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ARE THERE NEW PATTERNS OF THE GLOBAL IMBALANCE (FROM THE PERSPECTIVE OF 2023)?

Abstract:
The aim of the article is to assess the validity of considering the global imbalances through the prism of imbalances in the calculations of the Current Account and the International Investment Position to investigate the impact of the crises on these values in the years 2005-2022. The research period has been broken down into the following sub-periods: 2005-2006 (pre-crisis period), 2007-2009 (Global Financial Crisis), 2010-2019 (inter-crisis period), 2020 (Covid-19), 2021 (post-pandemic recovery), and 2022 (Russian war). The countries have been selected from each of the following categories: the highest surpluses and highest deficits in the Current Account and the International Investment Position. The countries have been divided into research groups according to the criterion of the Current Account balance stability, understood as the value of the coefficients of variation based on the first differences of the Current Account balances during the inter-crisis period. The similarities and differences among the groups have been reduced to the assessment of average values of the Current Account and the net International Investment Position, the relationship between these accounts and the share of the Current Account balance in the creation of the GDP. The results have been summarized by presenting the correlation coefficients between the Current Account balance and net International Investment Position. The results indicate: (*i*) adopting the traditional global imbalance approach based on the calculations of the Current Account and International Investment Position is valid; (*ii*) the crises disrupt cross-border trade; (*iii*) there are connections between the variability of the Current Account balance and the specialization of a given country, geographical location and membership in international organizations. The study is based on WDI and IMF database.

Keywords: global imbalance, current account, international investment position, crisis.

JEL Codes: F16, F21, F43, F63.

1. Introduction

Global imbalances are usually viewed through the prism of the Current Account (CA) imbalances and the net International Investment Position (IIP_{net}). This imbalance has been growing in the recent decades, leading to a deepening of the disproportions between countries in terms of national income and the standard of living of their inhabitants. Conflicts between the deficit and the surplus countries are intensifying, there are pressures to introduce restrictions in the area of financial account transactions. The phenomenon of the global imbalance becomes particularly important during the periods of crisis, and, in particular, during the accumulation of crisis events that have been taking place since 2020. 2020 marked the onset of the Covid-19 pandemic which, according to the World Bank (2021), undermined the strategies adopted by countries aimed at economic growth. In 2021, the global economy entered a post-pandemic recovery phase. Unfortunately, in 2022, hopes for prosperity were destroyed by Russia's attack on Ukraine (the Russian war) and the resulting crisis on the commodity market. The conditions of international exchange were additionally complicated by signs of the escalation of conflicts existing for many years in various parts of the globe. From the perspective of October 2023, the greatest threat to the global economy is the Israeli-Palestinian war. The events listed above may affect the changes in the directions of cross-border flows. The preliminary results of the research on changes in the Balance of Payments (BP) in the EU countries in the initial stage of the pandemic (Andrzejczak, 2021), indicated the possibility of changes in the current directions of the cross-border flows. Possible changes in this respect are of key importance in shaping the "new imbalance", which may result in the accumulation of new or mitigation of the existing areas of conflicts between countries and disproportions in the levels of the GDP *per capita* on a global scale, influencing a country`s savings and investment behavior (Yang, Sun & Xiao, 2023), leading to significant labor market disruption (Dix-Carneiro, Pessoa, Reyes-Heroles &Traiberman, 2023).

The aim of the article is to assess the validity of considering the global imbalances through the prism of imbalances in the calculations of the CA and the IIP, and to investigate the impact of the crises on these values in the years 2005-2022. Its partial goal is to compare the scale of imbalances occurring during the crises. The paper proceeds as follows. The next section is the literature review on the global imbalance. Section 3 explains the research methodology. Section 4 contains research findings divided into characteristics of the surplus and the deficit countries during the inter-crisis period and assessment of the changes in the global imbalance caused by the crisis phenomena. Section 5 concludes discussion of findings, the last section is the conclusion.

2. Review of the literature on the global imbalance

The collapse of the Bretton Woods system resulted in the liquidation of exchange rates and the progressive liberalization of the cross-border capital flows. Globally, trends in maintaining the surplus or the deficit balances in trade and in the directions of the international capital flows began to consolidate. This phenomenon is referred to as the global imbalance. Bracke, Bussiere, Fidora & Straub (2008) defined the global imbalances as the external positions of systemically important economies that reflect disruptions or carry risks for the global economy. Traditionally, the global imbalance is reduced to an imbalance of one of the accounts of the Balance of Payments (BP): an imbalance in the Current Account (CA) and the net International Investment Position (IIP_{net}). The CA balance is calculated as:

$$CA_{balance} = credit - debit \ (1).$$

According to the IMF methodology (2009) it is calculated as the sum of the balances of the following accounts: the Trade Balance, the Services Account, the Primary Income, and the Secondary Income. The IIP_{net} is calculated as:

$$IIP_{net} = assets - liabilities \ (2).$$

The creditors have a positive balance of the $IIP_{net,}$ and debtors a negative one. They are usually associated with a positive CA balance, as the CA surplus means an excess of exports over imports, i.e. an excess of receivables over liabilities (compare: Mendoza & Quadrini, 2009; Alberola, Estrada & Viani, 2020). According to the traditional view of the global imbalances, the CA surpluses should be accompanied by the IIP_{net} surpluses and *vice versa*.

However, new approaches to the global imbalances are emerging in the literature, considering this issue, i.a., through the prism of energy resources; the currency in which international flows are invoiced (so-called currency zones); migration; protectionism; global supply chains; other factors (more: Serven & Nguyen, 2013; Djigbenou-Kre & Park, 2016; Bettendorf, 2017).

In the second half of the 20th century the rules governing the world economy resulted in reducing the BP balance to the Trade Balance (TB). The growing global imbalance resulted from the existence of countries with permanent trade surpluses, being net exporters of goods, and the existence of countries with permanent deficits in the Trade Balance - being net importers of goods. Capital flows followed the flow of goods on a global scale. Exporters had excess reserves and usually a positive IIP_{net}, importers had the opposite. The development of economic relations increased the role of the remaining elements of the CA in shaping the BP balance. The flows of goods were dominated in some regions by the flows of services. The liberalization of the international capital flows resulted in a sharp increase in the

diversification and scale of these flows, which, in turn, brought about an increase in the significance of investment income, which is an important element of the Primary Income. The increase in the freedom of movement of the labor force contributed to the increased role of unilateral transfers in shaping the BP. The flows of international capital ceased to appear only as a payment for the sold goods, but began to constitute an independent element of the transaction. Traditionally, cross-border transactions mainly concerned the exchange of goods for capital (i.e. reserves), now transactions involving the exchange of financial assets for financial liabilities are becoming increasingly important. There has been a change in the definition of the global imbalance. Surplus countries have become understood as countries with a persistent surplus in the flows of goods, services, investment income and unilateral transfers. Interestingly, exporters of goods are typically not service exporters, investment income surpluses appear in countries with a positive trade or service balance, and unilateral transfers are usually unable to determine the CA balances (compare: Habib, 2010; Forbes, Hjortsoe & Nenova, 2016; Śliwiński & Andrzejczak, 2019). Nevertheless, according to Obstfeld (2012), the imbalance of the CA on a global scale remains the key factor of the imbalances. Despite the sharp increase in flows in the assets-liabilities category. The CA balance is financed by the net flows, expressed in the IIP_{net}, however the CA imbalances can be financed in many different ways, so countries with a deficit CA may have different Financial Account structures, and this is the argument in favor of recognizing the dominant role of the CA in assessing the degree of global imbalance. For this reason, in this article an attempt was made to verify the global imbalance precisely through the prism of the CA balance relationship with the IIP_{net}. In the model approach, countries with a positive CA should have a positive IIP_{net}, i.e. an advantage of foreign assets over foreign liabilities. Another argument supporting the recognition of the key role of the CA balance is the role of the BP imbalances expressed by the CA imbalance in creating economic growth and economic crises, emphasized in the literature (Cheung, Furceri & Rusticelli, 2013; Kollmann, Ratto, Roeger, In`tVeld & Vogel, 2015; Beirne, Renzhi & Volz, 2021). The explanation of the CA imbalance transmission channels to the GDP changes and economic crises refers to the absorption theory (Alexander, 1952; Laursen & Metzler 1950) and the intertemporal theory (Obstfeld & Rogoff, 1995). The CA surpluses and deficits are the result of maladjustment of the size of the available domestic savings in relation to the investment. They also refer to the savings glut hypothesis: an excess of savings in a given country, resulting in the export of capital, may result in an excess of savings on a global scale and lower global interest rates (Bernanke, 2005). This may have a positive impact on the economic growth, when low interest rates result in an increase in investment. While low

interest rates result in overinvestment and the formation of bubbles (e.g. consumption, real estate), asset price inflation appears and, as a result, a crisis. The CA surplus may result in huge inflows and outflows of the capital, e.g. capital flows bonanzas in developing countries (Reinhart & Reinhart, 2009), which may harm financial stability. The capital inflows can affect the competitiveness of the host economy through the changes in the exchange rate. The CA imbalances can affect global demand, consumption and employment through wage restraints in countries with a surplus of the domestic savings that invest abroad, restricting domestic investment (Baldwin, 2013; Krugman, 2013; Pettis, 2013, Horn, Lindner, Stephan & Zwiener, 2017). The problem of the global imbalance in the context of the CA imbalance was also addressed by Alberola et al. (2020), who drew attention to the differences in the assessment of imbalance resulting from the recognition of the cross-border flows in terms of flows (the BP approach) and stocks (the IIP approach). A similar approach to the problem is also found in other sources indicating the risk to financial stability resulting from stock imbalance (IMF, 2014a, 2014b, 2016, Catao & Milesi-Ferretti, 2014). In this context, the key issue is whether countries with a positive IIP_{net} will increase the CA surpluses, and countries with a negative investment position – the CA deficits. This means that creditors will accumulate more and more wealth and debtors will increase their losses. So, is stock imbalance, according to Alberola et al., (2020), self-feeding?

The aim of this study is to identify changes in the global imbalance in the traditional approach, through the prism of the CA imbalances and the countries' IIP_{net} position associated with this balance.

The research on the phenomenon of the global imbalance has resulted in the emergence of the alternative approaches to this issue, the role of which cannot be ignored. Selected theories are reviewed below.

Energy as a factor that exacerbates the global imbalances usually appears as a subject of international trade. In this approach, energy takes on the characteristics of a typical good and contributes to the deepening of the trade imbalance presented above (IMF 2011; Allegret, Mignon & Sallenave, 2015). In a globalized world, international flows of goods and services are measured in terms of money, however Li et al. (2020) pointed out that the international exchange of goods and services also contains hidden energy. The current directions of cross-border exchange: goods and services for currencies, should therefore be extended to the energy flows, that is: energy (contained in goods and services) for currencies. In fact, all transfers between countries include the cost of generating energy. International trade, expressed not in currency, but in energy flows, relates to the transfer of water, land and other resources such as coal, mercury, emissions of particulate matter in the economy of the whole world, as well as other

natural resources. (Li et al., 2020). Thus, apart from the global imbalance based on the flow of goods, there is also a global energy imbalance. Energy flows go in the opposite direction to money (or capital) flows for export goods and services (Xu, Allenby & Chen, 2009; Li et al., 2020).

An interesting approach to the global imbalances is the proposal to present it not from the perspective of a single country, but through the prism of a group of countries that use the same currency to settle international flows and/or against which the local currency rate is set. According to Ito and McCauley (2019), the key currencies anchor the remaining ones and the external portfolio shows the zone bias. Therefore the analysis of the global imbalance requires the presentation of the zones using a given currency instead of countries, because from the point of view of this division, the global imbalance looks different than in the traditional approach. According to this approach, Ito & McCauley (2019) divided the world into currency zones. Then they examined the imbalance between the zones and the inside zones. More than a half of the global GDP is formed by the so-called dollar zone, i.e. the countries making international settlements in the USD, or the countries whose exchange rate is linked to the USD. The euro zone[1], i.e. the countries making international settlements in the EUR and/or having a currency exchange rate pegged to the EUR, covers most of Europe and a few oil producers, but its size is less than a half of the dollar zone. The share of the dollar zone in the creation of the global GDP is very stable, despite large shifts within this zone over time. This breakdown points to the disappearance of the pound zone (GBP) and the expansion of the EUR (replacing the German mark) from the northwestern Europe to all of Europe and beyond. According to Ito & McCauley's (2019) research results, the CA surpluses in any dollar zone country usually result in a deficit of that account in the US to a varying, but often significant, degree. Similarly, the situation concerned the recognition of flows through the prism of the IIP_{net} position. However, the increasing differences in the USD zone did not result in an increase in the risk of the entire USD zone. Ito & McCauley (2019) explain this relatively low level of risk by the scope of the group. A new currency group has appeared - countries that settle in the renminbi (CNY). As a result, some local currencies ceased to be quoted in relation to the dollar and the euro. According to Ito & McCauley (2019), the renminbi zone could shrink the dollar zone, deepening the CA deficits in this zone. The EUR does not pose a threat to the USD in this sense.

Another interesting approach to the problem of the global imbalance is the imbalance resulting from the directions of labor force flow, i.e. migration. This flow is the result of the so-called demographic evolution.

[1] Here not understood as the European Monetary Union.

According to Curtis et al. (2017), the demographic evolution influenced changes in the saver-non-saver relationship, as well as, the size of savings rate of the household and of the whole country. Migration largely affects the economically active population, changing the age structure of the host country and the country of origin. Generally, developed countries classified as high-income are characterized by high immigration, and developing countries classified as low-income by emigration. On a global scale, this phenomenon exacerbates or alleviates the global imbalance through changes in the demographic structure and changes in the so-called age dependency ratios, such as public spending on welfare, schools; income tax and other (d'Albis, Boubtane & Coulibaly, 2018, 2019). According to Coulibaly et al., (2020), migration explains a significant part of the global imbalance. The impact is achieved through changes in the level of domestic savings, improving the balance of the receiving country. Developing countries are affected in particular, the effect being weakened by remittances from emigrants posted in the Secondary Income (remittances). Research results are available explaining the relationship between the demographic structure of the population of a given country and the CA balance (Leff, 1969; Kelley & Schmidt, 1996; Cooper, 2008, Backus et al., 2014), therefore this global imbalance approach is a part of the traditional trend adopted in this article. Backus et al. (2014), using the multi-country overlapping generations model, explained the impact of demographic differences between countries on the savings decisions and, thus, on the capital flows between countries. Similar results were obtained by Domeij & Floden (2006) using the standard neoclassical model based on the life cycle theory in shaping capital flows between OECD countries. Also, according to Krueger & Ludwig (2007), capital flows from the regions that age faster to the regions that age more slowly. Based on the empirical studies covering developing and developed countries in 1990-2014, Coulibaly et al., (2020) found that migration improves the CA balances and the host country savings and worsens the countries of origin. Dependencies, migration and changes in the economic parameters of the host countries were confirmed for the stock approach, included in the IIP, and not for flows, included in the BP. These relationships can be related to the saving-glut hypothesis (Bernanke, 2005, Clarida, 2005; Gruber & Kamin, 2007).

3. Research methodology

Data on the CA account balance for 191 countries and the IIP_{net} position for 138 countries in the USD were collected, adjusted for the inflation rates of the analyzed countries[2]. The data on the IIP_{net} position were available from 2005, which marked the beginning of the research period. Countries with missing data in at least five years were discarded. The time series was divided into research sub-periods presented in Table 1.

Table 1. Division of the time series into research periods

Time period	Characteristics of the period
2005-2006	The pre-crisis period
2007-2009	The Global Financial Crisis (GFC)
2010-2019	The inter-crisis period (a period without major turmoil on a global scale)
2020	The Covid-19 pandemic
2021	The post-pandemic recovery
2022	The Russian war

Source: own work..

The aim of this article is to identify the occurrence of the phenomenon of the global imbalance in accordance with the traditional approach, and the impact of crisis phenomena on the changes of the existing global imbalance. For this reason, in this study, the relatively least unstable period in the global economy, i.e. the years 2010-2019, was selected as the benchmark for determining the scale of imbalance. The 20 countries from each of the following groups – countries with the highest surpluses and countries with the highest deficits in the CA and the IIP_{net} position, were selected based on the average levels of the phenomenon in the periods 2010-2019. Then, the countries that appeared in the classification of the highest surpluses and the highest deficits in both the CA and IIP_{net} categories have been chosen. The results are presented in Table 2.

[2] The data on the CA balance and data on the inflation rate come from the World Development Indicators (WDI) database, source: https://databank.worldbank.org/source/world-development-indicators, information about the IIP_{net} comes from the International Monetary Fund database, source: https://data.imf.org/regular.aspx?key=62805745 [access: July 13, 2023].

Table 2. Countries with the highest CA and IIPnet surpluses and deficits, calculated as the average in 2010-2019, USD million

The highest CA & IIP_{net} surpluses	The highest CA & IIP_{net} deficits
Germany	The United States
China	The United Kingdom
Japan	Brazil
The Netherlands	India
Korea	Australia
Saudi Arabia	Turkey
The Russian Federation	Mexico
Singapore	France
Switzerland	Indonesia
Norway	Colombia
Kuwait	Poland
Denmark	Greece
Hong Kong	Egypt

Source: own work..

The identification of the 26 countries responsible for affecting the imbalance on a global scale necessitated the need to group them. Considering that this study has been based on the traditional approach, emphasizing the important role of the CA balance in shaping the discussed phenomenon, its verification justifies focusing on the results of the CA balances as the primary factor in the creation of this phenomenon, followed by capital flows booked in the IIP_{net} position in a secondary manner. For this reason, the countries presented in Table 2 have been divided according to the criterion of the CA balance stability, which involved the value of the coefficients of variation (CV) based on the first differences[3] of the CA balances in the period 2010-2019. The results of the study are presented in Table 3.

[3] The first difference of each variable is obtained and the result stored in a new variable with the prefix d_. Thus difference creates the new variable: d_x = x(t) - x(t-1). Source: http://www.gnu.org/licenses/fdl.html.

Table 3. The division of the countries into research groups from the perspective of the CA balance changes and the value of the coefficients of variation of the first differences of the CA balance

Country	The CV Value	Group	Country	The CV Value	Group
Germany	1.237	S1 low variability of the CA	Greece	2.489	D1 low variability of the CA
Switzerland	3.008		Poland	2.575	
Norway	3.525		Indonesia	2.676	
Denmark	3.808		Australia	2.920	
Korea	5.735	S2 ordinary variability of the CA	Turkey	3.294	
China	6.404		France	4.450	
Hong Kong	8.850		Colombia	5.600	
Singapore	8.931		India	9.915	D2 ordinary variability of the CA
Japan	11.947		Egypt	9.943	
Saudi Arabia	21.531	S3 high variability of the CA	Brazil	11.949	
Kuwait	29.220		The US	30.717	D3 high variability of the CA
The Netherlands	146.710		The UK	35.554	
The Russian Fed.	214.230		Mexico	60.430	

Source: own work in GRETL.

It is interesting that the division of the analyzed countries according to the criterion of the coefficient of variation of the CA balance, in the case of the surplus countries, resulted in the inclusion of the rich Northern European countries in one group (S1), the rich Asian countries in the second group (S2), and the raw material countries from Europe, Asia and the Middle East in the third group (S3). In the case of the deficit countries, the D1 group is not homogeneous, the D2 group includes the BRICS countries and Egypt, a candidate to this group, the D3 group consists of the countries whose currencies were (the UK) and still are (the US) the most important currencies in international exchange, together with Mexico, with which the USA creates a free trade area (NAFTA). This division was made based on data from 2010-2019.

4. Research findings

The research results were presented in two separate parts. The first part is a characterization of the research groups from the perspective of the phenomenon of the global imbalance in the period considered to be the least unstable, i.e. 2010-2019 (inter-crisis period). The second part presents changes in the global imbalance caused by crises listed in Table 1.

4.1. Characteristics of the surplus and the deficit countries during the inter-crisis period

The potential similarities and differences among the identified groups were reduced to the assessment of the average values of the CA balance (CA_AV) and the IIP_{net} position (IIP_AV), the relationship between the CA balance and the IIP_{net} (CA/IIP) position and the share of the CA balance in the creation of the GDP (CA_GDP). The results are summarized by presenting the correlation coefficients between the CA balance and the IIP_{net} position. The characteristics of the identified groups from the point of view of the above-mentioned criteria are presented in Figures 1 - 2 and Table 4.

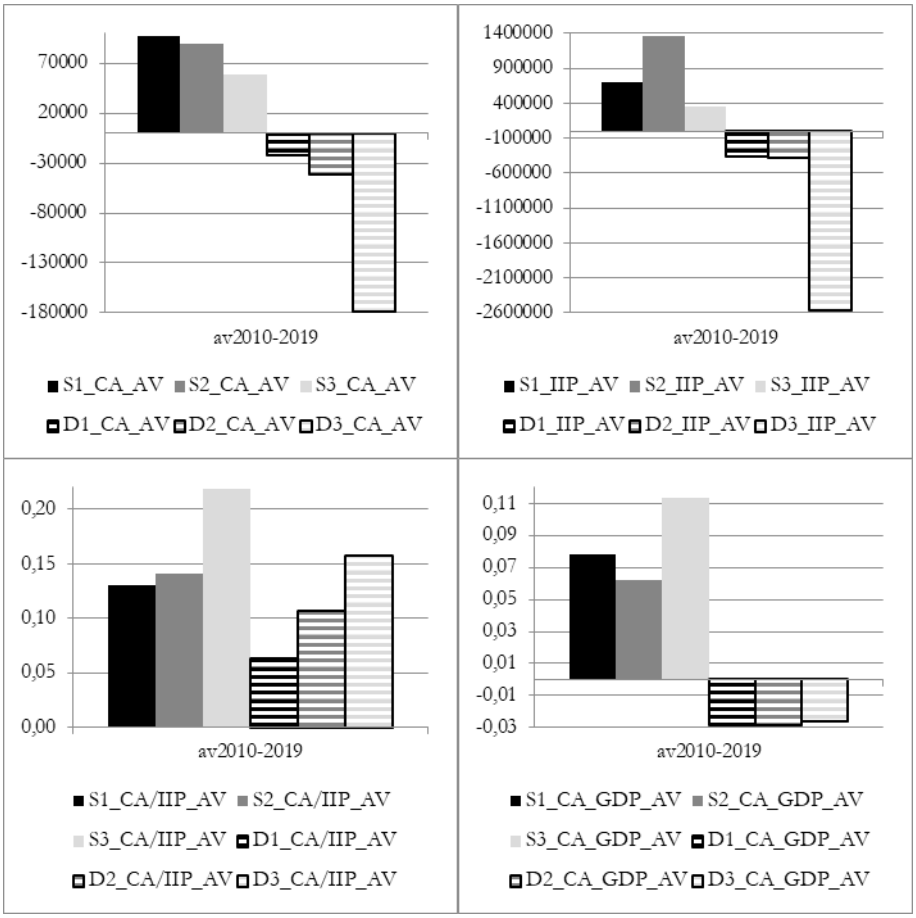

Figure 1. Characteristics of the separate groups in the period of relative stability

Source: own work based on the WDI and IMF data.

Based on the information presented in Figure 1, it can be concluded that countries considered to be the least volatile (S1, D1) had, on average, the highest CA balances during the period of 2010-2019, and those considered to be the most volatile (S3, D3) had the lowest ones. This rule did not apply to the IIP_{net} position for the surplus countries from the S2 group in the years 2010-2019. The increase in the value of the CA/IIP ratio occurred along with the increase in the volatility of the CA balance; CA/IIP values were generally higher for the surplus countries (exception: D3). From the perspective of the CA balance to GDP ratio, it can be stated that in the years 2010-2019, the higher the average CA balance, the higher the CA_GDP ratio (exception S2), and the surplus countries were characterized by a relatively greater impact of the CA balance on GDP creation.

The analysis was supplemented with correlation coefficients (CC) between the CA balance and the IIP_{net} position in the analyzed countries (Table 4 and Figure 2).

Table 4. The value of the correlation coefficient between the CA balance and the IIP_{net} position in the years 2010-2019

Group/country	The CC value	Group/country	The CC value
S1		**D1**	
Germany	0,8483	Greece	-0.2999
Switzerland	-0.2026	Poland	0.0688
Norway	-0.7901	Indonesia	0.5677
Denmark	0.6448	Australia	0.5033
S2		Turkey	0.2928
Korea	0.5262	France	-0.4810
China	-0.7407	Colombia	0.3636
Hong Kong	0.6236	**D2**	
Singapore	0.4841	India	-0.4092
Japan	-0.1674	Egypt	0.3946
S3		Brazil	0.5081
Saudi Arabia	0.1124	**D3**	
Kuwait	0.2332	the US	0.0665
the Netherlands	-0.1133	the UK	0.0335
the Russian Fed.	0.1253	Mexico	0.2953

Source: own work in GRET

A graphical presentation of the results from Table 4 divided into surplus and deficit countries has been shown in Figure 2.

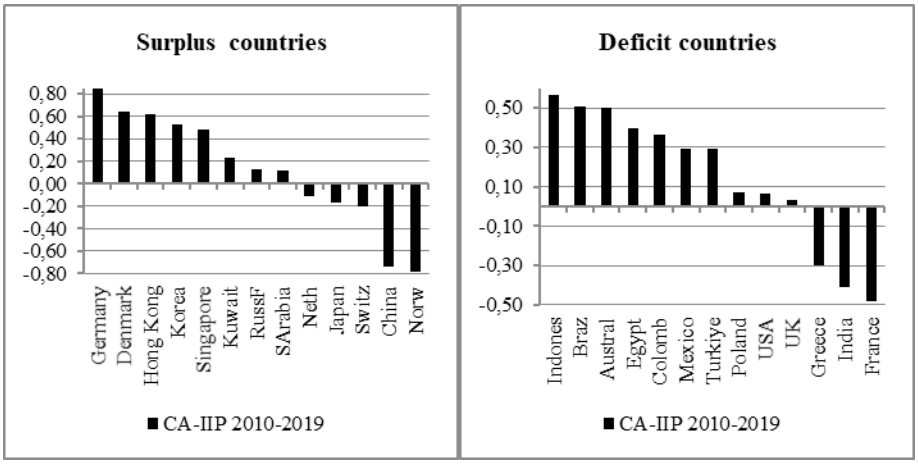

Figure 2. The value of the correlation coefficients between the CA balance and the IIP_{net} position in the years 2010-2019
Source: own work.

Over the period 2010-2019, the surplus countries generally had higher correlation coefficients between the CA balance and IIP_{net} position than the deficit countries. During this period, the countries for which a significant correlation between CA and IIP values could be found (which is expected in the case of the traditional approach to the global imbalance) were: Germany, Denmark, Hong Kong, Indonesia, Korea, Brazil and Australia (positive correlation), and China and Norway (negative correlation). An increase in the CA balance volatility in the surplus countries typically corresponded with a decline in the correlation coefficients between the CA and the IIP_{net}. This rule did not apply to the deficit countries.

4.2. Assessment of the changes in the global imbalance caused by the crisis phenomena

This study also serves to verify the impact of the selected crisis phenomena on the existing global imbalance. For this reason, the average values of the following variables: the CA balance, the IIP_{net} position, the CA/IIP ratio and the CA_GDP ratio, were compared in all periods listed in Table 1. The graphical presentation of the results is made in Figure 3 and 4.

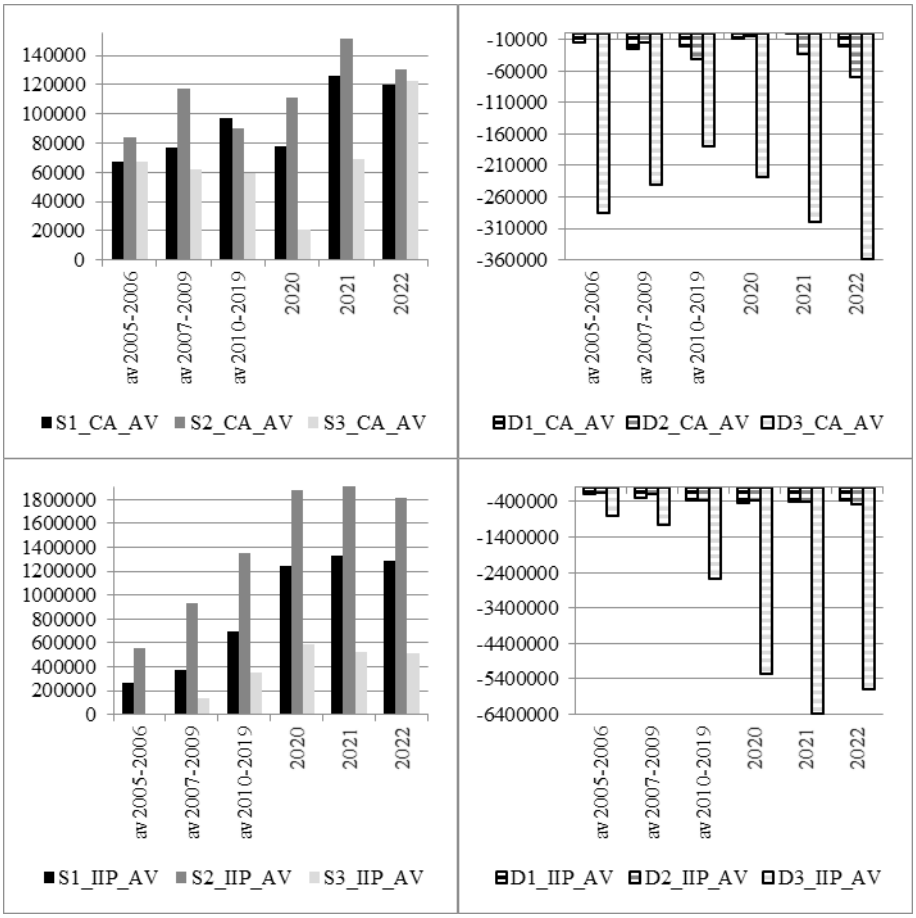

Figure 3. The average CA balance and the average IIP_{net} position during the selected research periods broken down into groups (million USD)
Source: own work based on the WDI and the IMF database.

During the GFC period there was a decline in the average CA balance in the groups S3, D1, D2, in 2020 the average CA balance worsened in the S1, the S3, the D3, and in 2022 in all groups except the S3. In the case of the IIP_{net} position, its average decline during the GFC period concerned the D1 and the D3, in 2020 the investment position deteriorated for the D1, and in 2022 the declines did not apply only to the D1 and the D3.

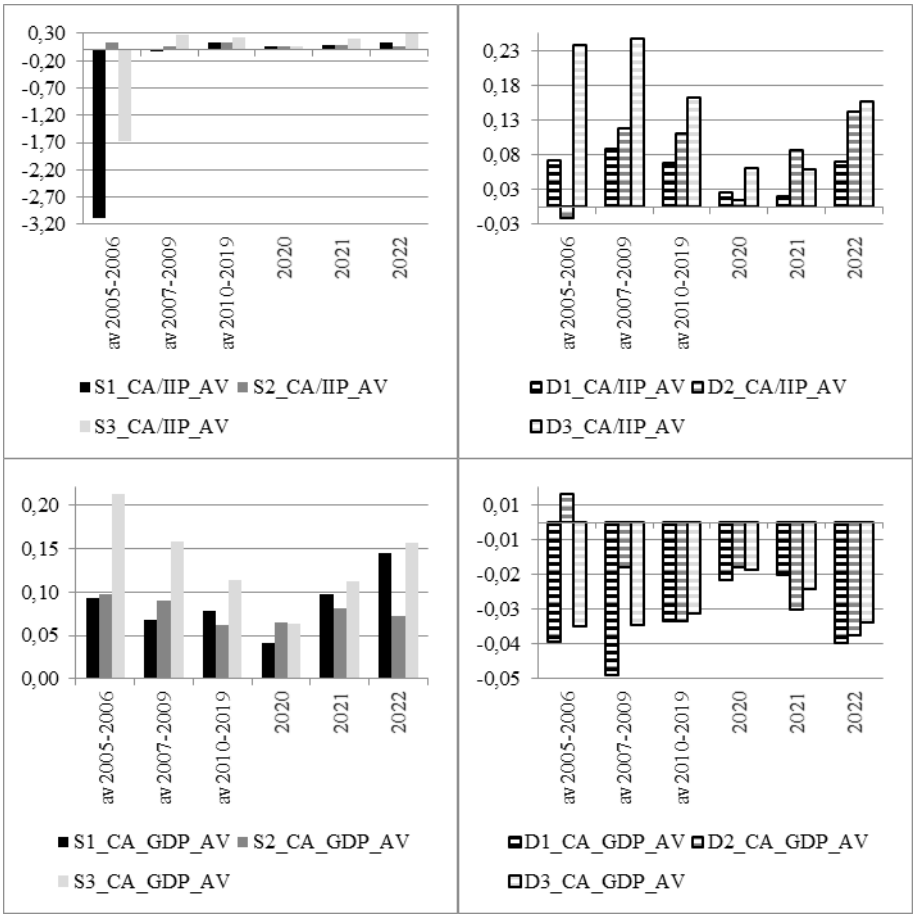

Figure 4. The average CA/IIP and the CA_GDP ratios during the selected research periods broken down into groups

Source: own work based on the WDI and the IMF database.

A negative CA/IIP ratio indicates surpluses in the CA account of countries with a negative net investment position or the CA deficits of countries with a positive IIP_{net}. This situation concerned the groups S1, S3 and D2. The highest CA to IIP_{net} ratio occurred in the groups S3 and D3, i.e. those with the highest d_CA variability, and usually the lowest in the groups S1 and D1. During the GFC period, there were decreases in the CA/IIP only in the S2 group, in 2020 all groups recorded decreases in the CA/IIP ratio, while in 2022 only the S2 group.

In the case of the CA_GDP indicator, only in the case of the S3 group it can be said that it was usually the highest (except for 2020). During the GFC, the indicator decreased in the case of the S1 and the D1, in 2020 the

S1 and the S3 and all deficit ones improved their situation, in 2022 the indicator decreased in the case of the S2 and all deficit groups.

The analysis of the global imbalance from the perspective of specific groups allows for the identification of trends that are, unfortunately, characterized by a certain degree of generality. For this reason, the analyses below are supplemented with changes in the average levels of the CA balances (the source of global imbalance in the traditional approach) during specific crisis phenomena. The study is based on the indicators of the dynamics of the average CA balance level (dyn_CA). The analyzed countries have been characterized by the changes in the CA balance during the crisis. Changes due to: (*i*) GFC (CA_AV 2007-2009/CA_AV 2005-2006); (*ii*) Covid-19 (CA_2020/ CA_AV 2010-2019); (*iii*) Russia's aggression against Ukraine (CA 2022/CA 2021) have been included. The results are presented as divided into countries with a relatively weak (Table 5) and strong (Table 6) response to the crisis phenomena[4].

Table 5. Countries characterized by relatively low changes in the CA balance in relation to the previous period (0.7 < dyn_CA < 1.3)

GFC			**Covid-19**			**Russian war**		
Country/group		dyn_CA	Country/group		dyn_CA	Country/group		dyn_CA
The US	D3	0.77	Colombia	D1	0.71	Hong Kong	S2	0.88
Russian Fed.	S3	0.85	The UK	D3	0.80	The US	D3	1.12
Denmark	S1	0.87	Turkey	D1	0.88	China	S2	1.14
Saudi Arabia	S3	0.87	Singapore	S2	1.00	Switzerland	S1	1.15
The Netherlands	S3	0.94	Germany	S1	1.02	Singapore	S2	1.18
Japan	S2	0.97	Japan	S2	1.08	Colombia	D1	1.19
Singapore	S2	1.05	Denmark	S1	1.10	Brazil	D2	1.23
Norway	S1	1.06	Korea	S2	1.13			
Turkey	D1	1.12						
Kuwait	S3	1.15						
Hong Kong	S2	1.18						
Australia	D1	1.24						
Indonesia	D1	1.27						

Source: own work in GRET

[4] Data for Egypt in 2022 were missing.

It was assumed that countries with the changes in the average CA balance by less than 30% to the previous period (dynamics index dyn_CA ∈ (0.7-1.3)) indicate a relatively weak reaction to the crisis, and countries with the changes in the average CA balanced by more than 30% compared to the previous period (dynamics index dyn_CA > 1.3 or dyn_CA < 0.7) indicate a relatively strong reaction to the crisis phenomena.

Table 6. Countries characterized by relatively high changes in the CA balance in relation to the previous period (0.7 > dyn_CA and dyn_CA > 1.3)

GFC			Covid-19			Russian war		
Country/group		dyn_CA	Country/group		dyn_CA	Country/group		dyn_CA
Germany	S1	1.41	Greece	D1	1.36	Denmark	S1	1.43
The UK	D3	1.50	China	S2	1.40	Greece	D1	1.55
Greece	D1	1.84	The US	D3	1.52	Mexico	D3	1.64
China	S2	1.86	Egypt	D2	1.58	Kuwait	S3	1.81
Poland	D1	2.09	Hong Kong	S2	2.09	Russian Fed.	S3	1.91
Korea	S2	2.11	France	D1	2.36	Poland	D1	2.16
India	D2	2.22	Poland	D1	-1.16	India	D2	2.41
Colombia	D1	2.31	Mexico	D3	-1.12	The UK	D3	2.58
Mexico	D3	2.61	Australia	D1	-0.79	Norway	S1	2.65
France	D1	-105.80	India	D2	-0.72	Saudi Arabia	S3	3.40
Brazil	D2	-2.01	Saudi Arabia	S3	-0.36	Indonesia	D1	3.76
Egypt	D2	-0.61	Switzerland	S1	0.04	Turkey	D1	6.74
Switzerland	S1	0.52	Norway	S1	0.10	France	D1	-5.98
			Indonesia	D1	0.24	Korea	S2	0.35
			Brazil	D2	0.40	Australia	D1	0.38
			Russian Fed.	S3	0.56	Japan	S2	0.46
			Kuwait	S3	0.58	Germany	S1	0.52
			The Netherlands	S3	0.66	The Netherlands	S3	0.59

Source: own work in GRET

Only Singapore, after all the above-mentioned crises, was characterized by small changes in the CA balance, even though from the perspective of the period 2010-2019, this country was classified to the group with an average variability of this balance. Apart from Singapore, only Denmark, Japan and Turkey were countries whose dyn_CA did not change by more than 30% during the GFC and the Covid-19 period. From the perspective of the two consecutive crises, i.e. Covid-19 in 2020 and Russia's aggression against Ukraine in 2022, only Colombia was characterized by these features. Interestingly, with each successive crisis, the list of countries with potentially small changes in the CA balance became shorter.

The countries whose CA balances changed by more than 30% from period to period were deficit countries in each of the identified crises, such as Greece, Poland, India, Mexico, and France. Countries that had these features only in the GFC and Covid-19 crises were China, Brazil, Egypt and Switzerland, while countries with relatively high changes in the dyn_CA only during the last two crises were Australia, Norway, Indonesia and all countries from the S3 group: Saudi Arabia, the Russian Federation, Kuwait, the Netherlands.

It is also worth pointing out the countries with the largest changes in the dyn_CA, which include France with values from -105.80 to +2.36 and Turkey in the last crisis with dyn_CA amounting to 6.74. Some of the analyzed countries during specific crises were also characterized by negative dyn_CA values, indicating deficits in the case of the surplus countries and surpluses in the deficit countries; these were: France and Brazil (GFC), Poland, Mexico, Australia, India, and Saudi Arabia (Covid-19) and France (2022). With the exception of Saudi Arabia, this situation only concerned countries classified as deficit.

5. Discussion of findings

The research goal, to investigate the phenomenon of the global imbalance understood as an imbalance of the CA balance and the IIP_{net} position, was achieved. There are still grounds for recognizing the global imbalance through the prism of the relationship between the CA and the IIP_{net} imbalances. The obtained results indicate that, according to Śliwiński & Andrzejczak, 2019 exporters of goods are typically not service exporters, investment income surpluses appear in countries with a positive trade or service balance, and unilateral transfers are usually unable to determine the CA balances. The results do not contradict theories pointing to the energy flows contained in traded goods as the source of imbalance (Xu, Allenby & Chen, 2009; Li et al., 2020). The results obtained by dividing countries according to the criterion the value of the coefficients of variation of the first differ-

ences of the CA balances, do not clearly confirm the theory of global imbalance presented through the prism of a group of countries that use the same currency to settle international flows and/or against which the local currency rate is set (Ito & McCauley, 2019), especially in the case of the deficit countries.

In turn, the division of research into research sub-periods showed the impact of crisis phenomena on the directions of the cross-border flows.

In the years 2010-2019, selected in the study as a benchmark due to the existence of the relatively smallest number of disruptions in the global economy, the obtained research results indicate the existence of potential relationships between the size of the CA balance and its variability. The increase in the variability of the first differences of the CA balance occurred with a decrease in the value of the CA balance and an increase in the value of the CA/IIP relationship. This suggests that countries that have achieved the highest position (from the exporter's perspective) find it easier to maintain it. It was also shown that there is a convergence between the variability of the CA balance and the location or specialization of the country: the group S1 is composed of the Northern European countries, the S2 is composed of the rich Asian countries, group S3 contains the raw material countries from Europe, Asia and the Middle East. In the deficit countries with the lowest variability (D1), these relationships were not so obvious. The D2 group consists of two BRICS countries – India and Brazil and a candidate to this group - Egypt, and in the group with the highest d_CA variability there are the USA and Mexico - economically related neighboring countries and the UK, which, like the US today, once had the dominant currency in the reserve assets in the world.

In the surplus countries, the CA/IIP and the CA_GDP ratios and the correlation coefficients between the CA and the IIP_{net} (in absolute terms) were generally higher than in the deficit countries. Moreover, an increase in the volatility of the CA balance in surplus countries tended to correspond with a decrease in the correlation coefficients between the CA and the IIP_{net}.

Taking into account the impact of the crisis phenomena on the phenomenon of the global imbalance, such as the GFC (2007-2009), Covid-19 (2020) and the Russian war (2022), introduced distortions in the assessment of the phenomenon of the global imbalance. No clear trends were identified at the level of the analyzed research groups.

From the perspective of individual countries, it can be stated that only Singapore during the period of all crises was characterized by low changes in the CA balance in relation to the previous period, whereas Denmark, Japan, Turkey and Colombia were countries for which the dyn_CA indicator in the period of two consecutive crises was not changed by more than 30%. In each subsequent crisis, fewer countries met the criterion of the 30% or less change

in the CA balance. In turn, the countries with changes in the CA balance higher than 30% in each of the identified crises were the deficit countries: Greece, Poland, India, Mexico, and France. The countries that had these characteristics in only two consecutive crises were China, Brazil, Egypt, Switzerland, Australia, Norway, Indonesia and all S3 countries: Saudi Arabia, the Russian Federation, Kuwait, the Netherlands. Deficits in the surplus countries and surpluses in the deficit countries occurred in France and Brazil (GFC), Poland, Mexico, Australia, India, and Saudi Arabia (Covid-19) and France (2022). With the exception of Saudi Arabia, this situation only concerned the deficit countries.

6. Conclusions

The crisis caused by the Covid-19 pandemic, unlike the Global Financial Crisis, has created opportunities for certain countries and regions to improve their position in the international movement of goods, services and capital. The lockdown resulted in a restriction of the traditional channels of the international flows and gave an opportunity to the countries that had had supply shortages so far. The examples include: Australia, India, Mexico, Poland, which achieved the CA surpluses, and Saudi Arabia, which achieved the CA deficit. However, the 2022 crisis showed that there is a real chance of disruption in this area due to current private and public consumption patterns.

The findings are unique to the context of the division of the countries into research groups from the perspective of the CA changes (based on data from 2010-2019). The division according to the criterion of the coefficient of variation of the CA balance, in the case of the surplus countries, resulted in the inclusion of the rich Northern European countries in one group, the rich Asian countries in the second group, and the raw material countries from Europe, Asia and the Middle East in the third group. In the case of the deficit countries, the first group is not homogeneous, the second group includes the BRICS countries and Egypt, a candidate to this group, the third group consists of the countries whose currencies were (the UK) and still are (the US) the most important currencies in international exchange, together with Mexico, with which the USA creates a free trade area (NAFTA).

The obtained research results indicate that the phenomenon of the global imbalance is still deepening. Politicians should pay attention to that, the possibility of maintaining the current *status quo* requires cooperation among countries that have not yet noticed a common interest, in particular, in the field of energy security and environmental protection. At the same time, countries are tightening their cooperation with the goal of significantly changing the current state of affairs. Currently (2023) there are many seemingly independent conflicts taking place in the world and more and more an-

tagonisms are emerging. From the perspective of October 2023, the greatest threat to the global stability seems to be the Israeli-Palestinian war. This conflict may change the current direction of cross-border flows, as there is a high probability of this conflict spilling over to other countries in the region and beyond.

From this perspective, current considerations about a new international monetary system that could maintain the current balance of the power seem less and less realistic. Problems related to the role of the SDR in the international exchange from this perspective are becoming more and more abstract, and in the face of potential armed conflicts, theories of global imbalance are becoming less and less adequate to reality. We have become globally dependent on raw materials extracted in several regions of the world, so it is difficult to expect that mining countries will not take advantage of the opportunity. The situation was complicated by rapid changes caused by the degradation of the natural environment, the mitigation of which would require an agreement at the level of all countries, which does not seem possible from the perspective of 2023.

So, is the global imbalance self-feeding, as according to Alberola et al., (2020)? At this stage, it can be said that the statement that the rich are getting richer and the poor are getting poorer is valid, but today we do not know who will belong to each of these groups in a few years.

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