	Eur	Quarterly	2017-2019	World Bank
Formation	and % of			
	GDP			
Foreign	Eur	Quarterly	2017-2019	CEIC Data
Portfolio	and % of			
Investments	GDP			
Foreign	Eur	Quarterly	2017-2019	CEIC Data
Portfolio	and % of			
Investment	GDP			
Real GDP	%	Yearly	2010-2020	International
Growth				Monetary
				Fund
Gross	Eur	Yearly	2008-2019	CEIC Data
domestic				
product				
Gross savings	%	Ouarterly	2017-2019	CEIC Data
rate		Q		
Investments	% of	Quarterly	2017-2019	CEIC Data
	GDP			
Consumption	% of	Quarterly	2017-2019	CEIC Data
	GDP			
Current	Eur	Monthly	2017-2019	CEIC Data
account	and % of	and		
balance	GDP	quarterly		

Source: prepared by authors

During the analyses of capital flows gross capital flows were considered, as gross capital flows are larger and much more volatile relative to net capital flows. EU countries' data were collected, and computed coefficients, which represent the change associated with a variation in capital flows, equal to changes of GDP, were analysed.

In World Bank, Global Development Finance there was analysed relationships between private capital flows and investment, consumption, and the current account in the regions: East Asia, Latin America, Central Europe, and Africa, in the period 1972–97. The authors provided computed coefficients representing the change associated with an increase in capital inflow equal to 1 percent of GDP. Based on this accounting method, this article provides the analyses of the impact of affected by COVID-19 virus international capital flows on domestic savings, investments, consumption, and current account [26].

For deeper analyses it has been developed on the assumption, that the impact of international capital flows on country's economic growth, depends on the level of the country's economic development. For this reason, EU countries were divided into 3 clusters, according collected

data about the countries (different indicators, see Table II) and by using K-means algorithm.

TABLE II: INDICATORS FOR COUNTRIES' SIMILARITIES FOUNDATION

Name	Description	Measurement	
Countries' economic	size		
GDP_per_capita	Gross domestic product of country, related to population	US Dollars at current prices	
Investments			
GDP_gross	Gross capital formation	% of GDP	
GDP_fixed	Gross fixed capital formation	% of GDP	
International trade			
Export	Export of good and services	% of GDP	
Import	Import of good and services	% of GDP	
Trade	Sum of export and import of good and services	% of GDP	
Current_account	Current account balance	% of GDP	
FDI	Foreign direct investments	% of GDP	
Macroeconomic conditions			
Infliation	Consumer price index	%	
Human capital			
Human_capital	Human capital index	Total	
Technological knowledge intensity			
R&I_level	Level of Research and	Based on EU list	
	Innovation performance		

Source: prepared by authors

Indicators, provided in table II, were selected based on [27] and [28]. The determinant 'technological knowledge intensity' was selected based on [29].

B. Analyses

Seeking to divide the most similar countries into clusters, a K-means algorithm was applied, as suggested in the literature – this algorithm uses within-cluster variation and is one of the simplest non-hierarchical clustering methods. The data was segmented, and within-cluster variation was minimized.

TABLE III: CLUSTERS OF SIMILAR COUNTRIES

Cluster 1	Cluster 2	Cluster 3
Austria	Croatia	Bulgaria
Belgium	Denmark	France
Cyprus	Estonia	Greece
Czech Republic	Germany	Port2ugal
Finland	Hungary	Romania
Ireland	Italy	
Luxembourg	Latvia	
Netherlands	Lithuania	
Sweden	Malta	
	Poland	
	Slovak Republic	
	Slovenia	
	Spain	

Source: prepared by authors

A K-means algorithm allows freedom to decide how many clusters can be created. We chose to divide the 27 EU countries into 3 clusters (see Table III). The most similar and <u>highly developed</u> countries were 9 in cluster 1, and the lowest-level <u>emerging market</u> countries were 5 of 27

countries included in cluster 3. The remaining 13 <u>developing</u> countries formed cluster 2.

The extent of the virus should be analysed in selected countries and formatted clusters. Table IV shows the numbers of COVID-19 virus cases in EU countries. The highest number of cases is in cluster 2, as here the total number of selected countries are also highest. Cluster' 3 consists of 5 EU countries and the number of COVID-19 cases are the lowest.

TABLE IV: CASES OF COVID-19 VIRUS			
Cluster	Covid-19 cases		
Cluster 1	1039.70		
Cluster 2	2036.81		
Cluster 3	212.782		

Source: prepared by authors, based on https://www.worldometers.info

In an evaluation by cases, the most affected EU countries are Spain (248.301 cases), Italy (211.938 cases), which are in cluster 2, and France (cluster 3) and Germany (which remain to cluster 2 also) 165.000 - 169.000 cases. The lowest number of cases are fixed in Malta (480) (cluster 2). Total there is 3.291.698 COVID-19 cases (based on 4th of May 2020) in European Union.

The pandemic is going further by slowing done the countries' economies and it is needful to analyse, how affected international capital flows would have the impact on domestic savings, investments, consumption, and current account. The gross domestic product of all selected countries was analysed. It provides an economic snapshot of a country, used to estimate the size of an economy and growth rate.



Source: World Bank, Global Development Finance: Country Tables and sources, period 2010-2020 Prepared by authors.

	TABLE V: FORECASTS GDP GROWTH PER CLUSTER
luster	Forecast GDP growth in 2020, %

Cluster 1	-6.54	
Cluster 2	-6.81	
Cluster 3	-6.84	
	-	

Source: prepared by authors

Fig. 1 shows the dynamic of GDP annual growth per created clusters of EU countries in the period 2010-2020. It can be said that the dynamic of GDP annual growth is quite similar in all three clusters. The major rise of GDP was in cluster 2 (2013-2015 year), influenced by the GDP dynamic of Ireland from 0.22 % to 25.12 %, after the crises period was ended. From 2014 almost all countries displayed an indicator

of incremental growth. During the last years (2018-2019) the growth is slowed down, and regarding the banks' prognoses the GDP growth had to be around 1-1,5 % points less than in 2018 at the 2020 year, because of staff shortage, demography, declining of investment, less export. Unfortunately, according to these days' situation, as the COVID-19 virus stopped the world, the sudden decrease in the forecast GDP growth can be seen. Table V provides forecast GDP growth per created clusters in 2020.

The major decrease in GDP is foreseen in cluster 3 (-6.84 %), which consists of emerging markets. Such a decrease was caused by forecast variation in countries, like Greece (-10.04 %), Portugal (-8 %), and France (-7.18 %). Cluster's 2 (developing countries) we can see quite similar changes as in cluster 2. The highest decrease foreseen in Italy (-9.13 %), Croatia (-9.02 %), Slovenia (-8.03 %). In highly developed countries (cluster 1), the variate of GDP is the lowest. It should be mentioned that this is only the initial impact on the level of output. The implications for annual GDP growth will depend not only of the COVID-19 virus, but also on many other factors, like how long countries would be on quarantines position, duration of national shutdowns (schools, markets, jobs, and other), the extent of reduced demand for goods and services in other parts of the economy, and the speed and size of the governments support. From Table IV, it is visible, that the impact of the shutdowns will weaken short-term growth prospects substantially. According to the bank prognoses, if the shutdown continued more than for three months, with no offsetting factors, countries' annual GDP growth could be around 4-6 percentage points lower than it might have been.

Further, the impact of affected EU countries' capital flows on investment, domestic savings, consumption, and current account was evaluated and provided in the figures by these steps:

- 1) Estimated each countries' average sum of GDP (used Eur, mln.) of 2008-2019 period.
- 2) Calculated average percentages of investments, domestic savings, consumption, and current account of each country (used % of GDP) in 2017-2019 period quartiles.
- Calculated average sums of gross capital flows, foreign direct investments and portfolio investments of each country (used Eur and % of GDP) in 2017-2019 period quartiles.
- Estimated what is the percentage part of investments, domestic savings, consumption, and current account of each country in gross capital flows, foreign direct investments, and portfolio investments.
- 5) Evaluated how would change gross capital flows, foreign direct investments and portfolio investments if GDP would decrease, due to COVID-19 virus and regarding forecast decrease, provided in table V.
- 6) Estimated what is the percentage part of investments, domestic savings, consumption, and current account of each country in gross capital flows, foreign direct investments, and portfolio investments after the GDP changes.

7) The estimations were grouped into the created clusters and the percentage part of investments, domestic savings, consumption, and current account of each cluster in gross capital flows, foreign direct investments, and portfolio investments showed in the figures.

Fig. 2 shows the impact of the COVID-19 pandemic on created clusters' capital flows, calculated regarding the forecast decrease of GDP, per each country. The analyse conducted, suggests, that mostly gross capital flows would decrease in emerging market countries (cluster 3) (-7.26 %). A major decrease in gross capital flows would be in France (-27.59 %). In others cluster's 3 countries, the decrease of gross capital flows variates from -0.67 % to -3.08 %. Most developed countries' gross capital flows would change at around -3.52 %. Even GDP decrease, it can be seen the positive impact on foreign direct investments in cluster 1 (mostly developed countries), this would be caused by positive changes in Luxembourg (3.81 %) and Netherland (1.43 %). Overall, foreign direct investments would not be influenced so strongly, by changes in GDP. The impact on portfolio investments deviates from -0.72% to -1.44 % in created clusters.





Source: World Bank and CEIC Data, period based on table I. Prepared by authors.



■ Savings, % ■ Investments, % ■ Consumption, % ■ Current account balance, % Fig. 3. The impact of an affected gross capital flows on the created clusters' domestic savings, investments, consumption, and current account. Computed coefficients representing the change associated with a decrease in clusters' gross capital flows equal to a forecast percent decrease in GDP.

Source: World Bank and CEIC Data, period based on table I. Prepared by authors.

In Fig. 2, we provided the general impact of the COVID-19 pandemic on created clusters' capital flows. After that, we can evaluate, what would be the impact of affected capital flows for the cluster's domestic savings, investments, consumption, and current account. Fig. 3 shows the impact of

gross capital flows (GCF), affected, by the COVID-19 pandemic. The analyse conducted suggests, that in all clusters, and different level of countries' development, affected gross capital flows would negatively influence countries' domestic savings, investments, and consumption, and the highest *negative impact* would be for consumption (-0.28 %). While current account balance, would be affected positively in highly developed countries (cluster 1). In emerging countries, the impact of affected gross capital flows would not influence the countries' current account balance.



Fig. 4. The impact of affected foreign direct investments on the created clusters' domestic savings, investments, consumption, and current account. Computed coefficients representing the change associated with a decrease in clusters' gross capital flows equal to a forecast percent decrease in GDP. Source: World Bank and CEIC Data, period based on table I. Prepared by authors.

Fig. 4 shows the impact of foreign direct investments (FDI), affected by the COVID-19 pandemic, on created clusters' domestic savings, investments, consumption, and current account. As we can see, different from Fig. 3, the impact of affected foreign direct investments would significantly influence countries' economies, especially developing once (cluster 2, -5.91 %). Affected foreign direct investments would not have the impact on highly developed countries' (cluster 1) current account balance, while in other clusters (developing and emerging markets) would have a negative impact (-0.01 - 0.25 %). Domestic savings (-2.62 %)and investments (-2.33 %) would be most affected in developing countries (cluster 2). The impact on domestic savings and investments would variate around -0.70 % in highly developed countries (cluster 1) and emerging markets (cluster 3).

Fig. 5 shows the impact of affected portfolio investments (PI) on clusters' domestic savings, investments, consumption, and current account. Made analyses showed, that short-term flows, like portfolio, may have the impact on countries' economies as well. Differently from the impact of affected gross capital flows and foreign direct investments, affected portfolio investments would have the highest positive impact on developing countries' (cluster 2) consumption (2.07 %). The current account balance would be affected positively in highly developed countries (cluster 1) and emerging markets (cluster 3) in 0.01 - 0.03 %. Like the impact of foreign direct investments, portfolio investments would also influence the similar negative changes on domestic savings and investments (around -0.35 %) in highly developed countries and emerging markets. Developing countries' domestic savings and investments would decrease at around -1.80 %.



Consumption % of GDP Current account balance, % of GDP Fig. 5. The impact of affected portfolio investments on the created clusters' domestic savings, investments, consumption, and current account. Computed coefficients representing the change associated with a decrease in clusters' gross capital flows equal to a forecast percent decrease in GDP.

Source: World Bank and CEIC Data, period based on table I. Prepared by authors.

Made analyses show that the COVID-19 pandemic has the impact on EU countries' development, especially on that the forecast GDP growth was projected lower than it would be after the COVID-19 trap. The analyse conducted could help to answer what is the impact of affected capital flows on different development level clusters' domestic savings, investments, consumption, and current accounts when markets are influenced by the COVID-19 virus and GDP decrease (see Table VI).

TABLE VI: THE IMPACT OF AFFECTED CAPITAL FLOWS ON DIFFERENT DEVELOPMENT LEVEL CLUSTERS' D	DOMESTIC SAVINGS, INVESTMENTS, CON	NSUMPTION,
AND CURRENT ACCOUNTS		

		 <u>Affected FDI</u> - negative impact on consumption. 	 Affected FDI - negative impact on domestic savings, 	 Affected FDI - negative impact on consumption.
8	륗	 Affected PI - negative impact on consumption. 	investments, and consumption.	 Affected PI - negative impact on consumption.
2 2 2	포		-Affected PI - positive impact on consumption and	
100			negative impact on domestic savings, and investments.	
t ioi 1		- Affected FDI - negative impact domestic savings	 Affected <u>GCF</u> – negative impact on consumption. 	-Affected FDI - negative impact domestic savings and
the cost		and investments.		investments.
Sur Sti		-Affected PI - negative impact domestic savings and		-Affected PI - negative impact domestic savings and
t ac m		investments.		investments.
do do		- Affected GCF - negative impact on domestic	-Affected FDI - negative impact on current account	-Affected FDI - negative impact on current account
aff single	~	savings, investments and consumption and positive	balance.	balance.
1 Inter of	- S	impact on current account balance.	 Affected <u>GCF</u> – negative impact on domestic savings, 	 Affected <u>GCF</u> – negative impact on domestic savings,
est las		-Affected PI - positive impact on current account	investments, and current account.	investments, and consumption.
inv of		balance.	-Affected PI - negative impact on current account balance.	-Affected PI - positive impact on current account balance.
4		Highly developed countries	Developing countries	Emerging markers

Source: prepared by authors

Level of clusters

As analyses show mostly affected countries', like Italy, Spain, in which the highest numbers of COVID-19 cases are fixed, international capital flows may not influence so strongly the 4 analysed categories. So, for future analyses, the economic size and population elements could be also included in the investigation. This could help to see a wider

view, e.g. does cases of the virus depend on country's size; how affected population would influence the international capital flows.

V. CONCLUSION

Existing literature analyses showed that there is no one model to evaluate the impact of a pandemic on countries' economies. Most of the analyses are based only on predictions, some of the jobs, that disappear during the lockdown, will not reappear when it is lifted, so it is hard to evaluate the real impact of the pandemic. Even the pandemics repeat, there is still a wide field for research and analyses.

After the investigation, it might be concluded that the pandemic has the impact on EU countries' economies developments. One key indicator of this is that it was projected higher EU countries' GDP growth. After the world suspension of the COVID-19 virus, GDP would extremely decrease in all EU countries. Conducted analyses show, that capital flows, negatively affected by the pandemic, mostly have a negative impact on clusters' domestic savings, investments, consumption, and current account. Affected foreign direct investments would have a high negative impact on highly developed countries' (cluster 1) and emerging market's (cluster 3) consumption, and on developing countries'(cluster 2) - domestic savings, investments, and consumption as well. Affected FDI would low and negatively influence current account balance in developing countries and emerging once. Affected portfolio investments would have a *high negative* impact on highly developed countries' and emerging market's consumption too, while the high positive impact on developing countries' (cluster 2) consumption, but the *high negative* impact on these countries' domestic savings, and investments. Affected PI would have a *low positive* impact on the current account balance of highly developed countries (cluster 1) and emerging markets (cluster 3), and low negative - of developing countries (cluster 2). Affected gross capital flows would have a *low negative* impact on highly developed countries' (cluster 1) and emerging markets (cluster 3) domestic savings, investments, and consumption.

For future analyses, the economic size and population elements could be also included in the investigation. A conclusion section is usually required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

L. V. and D. D. developed an idea and the theoretical background, L. V. performed the analytic calculations and simulations. Both authors contributed to the final version of the paper. D. D. supervised whole paper writing process.

REFERENCES

- WHO Commission on Macroeconomics and Health, Ed. Macroeconomics and Health Investing in Health for Economic Development, World Health Organisation, 2001.
- [2] C. W. Potter, "A history of influenza," *J Appl Microbiol*, vol. 91, no. 4, pp. 572-579, 2017.
- [3] E. D. Kilbourne, "Influenza pandemics: Can we prepare for the unpredictable?" *Vital Immunol*, vol. 17, no. 3, pp. 350-357, 2004.
- [4] K. D. Patterson and G. F. Pyle, "The geography and mortality of the 1918 influenza pandemic," *Bull Hist Med*, vol.65, pp. 4-21, 1991.
- [5] W. McKibbin and A. Sidorenko, "Global macroeconomic consequences of pandemic influenza," Analysis, Lowy Institute for International policy, February, Sydney, 2006.
- [6] M. I Meltzer, N. J. Cox, and K. Fukuda, "The economic impact of pandemic influenza in the United States priorities for intervention," *Emerg Infect Dis*, vol. 5, pp. 659-71, 1999.
- [7] E. Brainerd and M. Siegler, "The economic effects of the 1918 influenza epidemic," CEPR Discussion Paper, no. 3791, 2003.
- [8] D. Almond and B. Mazumder, "The 1918 Influenza Pandemic and Subsequent Health Outcomes: An analysis of SIPP data," *American Economic Review*, pp. 258-262, 2005.
- [9] A. Young, "The gift of the dying: the tragedy of aids and the welfare of future african generations," NBER working paper, no. 10991, 2004.
- [10] C. Bell, S. Devarajan, and H. Hersbach, "Thinking about the long-run economic costs of AIDS in the maroeconomics of HIV/AIDS,", Woshungtin DC, IMF, pp. 96-144, 2004.
- [11] J. Lars and R. Werner, "The macroeconomic effects of a pandemic in Europe - A model-based assessment. European Commission directorate-general for economic and financial affairs," Economic papers, no. 251, 2006.
- [12] M. Haacker, "The economic consequences of HIV.AIDS in Sourthern Africa," IMF Working Paper vol. 02/28, pp. 21-95, 2002.
- [13] W. McKibbin and F. Roshen, "The global macroeconomic impacts of COVID-19: Seven scenarios," CAMA Working Paper No. 19/2020, 2020
- [14] J. W. Lee and J. W. J. McKibbin, "Globalisation and disease: the case of SARS," Asian Economic Papers, vol. 3, no. 1, pp. 113-31, 2003.
- [15] A. Sui and Y. C. R. Wong, "Economic impact of SARS: the case of Honk-Kong,"Asian Economic Papers, vol. 3, no. 1, pp. 62-68, 2004.
- [16] C. Arndt and J. D. Lewis, "The HIV/AIDS Pandemic in South Africa: Sectoral Impacts and Unemployment," *Journal of International Development*, vol. 13, no. 4, pp. 427-49, 2001.
- [17] J. Chou, N. F. Kuo, and S. L. Peng, "Potential impacts of the SARS outbreak on Taiwan's economy," Assian Economis Papers, vol. 3, no. 1, pp. 84-112, 2004.
- [18] W. Hai, Z. Zhao, J. Wang, and Z. G. Houo, "The short-term impact of SARS on the Chinese economy," Asian Economic Papers, vol. 3, no. 1, pp. 57-61, 2004.
- [19] J. T. Cuddington, "Modeling the macroeconomic effects of AIDS, with an application to Tanzania," *World Bank Economic Review*, vol. 7, no. 2, pp. 173.89, 1993.
- [20] J. T. Cuddington, D. Hancock, and C. A. Rogers, "A dynamic aggregate model of the AIDS epidemic with possible policy interventions," *Journal of Policy Modeling*, vol. 16, no. 5, pp. 73-96, 1994.
- [21] M. Over, "The maroeconomic impact on HIV/AIDS IN Sub-Sahara Africa," African Technical Working Paper No. 3, Population Health and Nutrition Division, Africa Technical Departments, World Bank, 2002.
- [22] S. Freire, "Impact of HIV.AIDS on saving behaviour in South Africa," African development and poverty reduction the macro-micro linkage, *Somerset West*, South Africa, 2004.
- [23] R. D. Smith, M. Yaho, M. Millar, and J. Coast, "Assessing the macroeconomic impact of a healthcare problem. The application of computable general equilibrium analyses to antimicrobial resistance," *Journal of Health Economics*, vol. 24, no. 5, pp. 1055-75, 2005.
- [24] E. Bloom, V. D. Wit, and M. J. C. S. Jose, "Potential economic impact of an Avian Flu pandemic on Asia," *ERD Policy Brief Series*, no. 42, 2005.
- [25] US Congressional Budget Office, A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues, 2005.
- [26] World Bank, Global Development Finance Data, 1997.
- [27] European Union. (2015). Sustainable development in the European Union – 2015 monitoring report of the EU Sustainable Development Strategy. [Online]. Available: https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-GT-15-001

- [28] M. Próchniak, "Determinants of economic growth in Central and Eastern Europe: The global crisis perspective," *Post Communist Economies*, vol. 23, no. 4, pp. 449-468, 2011.
- [29] European Commission. (2014). Research and Innovation Performance in the EU: Innovation Union progress at the country level. [Online]. Available:

http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2 014/iuc_progress_report_2014.pdf

Copyright © 2022 by the authors. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (CC BY 4.0).



Laura Vilutiene is currently working in the field of evaluation of international capital flows impact on countries' economies, through silver economy and pandemics perspectives. She owns a bachelor's degree in business and management and a master's degree in audit and accounting. At present, Laura Vilutiene is a PhD candidate in economics at the Kaunas University of Technology, Lithuania. She is

the author and co-author of few scientific papers and her scientific interests are mainly related to EU development, international capital flows, the impact of pandemics, and the silver economy.



Daiva Dumciuviene is a professor at the School of Economics and Business at the Kaunas University of Technology, Lithuania. She has given lectures and participated in numerous international projects, Prof. Daiva Dumciuviene has paid special attention to the issues of European Integration Economics, European Competitiveness and Cohesion Economics, Energy Saving Policy, the impact of

Education Policy on Economic Growth. Prof. Daiva Dumciuviene is also a chair of the Doctoral Studies Committee in economics.