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# Multinationals in Russia and Ukraine in the Face of War – the Stakeholders' Perspective

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## Abstract

The article categorises the attitudes of multinational corporations that do business in Russia (and Ukraine) in response to the war between the two countries from the perspective of the importance of their stakeholders. It also identifies the dimensions of responsibility to which the entity is committed. Eight types of strategies and four possible motives for the decision to adopt them are identified. Then, based on stakeholder theory, the companies' likely prioritisation of their primary interest groups in Russia and Ukraine is identified, and the dimensions of corporate responsibility that they perceive as key are identified. The analysis allows us to illustrate the background and consequences of the different strategies for the main stakeholders and indicate the firms' priorities and who has an impact on shaping their goals.

Keywords: Ukraine, Russia, war, stakeholders, corporate responsibility

JEL: M14, F23, F51



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## Introduction

On February 24th 2022, Russia invaded Ukraine, starting a cruel, unprovoked war. It has widespread humanitarian, social and economic consequences, not only in the conflict and neighbouring countries but – given the importance and political, military, and economic links of these countries – also worldwide. The direct and indirect effects of the war, in addition to humanitarian consequences, are also affecting businesses around the world. Multinational companies that do business in Ukraine or Russia or with Russian partners are facing pressure from stakeholders there and potential pressure from stakeholders in other locations. Thus, these companies are faced with the need to choose a strategy for further engagement in these markets. The value system of the company and its management or owners is also of significance.

There are several potential strategies for multinational corporations that do business in Russia (and Ukraine) in response to the war between these countries. This article aims to identify them and categorise the attitudes of selected firms from the perspective of the importance of their stakeholders, and to identify the dimensions of responsibility to which the entity is committed.

The article is structured as follows: first, stakeholder theory and corporate responsibility are outlined. Then the background – Russia's war against Ukraine – is presented, showing its consequences for companies. This is followed by an indication of the strategies of multinational corporations that do business in Russia and their potential motives. The next section presents sample companies. A discussion and a synthesis of conclusions follow, summing up the whole.

## Stakeholder theory and firms' responsibilities

Company objectives are derived from stakeholder[1] expectations, corporate values and perceived responsibility. It is not possible to take into account all stakeholders and all their expectations; therefore, it is necessary to make trade-off choices. This can be based on an assessment of stakeholder importance. Here, the strength and legitimacy of stakeholders and the 'urgency' of their expectations can be considered (Mitchell, Agle, and Wood 1997, pp. 853–886; see Figure 1). This prioritisation and stakeholder selection is made by management, whose decisions are also influenced by their personal value systems.

1 The stakeholders of a company are those entities that the company influences or can influence and vice versa (Freeman 2010, p. 64).

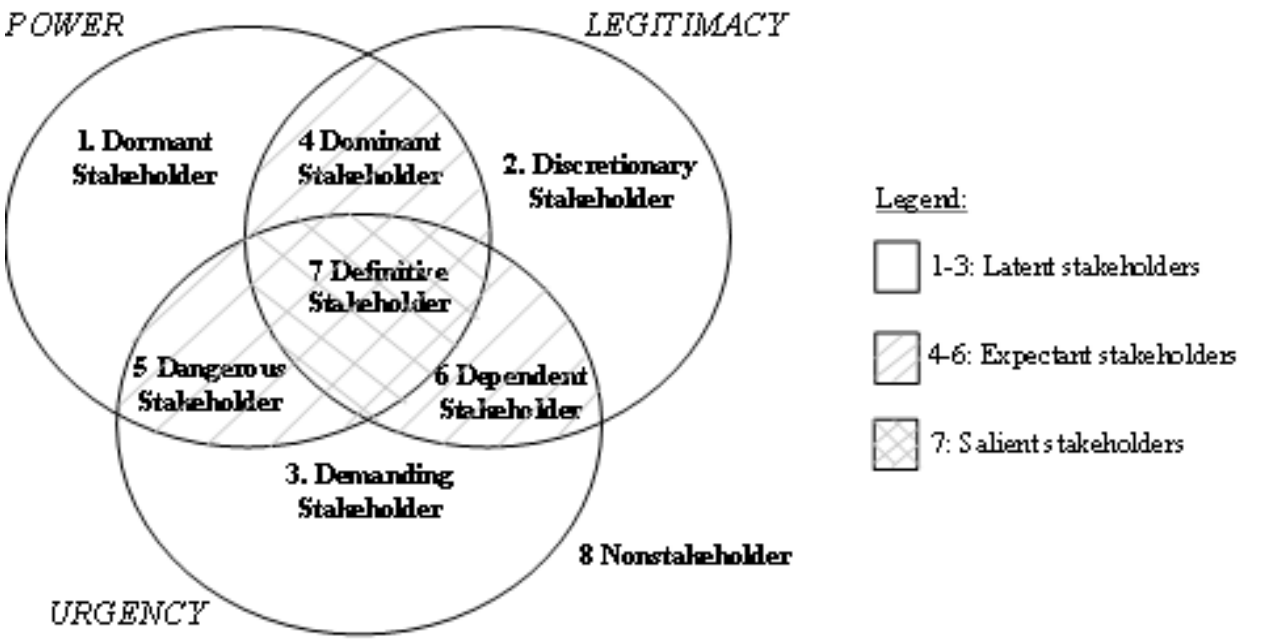


Figure 1. Stakeholders' analysis

Source: adapted from Mitchell, Agle, and Wood 1997, pp. 853–886.

This reflects the dimensions of corporate responsibility, as defined by Carroll (1979, pp. 497–505): economic (meeting the needs of customers and generating profits for owners), legal (compliance with laws and regulations), ethical (deriving from norms and values), and discretionary (philanthropic).

## The war and its impact on businesses in Russia and Ukraine

The war initiated by Russia, even in its very first weeks, produced ample evidence of exceptional cruelty, violations of the law and the commission of numerous war crimes by the aggressor. The vast majority of countries sided with Ukraine, providing support (humanitarian, financial, political and military) and trying to persuade the Russian authorities to cease hostilities and respect human rights.

Many democratic countries – including the EU – imposed sanctions on Russia, e.g., individual sanctions (imposed on individuals and entities, particularly those responsible for and who support the war), economic sanctions (targeting the financial, trade, energy, transport, technology and defence sectors), restrictions on Russian media, and diplomatic measures.[2] These sanctions caused many impediments and restrictions on how the Russian economy and businesses function (and, to a certain extent, also the countries imposing them).

2 For a full (updated) list of sanctions imposed on Russia, see Funakoshi, Lawson, and Deka (2022).

In response to these sanctions, and to stem the outflow of foreign companies from Russia or at least limit the losses to the Russian economy caused by this, the country enacted countermeasures: nationalisation and ownership transfer restrictions.[3] The intention to terminate operations in Russia and the resale of the company would therefore mean that the existing owner would lose the assets of the Russian entity. Subsequent retaliatory measures have involved banning the export of certain products and raw materials. To further discourage foreign companies from leaving Russia, but also to ensure that Russians have access to their products, legislation has been introduced to allow parallel imports for a certain group of products (Association of European Business 2022).[4]

Ukraine also responded legislatively by nationalising the property of Russians and those who support the Russian aggression. It also increased taxes rates by half on companies that operate in Ukraine and did not leave Russia (Trusewicz 2022a). For companies in Ukraine, a voluntary, simplified tax regime with a tax rate of 2% was introduced in connection with martial law. Additionally, the war was considered force majeure, justifying the failure to pay obligations, including taxes, on time (PwC 2022).

## Multinational companies' reactions to the war – strategies and motives

The following **strategies** can be identified for the response of multinational companies with operations **in Russia** to its assault on Ukraine:[5]

A. **Exit** strategy – leaving the Russian market can be done immediately (prompt termination of all contracts) or gradually (the stepwise expiry of contracts or the sale of assets – or the entire company – in Russia);

B. **Suspend/wait** strategy – suspend operations. It may precede an exit or return to full operations, depending on developments;

C. **Reduction** strategy – discontinue certain activities and reduce the scope of others (selling only certain types of products) in Russia. It may precede a market exit or return to full operations, depending on developments;

3 For a broader discussion of those countermeasures see e.g., King and Spalding (2022).

4 This mechanism allows original products to be brought into the country through intermediaries, without the consent of trademark owners.

5 The Yale School of Management maintains a list of companies that operated in the Russian market prior to Russia's invasion of Ukraine, distinguishing five categories; unfortunately, the classification in some cases is inadequate or misleading (*Over 1,000 Companies Have Curtailed Operations in Russia…* 2022).

D. **Minimal response** strategy – no new investments, no new development projects, but carry out core operational activities unchanged;

E. The "**having your cake and eating it**" strategy – support Ukraine while not condemning Russia for aggression. It may imply a desire to avoid losses due to the loss of income from Russian activities while assuaging the conscience by supporting – even if only declaratively – Ukraine;

F. The "**wolf in sheep's clothing**" strategy – declaring an exit (or intention to exit) from the Russian market, but continuing to operate (sometimes under a new brand);

G. **Business-as-usual** strategy – operations in Russia remain unchanged;

H. **Seizing opportunities** – expand operations in Russia, including acquiring the business of competitors who have left this market.

Adopting a particular strategy may be driven by the following:

1) **economic** (business, including operational) motives involve the entity's concern for financial performance, the desire to support the activities of customers and partners (e.g. suppliers), and concern for the situation of employees; financial performance may deteriorate due to the loss of revenue (if business activities are curtailed or not continued) or the loss of assets (due to warfare or Russian state takeover), resulting in consequent losses for investors;

2) **legal** issues include two aspects: (a) the need to honour contracts (doctrine of *pacta sunt servanda*), although there is a '*rebus sic stantibus*' clause, allowing a contract or treaty to become inapplicable because of a significant change in circumstances; however, this requires that both parties have the same intention,[6] which is not the case here;[7] (b) the obligation to comply with sanctions imposed on Russia and its counter-sanctions is a key reason for some companies to cease or suspend a certain type of activity in Russia;

3) **ethical** and humanitarian motives are the most common reason cited by those ending their operations in Russia, as well as companies that support Ukrainian citizens; they emphasise that remaining in Russia would legitimise the country's crimes, and paying taxes there feeds the budget that finances hostilities against Ukraine;

6 For a broader discussion of the *rebus sic stantibus* clause in the context of international law, see, e.g., Kulaga 2020, pp. 477–497.

7 Some multinational companies decided to break contracts in the face of war, accepting the primacy of ethics over law. The saying 'laws are silent in times of war' (silent leges inter arma) refers to this situation, although it has no legal basis, only a historical one.

4) **reputational** considerations are motivated by caring for the company's image. It usually results from pressure exerted by stakeholders (clients, investors, employees, suppliers, authorities) and the company's concerns about long-term consequences.

These motives may be derived from analysing stakeholder expectations that are fulfilled, the managers' value system or the corporate values that are demonstrated.

Many foreign companies operating **in Ukraine** withdrew after the war began, arguing that it was necessary to ensure the safety of their employees, but also that there were no conditions to continue operational activities (e.g., destruction of infrastructure). Some temporarily relocated operations to other countries, while others remained in the country and continued to supply their products. Many companies and individuals have joined in the humanitarian and philanthropic assistance to Ukraine.

## Examples of companies' attitudes during wartime – impact on stakeholders

In this section, we analyse examples of multinational companies from third countries that operated in Russia and/or Ukraine prior to the war. The analysis concerns selected examples of entities that took one of the strategies described in the previous section. Based on announcements by the entities and press articles, the likely motives for a particular decision will be indicated.

### Exit strategy

**Accenture** quickly announced that it would discontinue business in Russia in response to the country's invasion of Ukraine (Accenture 2022). It will not provide services to Russian clients but intends to support its Russian employees,[8] offering them financial compensation for losing their jobs or the possibility of relocating elsewhere in the firm's network.[9] Several senior leaders in Moscow have approached Accenture about transferring the business to their ownership to run it locally as an independent company (Booth 2022a). The company does not operate in Ukraine but has Ukrainian employees in other locations. It said that it intends to continue to help them and their extended families.[10] In addition, the company has donated ($5 million) to non-profit relief organisations that help people in Ukraine and those being displaced into bordering countries, and it is doubling the donations from its employees. The company's announcement of the ter-

8 It had 2,300 employees in Russia.

9 Employees were paid for two months (the amount was a disappointment for some), but many employees have decided to leave Russia and stay in the company in other countries.

10 By providing telemedicine for those in Ukraine and helping resettle family members who leave.

mination of business in Russia clearly indicated its motives, condemning the attack on Ukraine, demanding its immediate cessation, and at the same time, expressing support for Ukrainians.

On the same day, another consulting firm, **McKinsey**, announced that it would not undertake any new client work in Russia. It "will cease existing work with state-owned entities and have stopped work for government entities." It added that all client service in the country would be suspended after all remaining engagements in Russia conclude.[11] In May, the company exited the Russian market and transferred assets to a new, independent entity (McKinsey 2022). With regard to its Russian employees, the company reported that the Russian office would remain open so that the firm could support its employees in the country (the Moscow office employed 700 people). Unofficial information suggests that the company was relocating staff from its Moscow office to its base in Almaty, Kazakhstan (as it serves clients in the same sector, i.e., the energy sector, it made a lot of business sense). Social media posts suggest that the exit strategy was driven by pressure from current and former employees, particularly from Ukraine (Booth and Clarke 2022). The company did not provide any information regarding its activities in Ukraine,[12] indicating only that since the Russian invasion, it focused first on ensuring the safety of all Ukrainian employees and their families.

Another major consulting firm, **KPMG**, also announced its exit from Russia, but later than its competitors. It was seen as trying to stay in that market in the face of rivals pulling out, especially as the firm initially stated only that "it is 'a difficult time' for those involved in the conflict" (Booth 2022b). A few days later, however, the firm announced that its Russia and Belarus firms would leave the KPMG network, and that it was ending working relationships with employees there. The impression that the decision was triggered by pressure caused by the unambiguous actions of competitors was reinforced by the wording in the firm's statement.[13] The Kyiv office continued to work.

A high-profile example was **BP**'s immediate decision to sell its almost 20% stake in the Russian company Rosneft and end their joint ventures.[14] In doing so, it unequivocally condemned the Russian act of aggression. BP assured that it intends to support

11 This is, therefore, more nurturing of Russian clients (with the exception of government entities) than Accenture.

12 It has an office in Kyiv.

13 "We believe we have a responsibility, along with other global businesses, to respond to the Russian government's ongoing military attack on Ukraine" (KPMG 2022).

14 The cost of the operation resulted in a loss in the first quarter of 2022, while it was estimated that the operation would result in an approximate 6.5% decrease in the company's result looking forward to 2025.

employees in the region and that it is "looking at how [they] can support the wider humanitarian effort" (BP 2022).[15]

**British American Tobacco** stated in an announcement at the beginning of March that it is "concerned about the conflict in Ukraine" while stressing that its first priority is the safety and wellbeing of employees "there and across the region."[16] The firm has suspended all business and manufacturing operations in Ukraine and provided support to its Ukrainian employees, including relocation and temporary accommodation; additionally, it provided assistance to the humanitarian relief effort. At the same time, BAT continued to operate in Russia (only suspending planned investments and limiting marketing), arguing that as a key principle, it has a duty of care to all employees (BAT 2022a). Just days later, however, the company announced that the business in Russia is "no longer sustainable in the current environment" and thus initiated the process to rapidly transfer it "in full compliance with international and local laws."[17] The company added that it intends to continue to pay its employees and it will do its utmost to safeguard their future employment. In announcing the decision, BAT cited its values and ethos. In communications, it only wrote about the "tragic conflict in Ukraine" without calling it a war or identifying who caused it (BAT 2022b).

**KONE** announced quite early on that it was halting deliveries to Russia and accepting new orders, stressing that its priority was the safety of employees and their families "in all locations affected by the war in Ukraine". In addition, the company made a donation to the Red Cross to help those affected by the war (KONE 2022a). In June, the company announced that it had divested its business in Russia to local management (and the business would operate independently under a different brand), with the commitment to delivering spare parts to Russia for three months after the agreement has been closed (KONE 2022b).[18]

## Suspend/wait strategy – suspension of activities

Many multinational companies present in Russia have suspended operations there following its aggression against Ukraine. Examples include:

- **3M** – it decided to suspend all operations, and it assured that it was trying to ensure the safety of employees and their families; it also announced financial and in-kind

15 However, further communications did not specify either whether "support the region" meant only Russian or also Ukrainian employees, and whether any humanitarian support was provided.

16 The company has 1,000 employees in Ukraine and 2,500 in Russia.

17 Russia and Ukraine accounted for ca. 3% of BAT's revenue.

18 This decision is not fundamental to the company's finances, as the company had only 1,500 customers there and sales represented a mere 1% of the company's global sales.

donations to Ukrainian employees and medical supplies to doctors and medical workers assisting those in need (3M 2022);

- **Acer** – after Taipei expanded sanctions over Moscow's invasion of Ukraine, it said in a statement that it had decided to suspend its business in Russia "due to recent developments." It assured that the company is focusing on the safety of all its employees "impacted by the current situation" (AFP 2022).

Both companies cited concern for employees in Russia (and possibly Ukraine). The suspension of operations worked to the detriment of customers there in the short term, but the lack of a decision to exit implied concern for them in the longer term; it was driven by financial considerations and investor expectations.

## Reduction strategy

Many companies have decided to partially reduce their operations in response to the Russian-Ukrainian war.

One example is **Danone**, which announced in early March that it had suspended all investment projects in Russia. Citing its raison d'être, the company stressed the need to provide basic goods to the people, so it maintained the production and distribution of fresh dairy products and infant nutrition in Russia. With regard to Ukraine, the company reported that one factory was closed and that one has managed to resume operations. It assured that the safety of employees in Ukraine was its priority.[19] The company reported a donation of €0.5 m to the Red Cross to support humanitarian aid and doubled its employees' donations. Danone expressed "solidarity with the people who are now suffering the atrocities of war", although it did not indicate who was the aggressor (Danone 2022a). In the face of criticism of remaining on the Russian market, the April statement stressed that Danone is not profiting financially from its activities there (local profits were to be redirected to the humanitarian effort, Danone 2022b).

**Intel** condemned the invasion and suspended all shipments to customers in Russia and Belarus. The company also stressed that it supports its Ukrainian employees by doubling its employees' donations (Intel 2022a). However, the communiqué did not mention the work of the Russian factory in Nizhny Novgorod. Meanwhile, the Russian labour inspectorate threatened retaliatory action (nationalisation) in the event of a withdrawal. According to the agency, Intel answered that it was not suspending operations (Trusewicz 2022b). This information may have been either a propaganda hoax by the inspectorate or a smokescreen used by the company, as in the following days, Intel announced that it had suspended all business operations in Russia and assured that it

19 For those who decided to leave the country, employees from neighbouring countries, i.e., Poland and Romania, offered them hospitality.

was trying to support all of its employees (Intel 2022b). Thus, the company has moved from a reduction strategy to an exit strategy (with a "wolf in sheep's clothing" strategy in the meantime).

## Minimal response strategy

One of the minimal reactions of companies to the war in Ukraine is to stop developing in Russia and not invest in that country.

An example is the Dutch company **SHV**, which announced that in response to the situation, no new investments, no new projects, and no new exports to Russia would be undertaken. The company expressed its "deepest sympathy to all the people and families seeking safety, shelter and peace following the violation of the territorial integrity of Ukraine by Russia" and stressed that its priority was the wellbeing of the employees and their families in the region.[20] The company also mentioned contributing to the humanitarian crisis in a practical way.[21] SHV assured that it fully adheres to the sanctions, both in spirit and law (SHV 2022).

## The "having your cake and eating it" strategy

**Nokian Tyres** initially declared that it would continue production in Russia to retain control of its local factory, and that despite problems with material supply and transport, it was trying to serve customers in accordance with its contracts. It "followed the situation in Ukraine with great sadness" and hoped "for a quick diplomatic solution to this tragedy."[22] The company pointed to the safety of all its employees as its number one priority; it has taken measures to secure the safety of its 20 Ukrainian employees and their families. It also donated €100,000 to UNICEF to help Ukrainian children. Problems with the availability of production materials and the transport of products grew over time, and sanctions increased operational difficulties. As a result, the company ceased investment in production in Russia and announced that it aimed to invest in new capacity in Europe. In the face of public criticism for failing to unequivocally condemn Russia's aggression against Ukraine and maintaining operations in the country, it defended the decision to stay there for ethical reasons (Lehto 2022).[23] At the end of June, the company announced a controlled exit from the Russian market, as "due to the war in Ukraine and the subsequent, tightening sanctions, it is no longer feasible nor sustain-

20 The context suggests that this concerned Russia, not both countries.

21 Its Polish subsidiary Gaspol provided gas bottles for heating to refugees shelters.

22 It was only at the end of April that it first condemned the war, "which has caused unspeakable suffering to so many" (still not naming the aggressor, however).

23 Arguing that as long as the factory remained in the company's hands, production would not support Russia's war in Ukraine and stressed that it never sold tires to the Russian army.

able to continue operations in Russia." It declared, "the process will be done with due consideration to local employees and legislation" (Nokian Tyres 2022). We can conclude that the company had originally adopted a " having your cake and eating it" strategy. However, with the development of Russian hostilities in Ukraine and in the face of public pressure, it communicated its decision to exit (which will cause substantial losses[24]).

Many commentators pointed to the unique situation of **Revolut**, a company whose founders are Russian and Ukrainian. Its announcement focused on indicating support for Ukrainians. First, it emphasised that many of its employees are Ukrainian, and the company strives to support them and their families.[25] In addition, the company took care of customers by ensuring that people who wanted to send money to or from banks in Ukraine could still do that – though not without problems[26] – and waiving transfer fees for sending money to a Ukrainian bank account (Revolut 2022). The company also highlighted its support for humanitarian relief programmes by enabling its customers to donate money to Ukrainian relief efforts.[27] There was no mention of Russian customers in those communications. In later days, the company blocked the transfer of funds to and from Russia as a result of the sanctions imposed (all other company services were available for them). In his entry, Revolut's CEO emphasised the importance and commitment of employees from both Russia and Ukraine (Storonsky 2022). Some commentators were disappointed by the company's communications, pointing out that they do not condemn Russia's aggression against Ukraine. The company was largely supportive of Ukrainian customers, employees and society while at the same time taking care of Russian employees and customers and not condemning Russia's aggression against Ukraine.

Another unique case is the companies whose CEO is Elon Musk, i.e., SpaceX and **Tesla**. Musk has strongly supported Ukraine as a victim of Russian aggression. In response to a request from the Ukrainian authorities, SpaceX has donated 15,000 Starlink internet kits to Ukraine since the Russian invasion. This makes life easier for Ukrainians, allows them to fight Russian propaganda, and supports the operation of the Ukrainian military (Duffy 2022). Furthermore, Tesla announced that its Ukrainian employees who returned to fight the invaders would be paid for three months, and then the situation would be reassessed (Kolodny 2022a).

24 80% of the company's passenger car tires were produced in Russia; assets there amounted to €470 m, with Russia and Asia representing 20% of net sales.

25 Offered relocation support, guidance, emergency logistical support and the latest security updates in the country.

26 Many Ukrainian customers reported significant problems, e.g., the company blocked their accounts, verification of transactions took several weeks, and the company did not provide a customer service response. Revolut explained that it had to follow the AML procedures required by the UK supervisor but did not address the very slow pace of the procedures (Gajewski 2022).

27 In a later CEO announcement, the company said it would double customer donations within a week, to £1.5m (Storonsky 2022).

On the other hand, Tesla continued to purchase raw materials from Russian suppliers – Rusal, a company founded by sanctioned Russian oligarch Oleg Deripaska (Kolodny 2022b). Tesla's electric cars are sold unofficially in Russia. In April 2022, its sales increased by 90% and accounted for 44% of all electric car sales in Russia (DigitNews 2022). For the corporation, the volume of sales in Russia did not have a significant share (about 2% of global sales). At the same time, Audi and Porsche announced the suspension of the sale of their products in accordance with EU sanctions.

Musk's support for Ukraine significantly exceeded the benefits enjoyed by Russian stakeholders, but the fact that transactions were made in Russia, additionally taking into account that they related to sanctioned areas, means that the strategy towards these countries is classified as "having your cake and eating it".

## The "wolf in sheep's clothing" strategy

**L'Occitane** strongly condemned Russia's unjustified and unprovoked invasion of Ukraine. It stated that it has "significantly scaled back company's operations in Russia", but also explained that this meant it had suspended all investments and expansion plans. It also suspended all shipments into Russia and "discussed the possibility of closing stores at length". The company chose not to make this move, arguing that the scale of the consequences that would befall its employees. In addition, the company stressed that it is firmly committed to its partners and their employees in Ukraine. " Along with our charity work, including a company donation of €260,000 to UNICEF, we will launch an internal sponsorship program to provide the employees of our distributor in Ukraine with an income" (L'Occitane 2022a). The statement sparked numerous protests. A few days later, the company announced that in view of the human suffering caused by the escalating military action in Ukraine and to protect its employees worldwide from potential public aggression, it had decided to close down the stores and e-commerce in Russia. It also assured that it aims to support and protect its Russian employees and so will continue to pay their salaries (L'Occitane 2022b). A month later, the company announced that it was divesting its business in Russia to local management and would no longer have any operations in Russia nor supply products to any Russian retailers (L'Occitane 2022c). Later it emerged that the company's shops were still operating in Russia with the brand and design of the boutiques unchanged (except that it was written in Cyrillic – Л'Окситан); all stores in Russia have already opened with the range of products remaining the same (Archyde 2022).

The **OLX Group**, owned by Prosus, initially declared that it would not leave Russia. The Russian avito.ru website, owned by the group, publishes, among others, advertisements for the recruitment of soldiers for the Russian army.[28] The Dutch headquarters of the company argues that "it will not remove the advertisements because it fears

28 Very often in locations from where Russia is actively shelling Ukrainian cities.

that Russian companies will then stop advertising in them en masse" (Pikuła 2022). The Russian site is partly staffed by Polish and Ukrainian employees, who have called for the suspension of operations in the east. Responding to the allegations, the CEO stated that the company is committed to its employees "regardless of whether they are in Moscow or Kyiv". In early March, the company stated that it was "appalled by the war in Ukraine and highly concerned for everyone affected." It added that the safety of its employees in Ukraine is of paramount importance and that it has advanced salaries, offered additional financial support to those in need, and made a donation to the Red Cross, which is providing humanitarian aid to the local communities in Ukraine (Prosus 2022). At the end of March, the company decided to cease all involvement in its Russian operations. The separation of companies began, emphasising that Avito would operate as an independent company, and the management team will run the Russian operations fully independently of OLX Group (OLX 2022). The OLX Group itself thus sidestepped the issue by failing to indicate that the Russian "independent" company was still in the hands of the group.

## Business-as-usual

Many multinational companies did not take any action or provide communications regarding their operations in Russia, nor did they generally address the issue of the war itself (even if they were also doing business in Ukraine).

There has been much controversy over the attitude of the retail chain **Auchan**. Like many French entities, it has not withdrawn from Russia or curtailed its activity there in any way. The chain has shops in both Russia and Ukraine. A month after the start of the war, the company's CEO stated that "leaving Russia would be unimaginable from a human point of view" (Basini 2022). He added that the most important thing for the company was to "reserve employees and ensure the core mission, which is to continue to feed people in these two countries." The company's website contains only one message referring to the situation in Russia and Ukraine that Auchan shares the will "to strongly call for a stop to the fighting and to find the means for a quick peace" (Auchan 2022). A wave of criticism fell on the company; many protests and consumer boycotts were organised (but also protests by the company's trade unions). This reflected negatively on the network's operations in other countries but did not change the company's decision.

Many companies have made no reference in their communications to the topic of the war and their stance on the Russian market. An example is the fashion brand **Benetton** – there is no communication on the website relating to the war, and the company continues to sell in Russia.[29]

29 In this context, the company's declaration of sustainability sounds grotesque (see United Colors of Benetton n.d.).

### Seizing opportunities

Another French company, **Leroy Merlin**, has operations in both Russia and Ukraine. Not only has the chain not stopped its operations in Russia, but after Russia's onslaught on Ukraine, when many players withdrew from the Russian market, it has even seen an increase in revenue. According to media reports, the chain has sought to expand its range of products in Russian shops and sent a letter to suppliers stating that it is "open to proposals on the increase of supply and the increase of your assortment of products" (Wallace 2022). Even after the wave of protests, the company did not change its stance towards Russia. The company continued operations in Ukraine but did not support its Ukrainian employees or society (no corporate information about possible donations or aid). It also went a step further – cutting off employees in Ukraine from internal communication (Business & Human Rights 2022).[30]

## Discussion and conclusions

Although the examples presented above are based on limited information, we can analyse the importance of the main stakeholder groups from Russia and Ukraine for individual companies. The assessment of stakeholder relevance[31] is based on the nature (positive/negative) and strength of the company's strategy impact. On this basis, an assessment will be made as to which stakeholder category the company potentially falls into. Taking into account explanations given by the company, as well as information about the reactions of other stakeholders, it is possible to indicate the company's motives in choosing a particular strategy for its presence in Russia: whether the decision was based on economic considerations, legal requirements, ethics and values, or reputational factors. This will make it possible to indicate which area of its responsibility the company considered most important: economic, legal, ethical, or discretionary. Table 1 provides a summary.

A caveat is that many company communications are vague, and it is sometimes difficult to clearly assess the actual situation. It is also sometimes impossible to verify the infor-

30 This made it difficult for them to exchange information and support each other in an emergency.

31 Assessing the impact depends on: (a) in the case of customers, whether the entity continues to operate in the relevant market and if so, to what extent (reduced, increased, no change), (b) in the case of employees, whether the entity continues to operate in the relevant market and whether and to what extent employees are compensated, (c) in the case of partners, including suppliers, whether the entity continues relationship with them and whether it undertakes additional activities (e.g. acquiring new suppliers, additional assistance), (d) in the case of the public, whether the entity supports it, e.g. with humanitarian aid or otherwise, and, if so, to what extent, and whether and in what tone it issued a statement on the war. If no statement was issued, it was considered moderately positive for the Russian public. If a statement was issued, it was positive for the Ukrainian public. The tone of the statement and whether it was made clear which side was the aggressor determined the strength of the impact.

mation in corporate publications.[32] Additionally, the parallel import of certain products by Russia may cause misinterpretation.[33]

The same strategy can have different rationales. In particular, it may be driven by the company's professed values, legal factors (in particular, sanctions or counter-sanctions), economic factors (e.g., the need to meet customers' needs, the requirement to generate income) or social pressures (or those exerted by other stakeholders, such as employees or investors, who do not always accept the primacy of economic considerations).

The key stakeholders for all companies are the customers (and, indirectly, investors[34]) and employees. Where ethical, humanitarian motives play a central role, society is also important (recognising its relevance de facto means taking sides in this war). Companies were least likely to indicate suppliers and other partners in their communication; in the case of the Russian market, economic considerations were important, but in the case of the Ukrainian market, ethical ones were. In almost all analysed cases, Ukrainian stakeholders were positively impacted by companies. Society usually was classified as dependant, sometimes discretionary, and rarely definitive stakeholder; only in strategies of business-as-usual and seizing opportunities was it impacted negatively. Customers were classified as dependent, as were employees for whom the positive impact was stronger; again, the seizing opportunities and "the wolf in sheep's clothing" strategy were negative exceptions. The position of Russian stakeholders was more varied and dependent on the companies' motives. An exit strategy always was driven by ethical and sometimes also philanthropic responsibility. While Russian customers felt negative consequences (making them non-stakeholders or only latent ones), employees were treated positively, as expectant stakeholders. Society was impacted negatively and treated as a non-stakeholder or merely a demanding one. The suspend/wait strategy was driven by legal and sometimes ethical and discretional responsibility. Russian customers felt negative consequences, and employees felt a positive impact, but both were latent stakeholders. There was a similar categorisation in a reduction strategy (with the difference that the employees' position was stronger). Both strategies were in line with economic and ethical responsibilities. All other strategies were deeply rooted in economic responsibilities; in individual cases, ethical and discretionary ones were also present. In those strategies, Russian employees and customers enjoyed a strong positive impact, and they were prioritised as definitive or at least dangerous stakeholders (the latter occurred due to sanctions that delegitimised certain activities).

32 In addition, some information is provided by Russian news agencies (and later reproduced by Western media), without comment from the company concerned, so it is impossible to be sure that the information is definitely true and not propaganda.

33 The presence of certain products on the Russian market could suggest a wolf in sheep's clothing strategy.

34 They are not directly highlighted in Table 1, but it can be assumed that the economic motives largely concern this stakeholder group.

A particularly interesting finding is that in many of the examples analysed, it was not the economic and legal responsibility that was most important, but the ethical and volitional ones. More importantly, it was not always the values of the company that had primacy, but the values held by the stakeholders (e.g., employees, investors, customers, and society), and it was the pressure they exerted that gave primacy to values over economic factors. This demonstrates that business can have an ethical face and that profit is not always the most important thing in business. Some situations require unambiguous attitudes, and some stakeholders (including investors) demand ethical stances. The examples cited demonstrate that stakeholder capitalism is emerging.

The analysis is piecemeal (only selected examples of companies), and because it is based only on publicly available information, it has many limitations. In further stages, it would be worthwhile carrying out a broader and more in-depth analysis, e.g. of the consequences of companies' attitudes (and reaction times) on their financial and stock market performance in the long term, the differentiation of entities within particular strategies, taking into account, among other things, the nature of their presence on a given market (e.g., production, distribution and sales, only import or export of goods, or stake in a company), and the degree of a company's involvement in a given market (e.g., the share in total assets, revenues, income, and, on the other hand, the company's share in this market). Qualitative research would also be useful to ascertain actual and not just declared attitudes and motives. Given that different nations share different values, it would also be interesting to analyse the attitudes of companies from different countries and the impact of stakeholders of different nationalities. This study can therefore be a starting point for further research.

Table 1. Strategies, stakeholders' assessments, and multinational firms' motives in Russia amid its invasion of Ukraine

| Companies | Strategy[1)] | Impact on Russian stakeholders[2)] | | | | Impact on Ukrainian stakeholders[2)] | | | | Additional factors[3)] | Motives[3)] | Responsibility[4)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C | E | P | S | C | E | P | S | | | |
| Accenture | A | −−− (8) | + (6) | | −−− (8) | n.a. (8) | +++ (7) | | +++ (7) | V | V | Eth, D |
| McKinsey | C=>A | −−− / ± (8 / 6) | ++ (5) | | −− (3) | | + (6) | | ++ (6) | R (employees) V (declared later) | R/E, V, L | Ec, Eth |
| KPMG | A *H=>A?* | − (3) | ++ (7) | | −− (3) | + (6) | + (6) | | ++ (6) | R (competitors) V (declared later) | R/E, V | Ec, Eth |
| BP | A | −−− (8) | + (?) | −−− (8) | −−− (8) | | ? | | ++ (6) | R (customers – other countries) V | V, E | Eth, Ec |
| BAT | D+>A | + => −−− (6/3=>8) | + (6) | | − (3) | | ++ (6) | | + (2) | V | V, L | Eth |
| KONE | C=>A | + (3) | +++ (7) | | − (3) | | +? | | ++ (2) | V | E, V | Ec, Eth |
| 3M | B | − (3) | + (3) | ? | | | ++ (6) | | + (6) | V | V | L, Eth, D |
| Acer | B | − (3) | + (3) | | | | | | | | L | L |
| Danone | C | ± (3) | | | − (5) | + (6) | ++ (6) | | ++ (6) | V | E+V | Ec, Eth |
| Intel | C=>A | + => − | + (5) | | −−− (8) | | ++ (6) | | ++ (6) | V, L (sanctions) | E+V | Ec, Eth |
| SHV | D | ++ (7) | ++ (7) | | −−− (8) | | | | ++ (6) | | E+V | Ec, D |
| Nokian Tyres | E=>A? | ++ (7=> 5) | ++ (7) | | − (3) | | ++ | | ++ (6) | R (public & investors) | E+V | Ec, D |
| Revolut | E | ++ (5) | +++ (7) | | | ++ (6) | +++ (7) | | +++ (7) | L (sanctions) | V, L | Ec, Eth, L, D |
| Tesla, SpaceX | E/G | + (3) | | + (1) | −−− (8) | | +++ (7) | | +++ (7) | | V, E | Eth, D, Ec |
| L'Occitane | F | ++ (7) | ++ (7) | | −−− (8) | | | + (1) | ++ (7) | | E | Ec, D |

| Companies | Strategy[1)] | Impact on Russian stakeholders[2)] | | | | Impact on Ukrainian stakeholders[2)] | | | | Additional factors[3)] | Motives[3)] | Responsibility[4)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C | E | P | S | C | E | P | S | | | |
| OLX | F | ++ (7) | ++ (7) | | ± (1) | | ± (3) | | ± (2) | -R (employees-other countries) | E | Ec |
| Auchan | G/E | ++ (7) | ++ (7) | | | ++ (6) | ++ (6) | | + (2) | -R (public) | E | Ec |
| Benetton | G | ++ (7) | | | + (1) | | | | – (8) | | E | Ec |
| Leroy Merlin | H | ++ (7) | + (3) | ++ (7) | + (1) | ++ (6) | ± (3) | | – (3) | -R (public) | E | Ec |

Legend:

[1)] Firm's strategy in the face of war: A – exit, B – suspend/wait, C – reduction, D – minimal response, E – the "having your cake and eating it", F – the "wolf in sheep's clothing", G – business-as-usual, H – seizing opportunities. The change of strategy was marked '=>'

[2)] Stakeholders: C – customers, E – employees, P – partners including suppliers, S – society. Signs indicate impact: "+" positive or "-" negative (the more signs, the stronger the impact). Stakeholders' category numbering in line with Figure 1: 1 – dormant, 2- discretionary, 3 – demanding, 4 – dominant, 5 – dangerous, 6 – dependent, 7 – definitive

[3)] Motives and additional factors: E – economic considerations, L – legal requirements, V – ethics and values, R – reputational factors (if pressure was exerted but the company ignored it, it was marked '-R')

[4)] Areas of firm's responsibility: Ec – economic, L – legal, Eth – ethical, D – discretionary

Source: own work.

# References


3M (2022), *3M suspends Russia business operations*, https://news.3m.com/3M-suspends-Russia-business-operations (accessed: 15.03.2022).

Accenture (2022), *Accenture to Discontinue Business in Russia*, https://newsroom.accenture.com/news/accenture-to-discontinue-business-in-russia.htm (accessed: 4.03.2022).

AFP (2022), *Ukraine Crisis: Acer Suspends Business in Russia*, https://gadgets360.com/laptops/news/ukraine-russia-war-invasion-acer-stop-suspend-business-sanction-2873031 (accessed: 15.04.2022).

Archyde (2022), *L'Occitane stores resumed work in Russia under a "new" name*, http://www.www.archyde.com/loccitane-stores-resumed-work-in-russia-under-a-new-name/ (accessed: 10.07.2022).

Association of European Business (2022), *AEB memorandum on parallel imports*, https://aebrus.ru/weekly/2022%20Parallel%20Import%20AEB%20eng.pdf (accessed: 9.07.2022).

Auchan (2022), *Position of Auchan Retail on the pursuit of its activities in Ukraine and Russia*, http://www.auchan-retail.com/en/position-of-auchan-retail-on-the-pursuit-of-its-activities-in-ukraine-and-russia/ (accessed: 1.04.2022).

Basini, B. (2022), *EXCLUSIF. Yves Claude, PDG d'Auchan: "Partir de Russie serait inimaginable du point de vue humain"*, "Le Journal du Dimanche", http://www.lejdd.fr/Economie/le-pdg-dauchan-retail-international-partir-de-russie-serait-inimaginable-du-point-de-vue-humain-4101987 (accessed: 1.04.2022).

BAT (2022a), *BAT statement on Ukraine/Russia*, http://www.bat.com/group/sites/UK__9D9KCY.nsf/vwPagesWebLive/DOCCCGBH (accessed: 10.07.2022).

BAT (2022b), *Russia business update and revised guidance*, http://www.bat.com/group/sites/UK__9D9KCY.nsf/vwPagesWebLive/DOCCEKV9 (accessed: 10.07.2022).

Booth, J. (2022a), *Accenture mulls handing Russia firm to local staff as parent pulls out*, "Financial News", 25.03.2022, http://www.fnlondon.com/articles/accenture-russia-looks-to-set-up-successor-firm-after-parent-pulls-plug-20220325 (accessed: 1.04.2022).

Booth, J. (2022b), *PwC, Deloitte and EY condemn Russia, KPMG stops shirt as rivals drop clients*, "Financial News", 28.02.2022, http://www.fnlondon.com/articles/pwc-condemns-russian-attack-on-ukraine-kpmg-stops-short-20220228 (accessed: 1.04.2022).

Booth, J., Clarke, P. (2022), *McKinsey evacuates Russia staff to Kazakhstan*, "Financial News", 17.03.2022, http://www.fnlondon.com/articles/mckinsey-evacuates-russia-staff-to-kazakhstan-20220317 (accessed: 1.06.2022).

BP (2022), *BP to exit Rosneft shareholding*, http://www.bp.com/en/global/corporate/news-and insights/press-releases/bp-to-exit-rosneft-shareholding.html (accessed: 1.03.2022).

Business & Human Rights (2022), *Leroy Merlin allegedly disconnects Ukrainian office from corporate communication, still works in Russia*, http://www.business-humanrights.org/en/latest-news/france-leroy-merlin-disconnected-ukrainian-office-from-corporate-communication-but-continues-to-wrk-in-russia/ (accessed: 1.04.2022).

Carroll, A.B. (1979), *A Three-Dimensional Conceptual Model of Corporate Performance*, "Academy of Management Review", 4 (4), pp. 497–505, https://doi.org/10.2307/257850

Danone (2022a), *Statement – Ukraine, March 6th*, http://www.danone.com/content/dam/danone-corp/danone-com/homepage/Danone-statement-Ukraine-PDF-EN.pdf (accessed: 15.03.2022).

Danone (2022b), *Statement – Ukraine, April 1st*, http://www.danone.com/content/dam/danone-corp/danone-com/homepage/danone-statement-ukraine-april-en.pdf (accessed: 15.03.2022).

DigitNews (2022), *Tesla sales in Russia soared by 90%*, https://digitnews.in/tesla-sales-in-russia-soared-by-90/ (accessed: 2.06.2022).

Duffy, K. (2022), *Elon Musk zdradził, ile zestawów Starlink jest w Ukrainie*, https://businessinsider.com.pl/technologie/nowe-technologie/elon-musk-zdradzil-ile-zestawow-starlink-jest-w-ukrainie/jjkh2tk (accessed: 2.06.2022).

Freeman, R.E. (2010), *Strategic Management. A Stakeholder Approach*, Cambridge University Press, Cambridge, https://doi.org/10.1017/CBO9781139192675

Funakoshi, M., Lawson, H., Deka, K. (2022), *Tracking sanctions against Russia*, https://graphics.reuters.com/UKRAINE-CRISIS/SANCTIONS/byvrjenzmve/ (accessed: 9.07.2022).

Gajewski, M. (2022), *Revolut dał niezłą plamę i nie widzi problemu. Uchodźcy odcięci od swoich pieniędzy*, https://spidersweb.pl/2022/04/revolut-blokada-kont-ukraina.html (accessed: 15.04.2022).

Intel (2022a), *Intel Statement on the War in Ukraine*, http://www.intel.com/content/www/us/en/newsroom/news/intel-statement-war-ukraine.html (accessed: 10.07.2022).

Intel (2022b), *Intel Suspends Operations in Russia*, http://www.intel.com/content/www/us/en/newsroom/news/russia-business-statement.html (accessed: 10.07.2022).

King & Spalding (2022), *Russia's Recent Actions Against Foreign Investors Will Give Rise to Claims Under International Investment Treaties*, http://www.kslaw.com/news-and-insights/russias-recent-actions-against-foreign-investors-will-give-rise-to-claims-under-international-investment-treaties (accessed: 9.07.2022).

Kolodny, L. (2022a), *Tesla will pay Ukrainian employees for up to 3 months if they are conscripted to fight*, http://www.cnbc.com/2022/03/09/tesla-will-pay-ukrainian-employees-for-up-to-3-months-if-conscripted.html (accessed: 2.06.2022).

Kolodny, L. (2022b), *Tesla has bought aluminum from Russian company Rusal since 2020, showing how war complicates supply chain*, https://www.cnbc.com/2022/03/14/tesla-has-bought-aluminum-from-russian-supplier-rusal-since-2020.html (accessed: 2.06.2022).

KONE (2022a), *KONE ceases deliveries to Russia*, http://www.kone.com/en/news-and-insights/releases/kone-ceases-deliveries-to-russia-2022-03-03.aspx (accessed: 1.07.2022).

KONE (2022b), *KONE divests its operations in Russia*, http://www.kone.com/en/news-and-insights/releases/kone-divests-its-operations-in-russia-2022-06-28.aspx (accessed: 1.07.2022).

KPMG (2022), *KPMG statement on Russia and Belarus*, https://home.kpmg/ua/en/home/media/press-releases/2022/03/kpmg.html (accessed: 9.07.2022).

Kulaga, J. (2020), *A renaissance of the doctrine of Rebus Sic Stantibus?*, "International & Comparative Law Quarterly", 69 (2), pp. 477–497, https://doi.org/10.1017/S0020589320000032

L'Occitane (2022a), *Statement from the L'OCCITANE Group*, https://group.loccitane.com/sites/default/files/2022-04/220412_LOCCITANE_Statement.pdf (accessed: 10.07.2022).

L'Occitane (2022b), *L'OCCITANE closes its own stores and e-commerce websites in Russia*, https://group.loccitane.com/sites/default/files/2022-05/220415_LOCCITANE_Press_Release.pdf (accessed: 10.07.2022).

L'Occitane (2022c), *L'OCCITANE Group to exit Russian operations*, https://group.loccitane.com/sites/default/files/2022-05/220519_LOCCITANE%20Russia%20Statement_en.pdf (accessed: 10.07.2022).

Lehto, E., (2022), *Nokian Tyres says it is preventing use of Russian factory for war*, http://www.reuters.com/business/nokian-tyres-says-it-is-preventing-use-russian-factory-war-2022-04-29/ (accessed: 10.07.2022).

McKinsey (2022), *McKinsey Statement on Russia's Invasion of Ukraine*, http://www.mckinsey.com/about-us/media/mckinsey-statement-on-russias-invasion-of-ukraine (accessed: 1.06.2022).

Mitchell, R.K., Agle, B.R., Wood, D.J. (1997), *Toward a Theory of Stakeholder Identification and Salience. Defining the Principle of Who and What Really Counts*, "Academy of Management Review", 22 (4), pp. 853–886, https://doi.org/10.2307/259247

Nokian Tyres (2022), *Nokian Tyres' update on the war in Ukraine*, http://www.nokiantyres.com/company/news-article/nokian-tyres-statement-on-our-businesses-in-russia/ (accessed: 10.07.2022).

OLX (2022), *Statement on Avito*, http://www.olxgroup.com/press/statement-avito (accessed: 10.07.2022).

*Over 1,000 Companies Have Curtailed Operations in Russia – But Some Remain* (2022), https://som.yale.edu/story/2022/over-1000-companies-have-curtailed-operations-russia-some-remain (accessed: 9.07.2022).

Pikuła, R. (2022), *Firma powiązana z Grupą OLX pomaga w rekrutacji do rosyjskiej armii. Z rynku wycofać się nie chce*, https://wyborcza.biz/biznes/7,177151,28232719,w-rosji-agentow-i-zolnierzy-szukaja-na-portalu-ogloszeniowym.html (accessed: 9.07.2022).

Prosus (2022), *Statement on Ukraine*, http://www.prosus.com/news/statement-on-ukraine/ (accessed: 10.07.2022).

PwC (2022), *Ukraine. Overview*, https://taxsummaries.pwc.com/ukraine (accessed: 8.07.2022).

SHV (2022), *SHV's response to the situation regarding Russia and Ukraine*, http://www.shv.nl/news/shvs-response-situation-regarding-russia-and-ukraine (accessed: 10.07.2022).

Revolut (2022), *The war on Ukraine: our response*, https://blog.revolut.com/the-war-on-ukraine-our-response/ (accessed: 15.04.2022).

Storonsky, N. (2022), *A personal letter from our CEO*, Revolut, https://blog.revolut.com/a-personal-letter-from-our-ceo/ (accessed: 15.04.2022).

Trusewicz, I. (2022a), *Ukraina nacjonalizuje majątek rosyjski. Wyższe podatki za wsparcie Rosji*, "Rzeczpospolita", 1.04.2022, http://www.rp.pl/budzet-i-podatki/art36000371-ukraina-nacjonalizuje-majatek-rosyjski-wyzsze-podatki-za-wsparcie-rosji (accessed: 2.04.2022).

Trusewicz, I. (2022b), *Intel jednak zostaje w Rosji. Koncern wystraszył się gróźb rosyjskich władz*, "Rzeczpospolita", 4.04.2022, http://www.rp.pl/biznes/art36008421-intel-jednak-zostaje-w-rosji-koncern-wystraszyl-sie-grozb-rosyjskich-wladz (accessed: 5.04.2022).

United Colors of Benetton (n.d.), https://pl.benetton.com/l/sustainability.html (accessed: 10.07.2022).

Wallace, A. (2022), *French retail giant looks to expand its Russia business and increase products in stores after other brands pull out*, http://www.businessinsider.in/retail/news/french-retail-giant-looks-to-expand-its-russia-business-and-increase-products-in-stores-after-other-brands-pull-out/articleshow/90359909.cms (accessed: 1.04.2022).

## Przedsiębiorstwa międzynarodowe w Rosji i Ukrainie w obliczu wojny – perspektywa interesariuszy

Celem niniejszego artykułu jest skategoryzowanie postaw korporacji międzynarodowych prowadzących działalność gospodarczą w Rosji (i ewentualnie na Ukrainie) w odpowiedzi na wojnę między tymi krajami, z perspektywy znaczenia ich interesariuszy, oraz określenie wymiarów odpowiedzialności, do której dany podmiot się poczuwa. Zidentyfikowano osiem typów strategii firm oraz wskazano możliwe cztery motywy decyzji o ich przyjęciu. Następnie, w oparciu o teorię interesariuszy, zidentyfikowano prawdopodobne priorytety analizowanych firm w zakresie podstawowych grup interesu w Rosji i na Ukrainie oraz określono wymiary odpowiedzialności biznesu, które postrzegają one jako kluczowe. Przeprowadzona analiza pozwala zobrazować tło i konsekwencje różnych strategii dla głównych interesariuszy. Umożliwia także wskazanie priorytetów firm i tego, kto ma wpływ na kształtowanie ich celów.

Słowa kluczowe: Ukraina, Rosja, wojna, interesariusze, odpowiedzialność przedsiębiorstw

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# A Gain or a Loss? The Consequences of Brexit in the Opinions of Polish Migrants

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## Abstract

The aim of the article is to present the opinions of Polish migrants in Britain on the gains or losses that Brexit may bring to the European Union (EU), the United Kingdom (UK), and Poland, as well as the respondents themselves and their families. These opinions were determined based on the analysis of the results of a survey carried out among these migrants and presented against the backdrop of the results of public opinion polls on EU membership, which have been conducted in the British Isles regularly since the 1970s. The article analyses the beliefs held on this issue by economic migrants, who are faced with a choice as Brexit is underway: to remain expatriates or to return to their country of origin. Among the answers to questions about the possible benefits or negative outcomes of Brexit, it was the latter that predominated. In the discussion, the authors seek to ascertain why migrants from Poland fear the negative consequences of Brexit for the UK and for Europe more often than they fear those for Poland or for themselves and their close family members.

Keywords: Brexit, migrants, public opinion, Brexit's gains and losses

JEL: F22, F55, O15, O24, 052, Z19



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## Introduction

As Brexit is a process that impacts many domains of everyday life, its outcomes are extremely difficult to predict (Rogaly 2019). Its supporters claimed that the United Kingdom (UK) would be freed from excess legal regulations (Hobolt and Tilley 2021), while those in favour of remaining in the EU wrote scenarios predicting a financial apocalypse (Calliess 2021) or the weakening of Europe as a whole in the global struggle against terrorism (Piatkowska and Stults 2021). The evaluation of the gains and losses associated with Brexit was not made any easier by the dispute between the UK and the EU about the mutual relations after Britain's withdrawal. This was due to the fact that membership in the European Union (EU) means participation not only in a common political project but also in a unified market that ensures the free transfer of capital, goods, and services (Sieroń 2016). Moreover, the Brexit vote deepened existing divisions in British society on key issues such as national identity (Kozak, Fel, and Wódka 2021), globalisation, diversity, and multiculturalism (Ford and Goodwin 2017).

This article is not so much an analysis of British public opinion on Brexit (cf. Curtice 2018; Guber 2021; Hobolt and Tilley 2021) as an attempt to complement this picture by determining how the outcomes of Brexit are perceived by Polish migrants settled in the UK, who constitute an important part of British society (White 2016).

## Brexit surveys

In a 2018 sociological survey among Poles in Britain commissioned by the Department of Statistics of the National Bank of Poland (NBP), a clear majority of respondents (59.3%) stated that Britain's withdrawal from the EU would not have much effect on their current situation and would not require any additional actions on their part (Chmielewska, Panuciak, and Strzelecki 2019, p. 44).

What is interesting is the distribution of opinions on the outcomes of Brexit. Six in ten admitted that Brexit would negatively impact the UK, one in two respondents stated that Poland would be negatively affected by the absence of the UK in the EU, and one in five of respondents expected a negative effect of Brexit on the EU. The percentage was similar in the case of answers indicating the expected negative outcome for the respondents themselves (Taylor, Vautrin-Dumaine, and Bull 2019). In December 2021, in the UK, the R&WS Research Team conducted a survey on British people's opinions about Brexit ($N = 1500$). Although the respondents were not directly asked about the consequences of the UK leaving the EU, they were requested to express their views on the UK rejoining the EU. More than half (53.0%) believed that the UK should remain outside the EU, while 47.0% held the opposite view (R&WS-Research 2021).

Analysing the results of polls, Sara Hobolt and James Tilley concluded that British people often interpreted EU membership as beneficial. However, in the polls from 1974, 1977, 1979–1983, 2003, and 2008–2010, there was a higher proportion who believed that EU membership was not beneficial. That said, the results indicated a distinct trend of positively evaluating the UK's membership in the EU both before and after the referendum (Hobolt and Tilley 2021). However, Hobolt and Tilley's observations do not correspond with the 2021 poll, which opens a space for discussion on migrants' attitudes towards Brexit, as migrants account for a considerable proportion of British society.

## Methods

Our sample consisted of 620 respondents from London, Oxford, and Swindon associated with Polish migrant organisations operating in Great Britain (members and non-members of Polish migrant institutions). These organisations conduct their activities in Polish and provide various forms of cultural and charity initiatives targeted at the communities of Poles who went there in recent years. The respondents completed paper questionnaires, answering questions about their opinions on Brexit. The respondents selected (purposive sampling) were adults who attended Polish migrant organisations, for example, parents of children attending Polish ethnic schools linked to Polish parishes.

A review of the literature confirms that British public opinion on Brexit is fairly well documented and discussed (Hobolt 2016), but immigrants' opinion on this issue seems not to have been adequately surveyed. The literature includes reports from sociological studies concerning migrants' plans during Brexit (Mazzilli and King 2018; Kilkey and Ryan 2021; Markova and King 2021; Jonczyk Sédès, Miedtank, and Oliver 2022), but opinion polls on Brexit are noticeably lacking.

## Results

In view of the above, it seemed relevant in autumn 2019 to ask the respondents the following question: "Is the UK's departure from the EU advantageous or disadvantageous for the EU?".

Two-thirds of respondents expected negative outcomes for the EU, one in seven stated that it would be of little consequence, while two in hundred expected it to have a positive outcome for the EU. One in seven indicated the "hard to say" option, while one in twenty gave no response.

Table 1. Is the United Kingdom's departure from the European Union advantageous or disadvantageous for the European Union?

| Response categories | Within a few years | | In an indefinite future | | Never | | Hard to say | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % |
| Advantageous | 4 | 2.8 | 5 | 2.7 | 1 | 1.1 | 2 | 1.0 | 12 | 1.9 |
| Of little consequence | 21 | 14.6 | 23 | 12.4 | 18 | 20.7 | 23 | 11.3 | 85 | 13.7 |
| Disadvantageous | 87 | 60.4 | 123 | 66.1 | 56 | 64.4 | 142 | 70.0 | 408 | 65.8 |
| Hard to say | 21 | 14.6 | 25 | 13.4 | 11 | 12.6 | 29 | 14.3 | 86 | 13.9 |
| No response | 11 | 7.6 | 10 | 5.4 | 1 | 1.1 | 7 | 3.4 | 29 | 4.7 |
| Total | 144 | 100.0 | 186 | 100.0 | 87 | 100.0 | 203 | 100.0 | 620 | 100.0 |

Source: authors' calculations.

The respondents who saw no advantages for the EU were slightly more numerous among those who hesitated about whether to return to Poland or stay in the UK than among those who declared that they would return to Poland in an indefinite future or that they were planning to remain in the UK permanently. According to one in five of those planning to stay in the UK, Brexit would be of little consequence for the EU in the years to come. Brexit was seen as advantageous for Europe by a small percentage of respondents who were planning to return to Poland. In other words, those who remained in the UK expressed the opinion that Brexit would have little consequence for the EU more often than those who were planning to remigrate.

Among the respondents who saw no advantages of Brexit for the EU, there were more white-collar workers than blue-collar workers (71.2% vs 60.4%). In both groups, the survey revealed the same level of belief that Brexit was not significant for the EU (14.2% in both cases).

Next, the respondents were asked if the UK's departure from the EU was advantageous or disadvantageous for Poland. Compared to the previous, analogous question about the effect of Brexit on the EU, the percentage of respondents that indicated a lack of advantages for Poland decreased by 8 percentage points (from 65.8% to 57.7%), and the proportion of those who claimed that Brexit would be of little consequence for Poland increased by approximately 4 percentage points (from 13.7% to 17.4%). There was also a slight increase (from 1.9% to 2.3%) in the proportion of Brexit enthusiasts who believed that the UK's withdrawal would benefit Poland. Higher percentages (compared to the previous question) were also observed in the cafeteria for "hard to say" answers (from 13.9% to 16.1%) and for the "no response" category (6.5%).

Table 2. Is the United Kingdom's departure from the European Union advantageous or disadvantageous for Poland?

| Response categories | Within a few years | | In an indefinite future | | Never | | Hard to say | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % |
| Advantageous | 6 | 4.2 | 5 | 2.7 | 2 | 2.3 | 1 | 0.5 | 14 | 2.3 |
| Of little consequence | 29 | 20.1 | 34 | 18.3 | 16 | 18.4 | 29 | 14.3 | 108 | 17.4 |
| Disadvantageous | 79 | 54.9 | 109 | 58.6 | 51 | 58.6 | 119 | 58.6 | 358 | 57.7 |
| Hard to say | 19 | 13.2 | 25 | 13.4 | 14 | 16.1 | 42 | 20.7 | 100 | 16.1 |
| No response | 11 | 7.6 | 13 | 7.0 | 4 | 4.6 | 12 | 5.9 | 40 | 6.5 |
| Total | 144 | 100.0 | 186 | 100.0 | 87 | 100.0 | 203 | 100.0 | 620 | 100.0 |

$\chi^2 = 7.551$, df = 9, p = 0.580.
Source: authors' calculations.

When estimating post-Brexit outcomes, the respondents expected more benefits for Poland than for the EU. Concern about the negative impact of Brexit on Poland was expressed by three in five respondents who were planning to return to Poland in the indefinite future, the undecided, and those intending to remain in the UK permanently (58.6% in each case) and by slightly fewer respondents who declared that they would return in the near future (54.9%). The survey shows that the lack of Brexit-related benefits for Poland was more often stressed by respondents planning to remain in the UK permanently.

The view that Brexit **would be of little consequence** for Poland was held most often by respondents who were planning to return, similarly often by respondents who planned to permanently remain in the UK or postpone their return to Poland until an indefinite future (18.3%), and the least often by undecided respondents (14.3%).

**No benefits for Poland after Brexit** was the outcome predicted by respondents who were remaining in the UK or postponing their departure, by nearly two-thirds of white-collar workers (65.3%) and by half of the blue-collar workers (51.0%). Considerably more blue-collar workers than white-collar workers were unable to specify what effect Brexit would have on Poland (19.4% vs 12.0%).

The next stage in the survey was the evaluation of the UK's departure from the EU and its impact on the UK. Three-quarters (73.2%) stated that it would negatively affect the UK, and one in ten (9.5%) expected the UK to benefit from Brexit. Few respondents (3.1%) believed that Brexit would have no impact on Britain, one in ten (10.0%) reported having no clear opinion on the matter, and 4.2% gave no answer.

Table 3. Is the United Kingdom's departure from the European Union advantageous or disadvantageous for the United Kingdom?

| Response categories | Within a few years | | In an indefinite future | | Never | | Hard to say | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % |
| Advantageous | 16 | 11.1 | 16 | 8.6 | 8 | 9.2 | 19 | 9.4 | 59 | 9.5 |
| Of little consequence | 7 | 4.9 | 2 | 1.1 | 3 | 3.4 | 7 | 3.4 | 19 | 3.1 |
| Disadvantageous | 99 | 68.8 | 146 | 78.5 | 63 | 72.4 | 146 | 71.9 | 454 | 73.2 |
| Hard to say | 13 | 9.0 | 18 | 9.7 | 10 | 11.5 | 21 | 10.3 | 62 | 10.0 |
| No response | 9 | 6.3 | 4 | 2.2 | 3 | 3.4 | 10 | 4.9 | 26 | 4.2 |
| Total | 144 | 100.0 | 186 | 100.0 | 87 | 100.0 | 203 | 100.0 | 620 | 100.0 |

$\chi^2 = 5.972$, df = 9, p = 0.743.
Source: authors' calculations.

The group that was most sceptical about the positive outcomes of the Brexit decision for the UK itself was the respondents who had decided to return to Poland in an indefinite future (78.5%), this view being slightly less frequent among individuals who were planning to stay in the UK (72.4%) and among the undecided (71.9%). Scepticism about these outcomes was shared by two-thirds of respondents who declared they intended to return to Poland shortly.

One in nine respondents who planned to return to Poland in the near future expected Brexit to have positive consequences for the UK. This expectation was less often expressed by those who declared an intention to stay in the UK permanently. The number of respondents undecided about the ramifications of Brexit for the UK was the highest among Poles who had decided to stay in the UK (11.5%).

**No benefits** of Brexit for the UK were more often expected by individuals planning to stay in the UK, particularly by women (M = 66.1%, W = 77.8%), by eight in ten white-collar workers (79.6%), and by seven in ten blue-collar workers (70.1%). The respondents who saw Brexit as an **opportunity** for the UK were those who planned to return to Poland, more frequently men (M = 14.7%, W = 7.0%), one in ten blue-collar workers , and one in eleven white-collar workers.

In the last question, the respondents were asked if the UK's departure from the EU was advantageous or disadvantageous for them and their families. Almost half were concerned that the decision to leave the EU would have negative consequences for them and their family, while 22.6% believed that Brexit was of little consequence. Slightly fewer reported that they had no clear opinion (21.9%), and only five respondents in the sample saw Brexit as advantageous for themselves and their families. No answer was given by 5.5% of respondents.

Table 4. Is the United Kingdom's departure from the European Union advantageous or disadvantageous for you and your family?

| Response categories | Within a few years | | In an indefinite future | | Never | | Hard to say | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | *N* | % |
| Advantageous | 1 | 0.7 | 1 | 0.5 | 2 | 2.3 | 1 | 0.5 | 5 | 0.8 |
| Of little consequence | 34 | 23.6 | 36 | 19.4 | 22 | 25.3 | 48 | 23.6 | 140 | 22.6 |
| Disadvantageous | 64 | 44.4 | 104 | 55.9 | 38 | 43.7 | 99 | 48.8 | 305 | 49.2 |
| Hard to say | 33 | 22.9 | 38 | 20.4 | 22 | 25.3 | 43 | 21.2 | 136 | 21.9 |
| No response | 12 | 8.3 | 7 | 3.8 | 3 | 3.4 | 12 | 5.9 | 34 | 5.5 |
| Total | 144 | 100.0 | 186 | 100.0 | 87 | 100.0 | 203 | 100.0 | 620 | 100.0 |

$\chi^2 = 7.487$, df = 9, p = 0.587.
Source: authors' calculations.

Most respondents who were indefinitely postponing their return to Poland saw no advantages of Brexit for themselves and their families. The same was true of almost half who were undecided about returning or staying, and slightly fewer who declared that they would return to Poland shortly or who had decided to remain permanently.

A quarter of those who intended to remain in the UK believed that Brexit would be of little consequence for them and their families, while another quarter had no clear opinion. In other words, a comparable proportion of respondents returning to Poland and those planning to stay reported a similar view on the possible consequences of Brexit for themselves and their families. The belief that Brexit would not have positive consequences for the respondents and/or their families and the belief that it would be of little consequence were found in equal proportions among those who intended to remain and those planning to return.

Fears about the **negative consequences** of Brexit for themselves and their families were more frequent among women (M = 42.7%, W = 53.9%) and among people over the age of forty (40–49 years – 55.0%; ≥ 50 years – 54.5%). Similarly, individuals with higher education (master's degree – 56.0%, bachelor's degree – 55.9%) more often had a pessimistic view of their own future and that of their families after Brexit. Considerably more white-collar workers than blue-collar workers expressed concerns about Brexit, expecting that it would have negative consequences (56.6% vs 45.8%).

One in four men and one in five women believed that **Brexit would be of little consequence** for them and for their families; this opinion was also more often reported by the youngest respondents (< 30 years – 38.2%) and those with primary or basic vocational education (29.2%). The opinion that Brexit was of no consequence was held by a fifth of blue-collar workers (20.8%) and by slightly more white-collar workers (23.4%).

## Analysis

The analysis of the results concerning the advantages – or lack thereof – of Brexit showed that two-thirds of the respondents believed Brexit to be disadvantageous for the EU. Those who intended to remain in the UK more often believed that Brexit would not have a significant effect on the EU as a whole. Comparing the results of this survey with the results of a survey carried out in 2019 by Kantar Public in several EU countries reveals that Poles living in the UK viewed Brexit more critically (i.e., they more often saw it as having no advantages) than their compatriots in Poland, who – like the French – were fairly optimistic about the outcomes of the UK's departure from the EU.

Answering the question about the consequences of Brexit for Poland, the respondents from Swindon, Oxford, and London less often indicated the possible disadvantages resulting from the split between London and Brussels. Negative outcomes for Poland were much more often expected by respondents planning to stay in Britain, whereas those planning to return more often claimed that Brexit would be of little consequence for Poland.

Regarding the consequences of Brexit for the UK, a clear majority of respondents believed that leaving the EU would have a negative effect, although one in ten asserted that it would bring certain benefits to the UK. This is noteworthy also because in no other question were the possible benefits so strongly stressed and with such a high level of scepticism regarding the British public's decision. In other words, Poles saw the positive consequences of Brexit more often than Brits. In some respect, the attitudes of Poles in the UK to Brexit revealed by our survey correspond both with the Eurobarometer survey and a survey conducted by the R&WS Research Team among British people in December 2021. These results show the perceived consequences of Brexit in all the analysed frames of reference (the EU, the UK, Poland, family) in terms of doubts about, disputability of, and even opposition to the decision made by British society in 2016.

Doubts in British society about whether Brexit was the right decision clearly decrease with age, which may explain the difference in the perception of the European–British reality within British society itself. What argues in favour of this interpretation is the considerably high percentage of those who support rejoining the EU among respondents who did not vote in the 2016 referendum, i.e., those who had no voting rights at that time (as they were underage or did not have British citizenship) or were undecided on the matter.

In the last question, the respondents were asked about the consequences of Brexit for them and their families. Half of the respondents admitted that they feared the negative outcomes. Our survey found the proportion of respondents who claimed that Brexit would not negatively impact them and their families to be two times lower than the proportion of answers to an analogous question in a survey conducted by NBP. Compared

to the 2018 NBP survey, there was an increase in concerns about the negative outcomes of Brexit for migrants and their families, though, at that time, the respondents also indicated that Brexit did not change their plans to stay or return.

The respondents who expected difficulties in the future but had no plans to leave Britain anyway accounted for 17.7% of the sample in 2018. Meanwhile, 13.3% expected difficulties and reported the need to take action, applying for resident status. One in ten believed that their situation in the British job market might become so complicated that they were not planning to remain there after Brexit (Chmielewska, Panuciak, and Strzelecki 2019, p. 44).

As mentioned before, Polish migrants who were planning to remain in the UK were more tolerant of Brexit than those planning to return to Poland. This may have been due to the strong impact of the British media (Wodka et al. 2022), which they evaluated as non-objective (Gaber and Fisher 2022). Nevertheless, concerns about the post-Brexit reality are seen in many socioeconomic domains (e.g., economy and commerce, law, and migration). On the one hand, the future consequences of Brexit sparked a debate outside the EU on the expected benefits of EU membership; on the other hand, they inspired questions about the strengthening of attachment to the country of origin (Stanojević, Vujić, and Vujović 2022).

## Discussion

In hindsight, implementing Brexit has not been as straightforward as set out in the Treaty of Lisbon. It is very difficult to offer an accurate diagnosis and even more so to present an objective prognosis regarding the future of the EU or, more broadly, the world after the UK's departure from the EU. The debate on the character and potential scale of the consequences of Brexit continues to have a widely defined scope, comprising institutional (Wilson and Oliver 2019), political (Malet, Walter, and Association 2021), economic (Green, Hellwig, and Fieldhouse 2022), and social dimensions (De Vries 2022; Van der Brug, Gattermann, and De Vreese 2022). In this section, we present the key aspects of the outcomes of Brexit from the perspective of migrants living in Britain during its implementation and identify the causes of migrants' concerns about the current socio-political situation in the UK.

Leaving aside the issue of whether the ongoing Brexit process will lean in the "soft" or "hard" direction, most economists believe that Brexit will be contrary to the economic interest of the UK, contributing to a slowdown of economic growth (Zuba 2017). It is assumed that while the current economic migration, especially from EU member states, has negative social and economic consequences, its long-term effect on the economy and demography of the UK will be positive (McGuinness and Hawkins

2016). Therefore, because Brexit will lead to undesirable negative outcomes regarding the transfer of goods and services, resulting in painful consequences for the life of migrants in the UK, the respondents' fears that Brexit will not be advantageous for the UK seem to be grounded.

In the debate on the consequences of the 2016 referendum, emphasis has been placed mainly on the economic and political outcomes, which may explain the respondents' considerably high level of concern about the negative consequences of Brexit for the EU. Brexit means the loss of the second largest net contributor to the EU budget and the country with the third largest population, which may upset the balance between member states reflected in the current decision-making scheme. On the one hand, the withdrawal of a country with such a large potential means changes in the budget structure; on the other, it means a new distribution of power in decision-making within the EU (Dahl and Skomorokhova 2017, p. 256). Another issue in the debates is Brexit as a precedent that may pave the way for other member states to leave (Fingleton 2020), which may have consequences on the migration policy of many European countries (Simionescu 2021). The UK's withdrawal will strengthen German domination in the Union (Zuba 2017) and lead to the fulfilment of the Differentiated Integration model, referred to as "multi-speed Europe" (Górka and Łuszczyk 2017). That, in turn, may trigger debate about restrictions on further economic migration within the EU (Kelemen 2021). Therefore, the migrants' concerns about the negative outcomes of Brexit for the whole EU seem justified.

Brexit is related to security and defence policy, not only of the UK but also of the EU as a whole. It certainly means the common security and defence policy loses an important actor with considerable military, economic, and political potential. The absence of the British potential may be perceptible in military transport, early warning systems, and access to intelligence data (Usewicz 2017, p. 126). While the greatest powers in the EU set the direction for its foreign and security policy (Hyde-Price 2012), Brexit may be associated in the migrants' minds with a sense of betrayal and a disruption of their life in Britain, including the undermining of their personal involvement in the country where they have settled (Zontini and Genova 2022), interfering with their life plans. Understanding this process is particularly significant in the context of the uncertainty of post-Brexit reality (Guma and Dafydd Jones 2019). What may also cause concerns among Polish migrants is the military tension built up by Russia in Eastern Europe (Tropin 2021). It has resulted in the prospect of these countries ending up between Germany and Russia again, as there is every indication of the leading role of Germany in the EU in relations with Russia after Brexit (Fiszer 2018).

Paulina Bobińska performed a different kind of analysis of the consequences of Brexit for Europe. She seeks its consequences for the whole of Europe in at least three dimensions: **political** – weakened cooperation, upset balance in the EU, a "domino effect"

on other countries interested in following in the UK's footsteps, a division in Europe, political tensions; **economic** – deficits in the EU budget, a weakened bargaining position of the EU in the global arena, anxiety in the financial markets, and a decrease in the competitiveness of the EU; and **strategic** – a decrease in the UK's interest in the fate of Eastern Europe, understood as providing military support, and a slowdown of economic growth (Bobińska 2016, p. 23).

There is also a need to restore trust between the citizens and governments of EU member states, as well as between governments within the EU. With the divisions between member states being the strongest in a generation, the greatest hope for deeper integration is a flexible configuration of coalitions formed by various countries to address different problems. "A Europe of concentric circles – with Germany and France in the centre […] will not restore solidarity, since many divisions are within the eurozone and the Schengen zone rather than between different circles" (Fiszer 2018, p. 35). This explains the uncertainty in migrants' attitudes to Brexit and the concerns about its negative outcomes for the EU. Brexit may upset the political balance that was made possible in the EU precisely by the UK.

What emerges from the sociological surveys conducted so far is a post-Brexit forecast regarding migrants' return to the country of origin. For Polish migrants in the UK, there may be different motives behind the possible remigrations. At least one-quarter of Poles can be expected to return to their country, if not this year, then certainly within a few years. From the long-term perspective, it is reasonable to predict that half of Poles living in the UK will return home (Fel, Kozak, and Wódka 2020). Migrants see the Brexit precedent not only in terms of a political and economic pact being broken but also in terms of the privilege of free movement being taken away from them, which threatens the striving for the long-term stability of migrants' residence in the UK in the future (Lulle, Moroşanu, and King 2018). There are also other restrictions, including the potential loss of the right to return to Britain in the case of further migration or remigration, which may complicate intra-European mobility even more (Sredanovic 2020).

Brexit may also have positive outcomes for Poland. Given the country's worsening demographic situation and the shortage of skilled workers, the remigration of workers with experience in the competitive British market may bring added value to Poland's economy. In the long term, Brexit will also discourage potential future emigrants from going to Britain, where they will face complicated entry procedures and where there will be more requirements to obtain a residence permit associated with having one's own capital and a guarantee of employment in the UK (Borońska-Hryniewiecka 2016). This explains why the respondents in our survey, conducted in autumn 2019, who were planning to return to Poland considerably less often expressed concerns about the negative consequences of Brexit for Poland or for themselves and their families.

## Conclusions and implications

This article analysed the opinions of Polish migrants in the UK on the extent to which Brexit might bring benefits or losses to the EU, to Poland, to the UK, and to the respondents themselves and their families. Their answers were predominantly about how they would be affected.

Brexit is an unprecedented event that will be an important milestone in the history of the EU and significantly influence its place in the international environment. The EU can be expected to lose part of its economic (the loss of the second largest economy), financial (the loss of the second largest net contributor to the common budget), political (the loss of a country with efficient diplomacy and a permanent member of the UN Security Council), and military potential (the loss of the country with the highest military expenditures in the EU). Brexit will weaken the role of the EU in the transatlantic system and in the structure of the new international order. The countries that will strengthen their position are China and Russia, which will perpetuate the movement of the centre of gravity in the global order towards Asia (Baran 2018). Brexit weakens the EU in terms of image. For the first time in the history of the EU, the integration process has been effectively halted. This may result in a mistrustful attitude of other countries to the process of deepening cooperation and contribute to greater interest in the idea of selective integration (Möller and Oliver 2014).

The UK's departure from the EU will undoubtedly change the situation of the Poles who have chosen a life of migrants in Britain, making it more difficult to migrate there for those who have planned to do so in the near future. It is hard to estimate how exactly the status of Polish immigrants living in the UK will change, but many analysts who have examined this situation claim that, given the obstacles that present and future migrants may encounter, the likelihood of them returning to Poland will increase together with the social unrest caused by the uncertain socioeconomic and political situation between London and Brussels (Nowak and Sus 2019, p. 30; Fel, Kozak, and Wódka 2020; Falkingham et al. 2021; White 2022).

## References

Baran, B. (2018), *Brexit a soft power Unii Europejskiej*, "Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu", 539, pp. 22–30, https://doi.org/10.15611/pn.2018.539.02

Bobińska, P., (2016), *Próba oceny skutków wyjścia Wielkiej Brytanii z Unii Europejskiej*, Uniwersytet Warmińsko-Mazurki w Olsztynie, Olsztyn.

Borońska-Hryniewiecka, K. (2016), *The Impact of Brexit on Economic Migrants in the UK: Implications for Poland and Its Citizens*, "Biuletyn. Polski Instytut Spraw Międzynarodowych", 24 (874), pp. 1–2, https://www.ceeol.com/search/viewpdf?id=608737 (accessed: 31.03.2022).

Calliess, C. (2021), *The Future of Europe after Brexit: Towards a Reform of the European Union and its Euro Area*, "Yearbook of European Law", 40, pp. 3–55, https://doi.org/10.1093/yel/yeaa014

Chmielewska, I., Panuciak, A., Strzelecki, P. (2019), *Polacy pracujący za granicą w 2018 r. Raport z badania*, NBP. Departament Statystyki, Warszawa, https://www.nbp.pl/publikacje/migracyjne/polacy_pracujacy_za_granica_2018.pdf (accessed: 21.09.2022).

Curtice, J. (2018), *Harold D. Clarke, Matthew Goodwin, and Paul Whiteley. Brexit: Why Britain Voted to Leave the European Union. Cambridge: Cambridge University Press. 2017. 256 pp. $19.99 (paper)*, "Public Opinion Quarterly", 82 (2), pp. 409–412, https://academic.oup.com/poq/article-abstract/82/2/409/4979563?redirectedFrom=fulltext (accessed: 31.03.2022).

Dahl, M., Skomorokhova, Y. (2017), *Wpływ Brexitu na relacje między państwami w Unii Europejskiej ze szczególnym uwzględnieniem nowej roli Niemiec*, „Myśl Ekonomiczna i Polityczna", 4 (59), pp. 250–263.

De Vries, C.E. (2022), *Analysing how crises shape mass and elite preferences and behaviour in the European Union*, "European Union Politics", 23 (1), pp. 161–168, https://doi.org/10.1177/14651165211044086

Falkingham, J., Giulietti, C., Wahba, J., Wang, C. (2021), *The impact of Brexit on international students' return intentions*, "The Manchester School", 89 (2), pp. 139–171, https://doi.org/10.1111/manc.12356

Fel, S., Kozak, J., Wódka, M. (2020), *Zostać czy wracać? Metaforycznie o reemigracji Polaków po Brexicie*, "Polityka i Społeczeństwo", 18 (3), pp. 80–96, https://doi.org/10.15584/polispol.2020.3.6

Fingleton, B. (2020), *Italexit, is it another Brexit?*, "Journal of Geographical Systems", 22 (1), pp. 77–104, https://doi.org/10.1007/s10109-019-00307-0

Fiszer, J.M. (2018), *Czy Brexit przyspieszy rewizję traktatu lizbońskiego i uratuje Unię Europejską?*, "Politeja – Pismo Wydziału Studiów Międzynarodowych i Politycznych Uniwersytetu Jagiellońskiego", 15 (54), pp. 17–43, https://doi.org/10.12797/Politeja.15.2018.54.02

Ford, R., Goodwin, M. (2017), *Britain After Brexit: A Nation Divided*, "Journal of Democracy", 28 (1), pp. 17–30, https://www.journalofdemocracy.org/articles/britain-after-brexit-a-nation-divided/ (accessed: 31.03.2022).

Gaber, I., Fisher, C. (2022), *"Strategic Lying": Or How the Conservatives Dominated the Campaign News Agenda*, [in:] D. Wring, R. Mortimer, S. Atkinson (eds.), *Political Communication in Britain*, Palgrave Macmillan, Cham, pp. 103–114, https://doi.org/10.1007/978-3-030-81406-9_9

Górka, K., Łuszczyk, M. (2017), *„Europa dwóch prędkości": deklaracje polityczne czy fakty ekonomiczne*, "Barometr Regionalny", 15 (4), pp. 23–30, http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-9a36ed94-3ac3-406d-b3da-abb11ea7c79c (accessed: 31.03.2022).

Green, J., Hellwig, T., Fieldhouse, E. (2022), *Who Gets What: The Economy, Relative Gains and Brexit*, "British Journal of Political Science", 52 (1), pp. 320–338, https://doi.org/10.1017/S0007123420000551

Guber, D.L. (2021), *Research Synthesis: Public Opinion and the Classical Tradition: Redux in the Digital Age*, "Public Opinion Quarterly", 85 (4), pp. 1103–1127, https://doi.org/10.1093/poq/nfab053

Guma, T., Dafydd Jones, R. (2019), *"Where are we going to go now?" European Union migrants' experiences of hostility, anxiety, and (non-)belonging during Brexit*, "Popul Space Place", 25 (e2198), pp. 1–10, https://doi.org/10.1002/psp.2198

Hobolt, S.B. (2016), *The Brexit Vote: a Divided Nation, a Divided Continent*, "Journal of European Public Policy", 23 (9), pp. 1259–1277, https://doi.org/10.1080/13501763.2016.1225785

Hobolt, S.B., Tilley, J. (2021), *The Polls – Trends: British Public Opinion towards EU Membership*, "Public Opinion Quarterly", 85 (4), pp. 1126–1150, https://doi.org/10.1093/poq/nfab051

Hyde-Price, A. (2012), *Neorealism: A Structural Approach to CSDP*, [in:] X. Kurowska, F. Breuer (eds.), *Explaining the EU's Common Security and Defence Policy*, Palgrave Studies in European Union Politics, Palgrave Macmillan, London, https://doi.org/10.1057/9780230355729_2

Jonczyk Sédès, C., Miedtank, T., Oliver, D. (2022), *Suddenly I Felt Like a Migrant: Identity and Mobility Threats Facing European Self-Initiated Expatriates in the UK under Brexit*, "Academy of Management Discoveries", 1, pp. 1–53, https://doi.org/10.5465/amd.2020.0162

Kelemen, D.R. (2021), *Epilogue: A Note of Caution on Differentiated Integration*, "Swiss Political Science Review", 27 (3), pp. 672–681, https://doi.org/10.1111/spsr.12475

Kilkey, M., Ryan, L. (2021), *Unsettling Events: Understanding Migrants' Responses to Geopolitical Transformative Episodes through a Life-Course Lens*, "International Migration Review", 55 (1), pp. 227–253, https://doi.org/10.1177/0197918320905507

Kozak, J., Fel, S., Wódka, M. (2021), *Religijność a tożsamość narodowa polskich migrantów w Wielkiej Brytanii w dobie brexitu*, "Zeszyty Naukowe Katolickiego Uniwersytetu Lubelskiego Jana Pawła II ", 64 (3), pp. 3–29, https://doi.org/10.31743/znkul.13174

Lulle, A., Moroşanu, L., King, R. (2018), *And then came Brexit: Experiences and future plans of young EU migrants in the London region*, "Popul Space Place", 24 (e2122), pp. 1–11, https://doi.org/10.1002/psp.2122

Malet, G., Walter, S., Association, E.P.S. (2021), *Brexit spillovers: how British domestic politics affected support for European integration in remaining member states*, "European Political Science Association", 1, pp. 1–34, https://doi.org/10.5167/uzh-207167

Markova, E., King, R. (2021), *Leave or remain? The post-Brexit (im)mobility intentions of Bulgarians in the United Kingdom*, "European Urban and Regional Studies", 28 (1), pp. 58–65, https://doi.org/10.1177/0969776420977603

Mazzilli, C., King, R. (2018), *'What have I done to deserve this?' Young Italian migrants in britain narrate their reaction to Brexit and plans for the future*, "Rivista Geografica Italiana", 125 (4), pp. 507–523, http://sro.sussex.ac.uk/id/eprint/82918/ (accessed: 31.03.2022).

McGuinness, F., Hawkins, O. (2016), *Impact of immigration on population and the economy*, House of Commons Library, London, https://researchbriefings.files.parliament.uk/documents/CBP-7659/CBP-7659.pdf (accessed: 31.03.2022).

Möller, A., Oliver, T. (2014), *The United Kingdom and the European Union: What would a "Brexit" mean for the EU and other states around the world?*, Forschungsinstitut der Deutschen

Gesellschaft für Auswärtige Politik, Berlin, https://nbn-resolving.org/urn:nbn:de:0168-ssoar-55608-3 (accessed: 31.03.2022).

Nowak, B., Sus, M. (2019), *Brexit. Gdy wszyscy przegrywają*, Polska Fundacja im. Roberta Schumana, Warszawa.

Piatkowska, S.J., Stults, B.J. (2021), *Brexit, Terrorist Attacks, and Hate Crime: A Longitudinal Analysis*, "Social Problems", https://doi.org/10.1093/socpro/spab005

R&WS-Research (2021), *Joining/Staying Out of the EU Referendum Voting Intention (9 November 2021)*, https://redfieldandwiltonstrategies.com/joining-staying-out-of-the-eu-referendum-voting-intention-9-november-2021/ (accessed: 31.03.2022).

Rogaly, B. (2019), *Brexit writings and the war of position over migration, 'race' and class*, "Environment and Planning C: Politics and Space", 37 (1), pp. 28–40, https://doi.org/10.1177/0263774X18811923f

Sieroń, A. (2016), *Brexit – apokalipsa czy zbawienie?*, Instytut Edukacji Ekonomicznej im. Ludwiga von Misesa, Wrocław, https://mises.pl/wp-content/uploads/2016/05/Sieroń_Brexit-apokalipsa-czy-zbawienie.pdf (accessed: 31.03.2022).

Simionescu, M. (2021), *Italexit and the Impact of Immigrants from Italy on the Italian Labor Market*, "Journal of Risk and Financial Management", 14 (1), pp. 1–14, https://doi.org/10.3390/jrfm14010014

Sredanovic, D. (2020), *Brexit as a Trigger and an Obstacle to Onwards and Return Migration*, "International Migration", 59 (6), pp. 93–108, https://doi.org/10.1111/imig.12712

Stanojević, N., Vujić, N., Vujović, S. (2022), *The Causes of the Rise of Euroscepticism: a Survey of Serbian Citizens in 2020*, "Journal of Contemporary European Studies", pp. 1–17, https://doi.org/10.1080/14782804.2021.2024155

Taylor, L., Vautrin-Dumaine, E., Bull, A. (2019) *The European Perception on Brexit*, Paris–London, https://www.kantarpublic.com/download/documents/126/Kantar%2BEU%2BCitizens%2BPerceptions%2Bof%2BBrexit_Summary.pdf&cd=2&hl=pl&ct=clnk&gl=uk&client=safari (accessed: 31.03.2022).

Tropin, Z. (2021), *Lawfare as part of hybrid wars: The experience of Ukraine in conflict with Russian Federation*, "Security and Defence Quarterly", 33 (1), pp. 15–29, https://doi.org/10.35467/sdq/132025

Usewicz, T. (2017), *Brexit i jego konsekwencje dla wspólnej polityki bezpieczeństwa i obrony Unii Europejskiej*, "Roczniki Bezpieczeństwa Międzynarodowego", 1, pp. 119–128.

Van der Brug, W., Gattermann, K., De Vreese, C.H. (2022), *Electoral responses to the increased contestation over European integration. The European Elections of 2019 and beyond*, "European Union Politics", 23 (1), pp. 3–20, https://doi.org/10.1177/14651165211036263

White, A. (2016), *Polish Migration to the UK Compared with Migration Elsewhere in Europe: A Review of the Literature*, "Social Identities", 22 (1), pp. 10–25, https://doi.org/10.1080/13504630.2015.1110352

White, A. (2022), *Return migration experiences: the case of Central and Eastern Europe*, [in:] R. King, K. Kuschminder (eds.), *Handbook of Return Migration*, Edward Elgar Publishing, Cheltenham, https://doi.org/10.4337/9781839100055.00031

Wilson, P., Oliver, T. (2019), *The International Consequences of Brexit: an English School Analysis*, "Journal of European Integration", 41 (8), pp. 1009–1025, https://doi.org/10.1080/07036337.2019.1665656

Wodka, M., Fel, S., Zarzycka, B., Kozak, J. (2022), *How Does the Catholic Clergy Influence What Poles in the UK Know and Think about Brexit?*, "Religions", 13 (45), pp. 1–13, https://doi.org/10.3390/rel13010045

Zontini, E., Genova, E. (2022), *Studying the Emotional Costs of Integration at Times of Change: The Case of EU Migrants in Brexit Britain*, "Sociology", pp. 1–17, https://doi.org/10.1177/00380385211063355

Zuba, K. (2017), *Brexit: przyczyny oraz potencjalne konsekwencje wyjścia Wielkiej Brytanii z Unii Europejskiej*, "Studia Politologiczne", 45, pp. 287–313, http://www.studiapolitologiczne.pl/Brexit-przyczyny-noraz-potencjalne-konsekwencje-wyjscia-nWielkiej-Brytanii-z-Unii,115631,0,1.html (accessed: 31.03.2022).

## Korzyść czy strata? Konsekwencje brexitu w opinii polskich migrantów

Celem artykułu jest przedstawienie opinii polskich migrantów w Wielkiej Brytanii na temat korzyści lub strat, jakie brexit może przynieść dla Unii Europejskiej, Zjednoczonego Królestwa, Polski oraz samych respondentów i ich rodzin. Ustalono ją na podstawie analizy wyników sondażu przeprowadzonego wśród nich, a zaprezentowano na tle wyników badań opinii publicznej na temat członkostwa w Unii, które na Wyspach Brytyjskich prowadzone są regularnie od lat siedemdziesiątych ubiegłego wieku. W artykule analizowane są przekonania na ten temat migrantów zarobkowych, którzy w czasie dokonującego się brexitu stoją przed wyborem: pozostać na emigracji czy wracać do kraju pochodzenia. W odpowiedziach na pytania dotyczące ewentualnych korzyści bądź skutków negatywnych brexitu przeważały te drugie. W dyskusji poszukuje się odpowiedzi na pytanie, dlaczego migranci z Polski częściej obawiają się negatywnych konsekwencji brexitu dla Wielkiej Brytanii i Europy, a rzadziej dla Polski, dla nich samych i ich najbliższej rodziny.

Słowa kluczowe: Brexit, migranci, opinia publiczna, korzyści i straty brexitu

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# Ukrainian Agro-Food Sector in the Context of Global Patterns of Environmental Innovation Development

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## Abstract

The structure of the process of introducing innovative technologies in the agricultural sector, the competitive position of Ukraine in the world rankings of the development of agricultural science and training of personnel for the needs of the agro-industrial complex are considered and analyzed. Scientific and patent-investment activities of enterprises of the agro-industrial complex of Ukraine are studied. The methodology of bringing the mechanism of analytical and statistical observation of the state of innovative economic development in line with the standards of the Organization for Economic Cooperation and Development and the EU



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is analyzed. The main strengths and weaknesses of innovative activity of the agricultural sector of Ukraine are identified. As a result of the study, the authors propose adaptive changes in the process of implementing environmental innovations in the rational use of natural resources in the agricultural sector.

Keywords: agro-industrial complex, innovation, statistic, sustainable development, expenditure

JEL: O32, Q13, Q16, Q56

## Introduction

The agro-food sector of the Ukrainian economy is an export-oriented sphere, the stability of which is ensured by the activity of innovation processes.

"Strategy for the development of the sphere of innovation activity for the period up to 2030" (*Strategy of Development…* 2019) notes that it is the knowledge and results of scientific research that are the basis of the Ukrainian innovative competitiveness of the agricultural sector, and Ukraine has a number of competitive advantages, namely human capital, market capacity, the ability to innovate, the availability of educated personnel, scientific schools that provide the opportunity to obtain an innovative intellectual product. The above-mentioned strategy is complemented by "Strategy for the development of exports of agricultural products, food and processing industry of Ukraine for the period up to 2026", the implementation of which provides for stimulating the use of innovative approaches and technological solutions in the production of food and processing industry products. These national strategies have become a kind of response to the "Agenda for sustainable development until 2030" adopted by the UN General Assembly in 2015, "Goal 2. Eradicating hunger, ensuring food security and improving nutrition, promoting rational farming" and "Goal 9" (Fonseca, Domingues, and Dima 2020). Creating a sustainable infrastructure, promoting comprehensive and sustainable industrialization and innovation" that actualize the chosen research topic.

The purpose of the article is to determine the innovation profile of the agri-food sector of the national economy and the main components that form the determinants of the innovation process.

Methods of research. To achieve this goal, general and special research methods were used. In particular, empirical (comparison and measurement), complex (analysis and synthesis) and theoretical (reflection of reality in thinking) research methods were used. Economic and statistical methods (analysis of dynamics series, grouping, graphical methods) were also used.

## Literature review

Gradual innovation has always been at the heart of agriculture. From the beginning, farmers tried to improve the use of plants and animals for human consumption. Using trial and error breeding, they slowly domesticated different species of plants and animals. This process of millennial domestication has led to a huge expansion of cultivated fields, but only with a few species of homogeneous crops and the use of mainly five species of animals in animal husbandry. Along with gradual innovation, over the last few hundred years, agricultural research has led to many radical innovations in agriculture. These innovations, from mechanization to hybrid varieties, and from the Green Revolution to modern biotechnology, have shaped traditional agriculture worldwide. However, in recent years, especially these radical innovations have caused a lot of criticism from various types of NGOs and politicians. The main points of criticism of the modern agro-industrial complex relate to the use of pesticides and fertilizers, soil degradation and the use of genetically modified plants (Gremmen, Blok, and Bovenkerk 2019).

As a result, environmental innovations aimed at adapting all parts of the agro-industrial complex to modern environmental problems and increasing its competitiveness based on the paradigm of sustainable development have an increasingly important role in modern research.

Environmental innovations of the agricultural sector mean new or significantly improved low-waste technological processes and technologies, as well as resource-saving innovations, the implementation of which reduces the impact of the agro-industry on the natural environment. The innovativeness of countries and individual sectors of the economy is evaluated and compared using the EU Innovation Scoreboard.

According to a study by the Inter-American Institute for Cooperation on Agriculture (*Innovation in agriculture…* 2014), environmental innovations that provide environmental improvements are classified like ordinary ones using classification criteria that identify their species structure, typology, and implementer. In agriculture, innovations are mainly associated with new plant varieties, breeding new animal breeds, new equipment, new resource-saving technologies, the use of which changes the characteristic properties of agricultural products, but do not lead to the appearance of new types of products.

Ensuring innovative development includes two interrelated mechanisms: the mechanism for developing innovative projects, which is a source of supply in the innovation market, and the mechanism for implementing innovative developments, which creates a demand for innovation (Krysko 2009; Sevryukova and Sakun 2013) (Chart 1) and, to begin with, it should be noted that the agro-industrial complex consists not only of crop and livestock production, it represents a complex structure (Martusenko and Pohrishchuk 2015).

## Results

The process itself is implemented through various forms and methods of organization, training of scientific personnel, promotion of research and development work, development of entrepreneurial activity in the scientific and technical sphere and state support for the creation, distribution, implementation and development of agricultural innovations through their popularization and financial assistance.

It should be noted that not all agricultural innovations are of an environmental nature or reduce the impact on the environment, so in a comprehensive analysis of the links in the process of introducing innovative technologies in the agricultural sector, the eco-innovations should be highlighted.

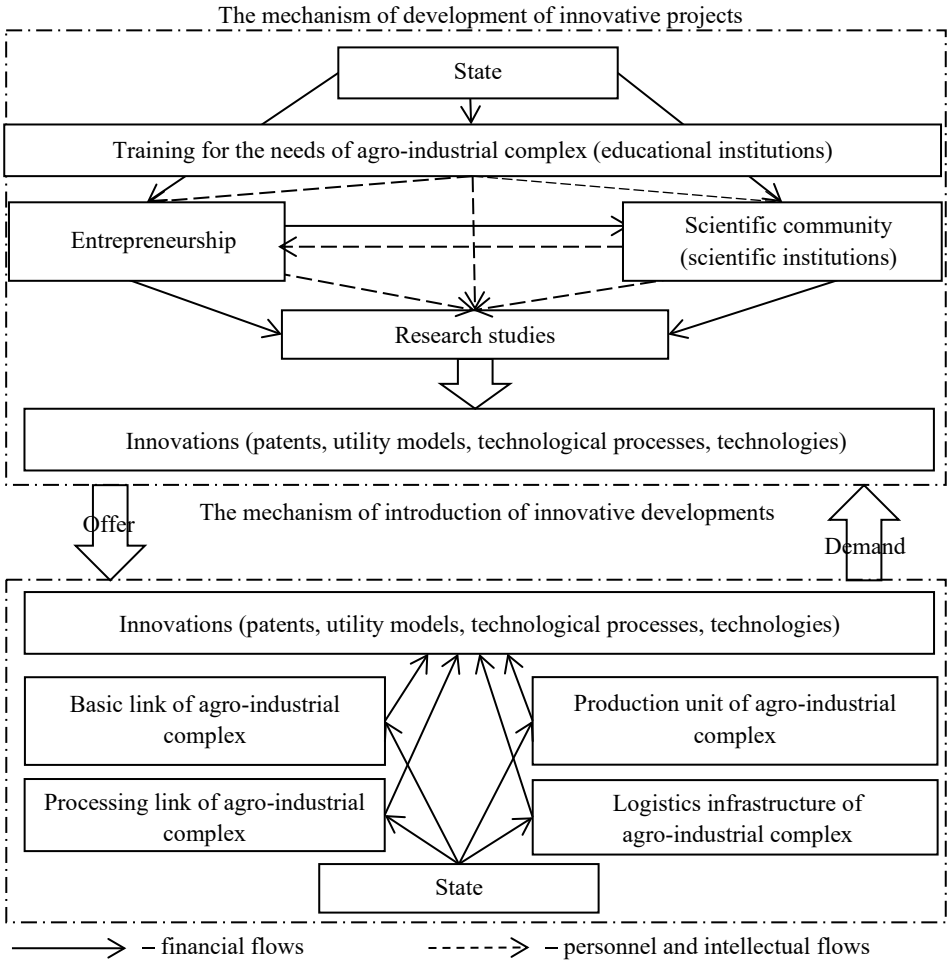


Chart 1. Structure of the process of introducing innovative technologies in agricultural sector

Source: created by the authors.

# Assessment of scientific activity of Ukraine in the field of agro-industrial complex

Human resources scientific and technical potential for innovation is the key to the success of the state in world markets (Samilyk 2013). The highest ratio of students of the higher educational institutions of agro-industrial complex to the total number of students falls on the fifth level of higher education (junior specialist) (Table 1).

Table 1. Summary information on the number of students of the higher educational institution of the agro-industrial complex and the total number of students in Ukraine in 2018 and 2019 (5–8th level of education)

| Tertiary education (levels 5–8) | 2018 | | | | 2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | A.S.* | Total | A.S. | Total | A.S. | Total | A.S. |
| 5 | 64,950 | 7,218 | 318,760 | 24,819 | 387 | 43 | 355,607 | 29,221 |
| 6 | 177,725 | 8,009 | 568,605 | 23,477 | 18,325 | 1,445 | 708,011 | 27,448 |
| 7 | 34,913 | 269 | 357,297 | 17,933 | 20,967 | 124 | 336,409 | 19,124 |
| 8 | 4,506 | 179 | 19,468 | 962 | 4,506 | 179 | 19,468 | 962 |
| Total | | | | | | | | |
| for all science | 1,264,130 | | | | 1,466,064 | | | |
| for agricultural sciences | 67,191 | | | | 78,638 | | | |

Notes: * A.S. is for agricultural sciences.
Source: European Commission database (n.d.); State Statistics Service of Ukraine (2019).

Analyzing the table we can conclude that in the country are stable training of personnel for the needs of the agro-industrial complex. A comparison of the activities of Ukraine and other countries of the world in the field of training personnel for the needs of the agro-industrial complex is presented in Table 2.

Table 2. Ratio of students of agro-industrial complex training programs of higher educational institutions to the total number of students by countries in 2018 and 2019 (5–8th level of education)

| Countries | levels 5–8 | | level 8 | |
|---|---|---|---|---|
| | 2018 | 2019 | 2018 | 2019 |
| Belgium | 2.1 | 2.1 | 3.2 | 3.2 |
| Bulgaria | 2.7 | 2.6 | 2.4 | 2.6 |
| Czechia | 3.6 | 3.6 | 3.5 | 3.7 |
| Denmark | 1.2 | 1.2 | 7.7 | 7.1 |

| Countries | levels 5–8 | | level 8 | |
|---|---|---|---|---|
| | 2018 | 2019 | 2018 | 2019 |
| Germany | 1.5 | 1.5 | 3.0 | 3.0 |
| Estonia | 2.1 | 2.1 | 5.0 | 5.3 |
| Ireland | 1.6 | 1.7 | 2.0 | 1.9 |
| Greece | 4.0 | 4.1 | 2.4 | 2.2 |
| Spain | 1.4 | 1.3 | 2.7 | 2.5 |
| France | 1.2 | 1.5 | 1.0 | 0.0 |
| Croatia | 4.0 | 3.4 | 3.7 | 3.6 |
| Italy | 2.7 | 2.6 | 4.5 | 4.6 |
| Cyprus | 0.6 | 0.5 | 1.7 | 1.7 |
| Latvia | 1.7 | 1.6 | 3.2 | 2.8 |
| Lithuania | 3.3 | 3.1 | 4.5 | 4.8 |
| Luxembourg | 1.8 | 2.7 | 0.0 | 0.0 |
| Hungary | 4.0 | 3.8 | 4.2 | 4.1 |
| Austria | 1.4 | 1.4 | 2.6 | 2.6 |
| Poland | 2.0 | 2.0 | 3.1 | 3.1 |
| Portugal | 2.2 | 2.2 | 1.7 | 1.7 |
| Romania | 4.7 | 4.5 | 5.1 | 4.2 |
| Slovenia | 3.2 | 3.1 | 0.5 | 0.6 |
| Slovakia | 2.6 | 2.6 | 3.1 | 3.3 |
| Finland | 2.3 | 2.3 | 2.4 | 2.5 |
| Sweden | 1.0 | 0.9 | 1.5 | 1.5 |
| Iceland | 1.2 | 1.2 | 0.0 | 0.0 |
| Norway | 0.8 | 0.8 | 1.4 | 1.5 |
| Switzerland | 1.2 | 1.2 | 1.8 | 1.9 |
| United Kingdom | 1.1 | 1.1 | 1.1 | 1.1 |
| Serbia | 3.4 | 3.3 | 5.0 | 4.8 |
| Turkey | 2.1 | 2.2 | 3.9 | 2.9 |
| Bosnia and Herzegovina | 4.3 | 4.0 | 1.6 | 2.0 |
| Ukraine | 5.3 | 5.3 | 4.8 | 4.7 |

Source: European Commission database (n.d.); State Statistics Service of Ukraine (2019).

The visual representation of the material shows that in terms of 5–8$^{th}$ educational levels, Ukraine ranks first, and in terms of the indicator that was calculated only for 8$^{th}$ level of education (postgraduate and doctoral studies), Ukraine is the fifth, only after Den-

mark, Estonia, Lithuania and Serbia. That is, the level of providing the Ukrainian education system with personnel for the needs of the agro-industrial complex, both specialists and scientists, is quite high.

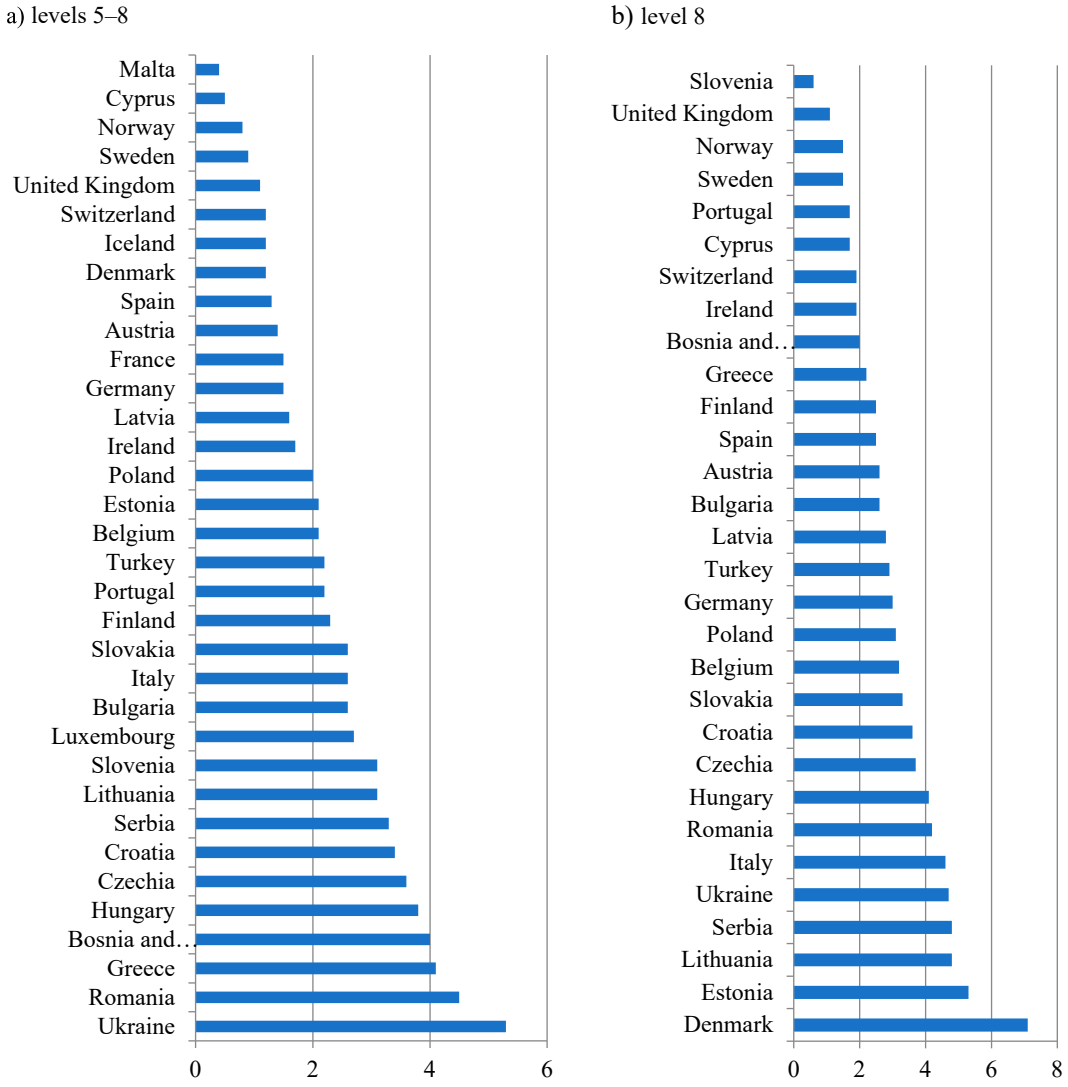


Chart 2. Ratio of students of agro-industrial complex training programs of higher educational institutions to the total number of students in the world in 2019

Source: European Commission Database (n.d.).

According to this indicator of financial support for the performance of research works (hereinafter referred to as – the Research), Ukraine ranked the tenth in 2018, after the Czech Republic, Croatia, Hungary, Poland, Portugal, Romania, Slovakia, Serbia, Turkey. In terms of agricultural research costs in terms of total research costs by countries, Ukraine ranked third after Serbia, Latvia and North Macedonia (Charts 3 and 4).

Thus, agricultural sciences make a significant contribution to the scientific activities of Ukraine, but in general, the level of research costs in the country is low.

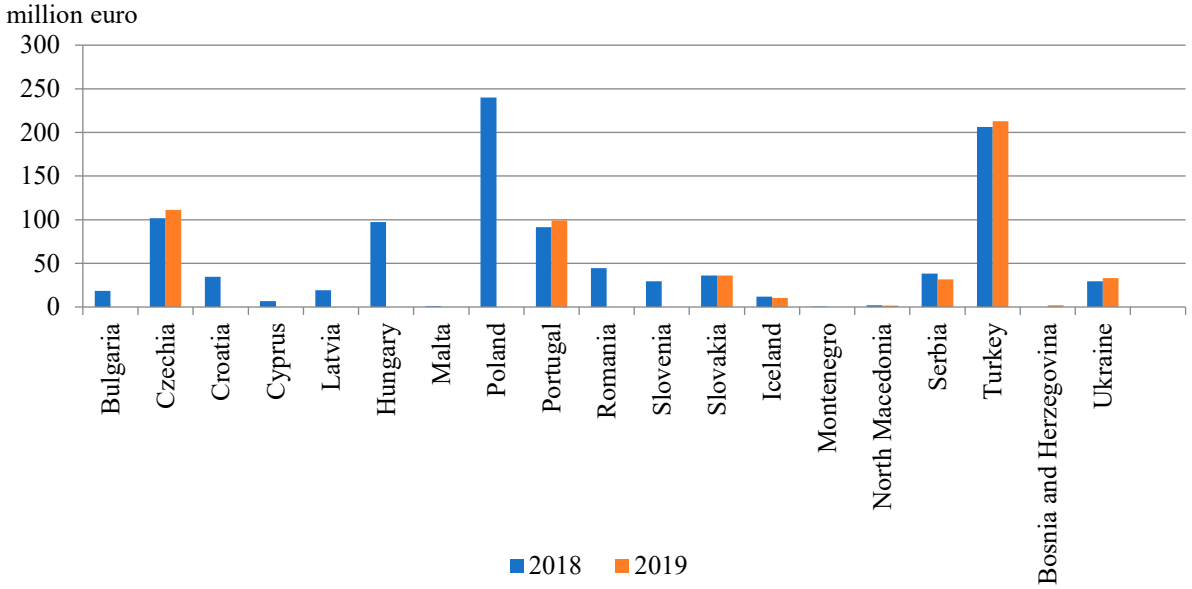


Chart 3. Expenditures on agricultural research by countries in 2018 and 2019

Source: European Commission database (n.d.); State Statistics Service of Ukraine (2019).

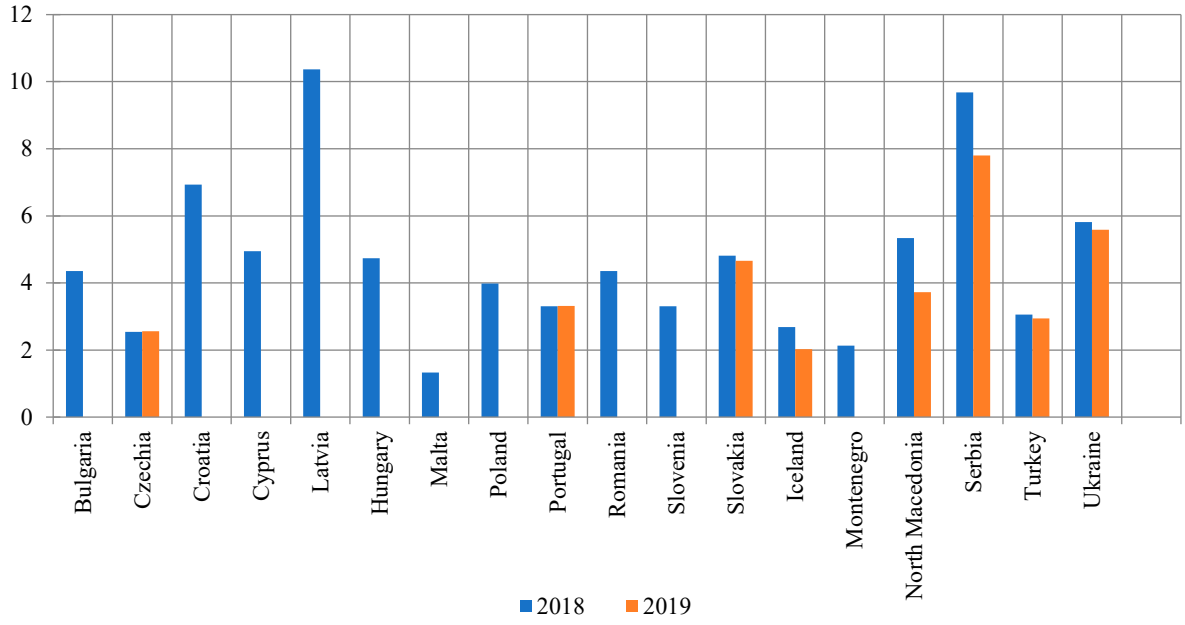


Chart 4. Percentage of agricultural research costs to total research costs by countries in 2018 and 2019

Source: calculated by the authors according to the European Commission database (n.d.); State Statistics Service of Ukraine (2019).

Statistical information provided by the State Institution "Ukrainian Institute of Intellectual Property" allows us to analyze the development of inventive activities. Due to the specifics of maintaining statistics on patent and inventive activities, technical areas that indirectly relate to environmental innovations in the agricultural sector, namely "Food chemistry" and "Ecotechnologies", were chosen for analysis. Patent activity

in technical areas indirectly related to the agricultural sector is characterized by instability. The reduction is particularly noticeable for the indicator of registration of utility models in the technical direction "Food Chemistry" (Table 3, Chart 5).

In 2020, Ukrpatent, with the support of the Ministry of Economy, held the "Invention of the Year" Contest in 12 industry categories that correspond to the most relevant areas of innovation activity. The event has identified the most promising inventions of recent years and built an effective system of links between international and national investors, industry and business.

Table 3. Dynamics of inventive activity indicators in Ukraine in technical areas that indirectly relate to the agricultural sector

| Scientific direction | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| **Applications for inventions** | | | | | |
| Food chemistry | 109 | 110 | 125 | 100 | 48 |
| Ecotechnologies | 53 | 60 | 41 | 41 | 30 |
| **Patents for inventions** | | | | | |
| Food chemistry | 91 | 95 | 92 | 90 | 58 |
| Ecotechnologies | 38 | 30 | 28 | 32 | 16 |
| **Utility model registrations** | | | | | |
| Food chemistry | 535 | 573 | 549 | 573 | 387 |
| Ecotechnologies | 152 | 190 | 153 | 186 | 143 |

Source: State Enterprise Ukrainian Institute of Intellectual Property (2021).

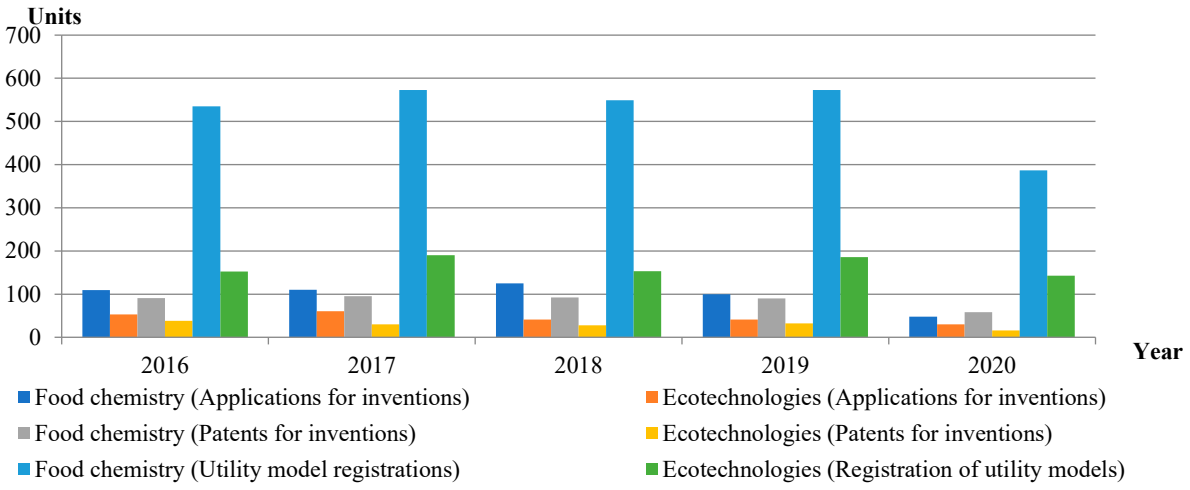


Chart 5. Indicators of inventive activity in Ukraine in technical areas that indirectly relate to the agricultural sector

Source: State Enterprise Ukrainian Institute of Intellectual Property (2021).

## Characteristics of scientific activity of enterprises of agro-industrial complex of Ukraine

According to the statistical collection "Scientific and Innovative Activities of Ukraine" in 2019, the number of organizations in the agricultural sector that carried out the research decreased significantly (7 against 15 units in 2018) and the number of employees involved in the research implementation decreased (106 against 332 people for the same period).

According to the State Register of Innovative Projects (The Ministry of Education and Science of Ukraine n.d.), which is formed on the basis of the Ministry of Education and Science of Ukraine, in 2013 only 6 agricultural projects out of 18 innovative projects were registered. Project executors are private enterprises, and the vast majority are limited liability companies (hereinafter referred to as – the LLC).

All 6 projects related to technological innovation in the categories of the Organization for Economic Cooperation and Development are innovation processes and product innovation.

It should be noted that only one of the above-mentioned projects can be attributed to innovations that are clearly ecological in nature. In the future, it is logical to consider the system of state financial assistance to enterprises that are performers of innovative projects.

According to the Order of the Ministry of Economic Development and Trade of Ukraine "Some issues of organization of activities in the field of intellectual property" No. 387 dated 22 March 2018, the institutions included in the state system of legal protection of intellectual property are the following: State Enterprise "Ukrainian Institute of Intellectual Property"; State Organization "Ukrainian Agency for Copyright and Related Rights"; State Innovative Financial and Credit Institution (hereinafter referred to as – the SIFCI); State Organization "National Office of Intellectual Property".

The SIFCI was created to provide financial support for the innovative activities of business entities of various forms of ownership, as well as attract domestic and foreign investment for the development of the real sector of the economy.

The SIFCI holds competitions for innovative projects on an ongoing basis. The form of project financing is an interest-free loan on a repayable basis for up to 36 months, and the amount of financing under one project is up to 25.0 million UAH.

According to the minutes of meetings of the Competition Committee for the selection of projects for their financing at the expense of the SIFCI funds, three of the four projects presented in Chart 4 received financial and credit assistance. However, scientif-

ic and technical expertise does not cover the ecological significance of the evaluated projects.

A good example is the Environmental and Social Policy of the European Bank for Reconstruction and Development (hereinafter referred to as – the EBRD) with the strategic goal to support projects that bring significant environmental and social benefits.

Quantitative assessment of scientific activity of Ukrainian enterprises is carried out by the ratio of total R & D costs in high-tech and medium-high-tech industrial sectors to total R & D costs in industry.

$$S_{h.t.} = \frac{\sum_{i=1}^{n} S_{h.t.i}}{S_{ind.}} \times 100 \quad (1)$$

where:

$S_{h.t.}$ – unit costs for R & D in the high-tech and medium-high-tech industrial sectors, in %;

$S_{h.t.i}$ – expenses of the "i" sector, which is classified as high-tech or medium-high-tech sectors;

$S_{ind.}$ – total R & D costs in industry.

According to the scientific and analytical report "Innovation activity in Ukraine in 2019" of the Ukrainian Institute of Scientific and Technical Expertise and Information, agriculture, hunting and provision of related services, forestry, logging and fisheries belong to the low-tech sector. But the Methodology of bringing the mechanism of analytical and statistical observation of the state of innovative development of the economy in line with the standards of the Organization for Economic Cooperation and Development and the EU has lost its relevance since certain statistical observations are either not carried out or are confidential.

An equally important issue is the activation of the innovation process. The motivational mechanism of innovation implementation is aimed at stimulating demand in the primary innovation market, that is, demand for novelty carriers (information, patents, licenses, know-how, etc.) from the production sector (Table 4, Chart 6).

The peak of investment occurs in 2010 and 2019, while in other years there is a gradual decrease in investment. This means that investment and patent activity is unstable, and there is no trend towards sustainable growth.

It should be noted that the volume of capital investment in the primary innovation market does not depend on the size of enterprises.

Table 4. Capital investments of enterprises in concessions, patents, licenses, trademarks and similar rights in the agricultural, forestry and fisheries sector divided into large, medium, small and microenterprises in 2010–2019 (thousand UAH)

| Year | Large enterprises | Medium enterprises | Small enterprises | Microenterprises |
|---|---|---|---|---|
| 2010 | – | 1,718 | 20,430 | 6 |
| 2011 | – | 6,350 | 162 | 146 |
| 2012 | – | 13,640 | 1,083 | 29 |
| 2013 | 145 | 7,770 | 2,778 | 143 |
| 2014 | 1116 | 8,087 | 194 | 18 |
| 2015 | 1562 | 2,278 | 165 | 15 |
| 2016 | 2 | 2,115 | 350 | 88 |
| 2017 | 110 | 1,528 | 1,836 | 7549 |
| 2018 | 331 | 3,650 | 791 | 626 |
| 2019 | 436 | 39,976 | 844 | 80 |

Source: State Statistics Service of Ukraine (n.d.), *Capital investment by type of economic activity*.

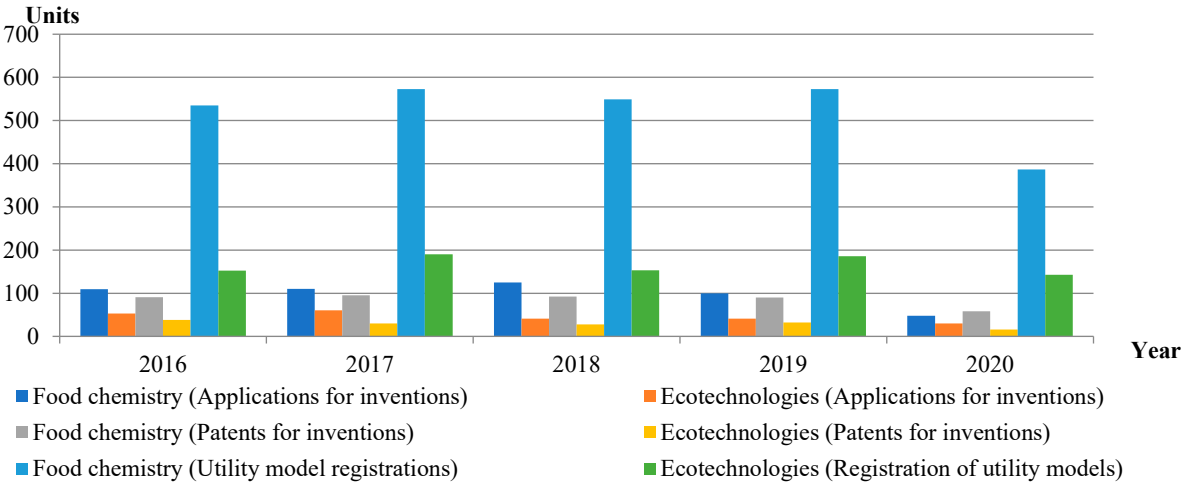


Chart 6. Investments of enterprises in concessions, patents, licenses, trademarks and similar rights in the agricultural, forestry and fisheries sector in 2010–2019

Source: State Statistics Service of Ukraine (n.d.), *Capital investment by type of economic activity*.

The overall indicator for all enterprises in the agriculture, forestry and fisheries sector is consistently low and does not exceed 0.07 %, while the percentage of enterprises' investment in concessions, patents, licenses, trademarks and similar rights to capital investments for all types of economic activity, in this period, ranged from 8% to 17% (Chart 7).

In the period from 2013 to 2019, the most patent-active enterprises are medium-sized enterprises. In 2017, microenterprises contributed almost 70% of the total investment in concessions, patents, licenses, trademarks and similar rights in the agricultural, forestry and fisheries sectors. Large enterprises are characterized mainly by a low contribution to patent investments, with the exception of 2015, when this Chart was almost 39 % (Chart 8).

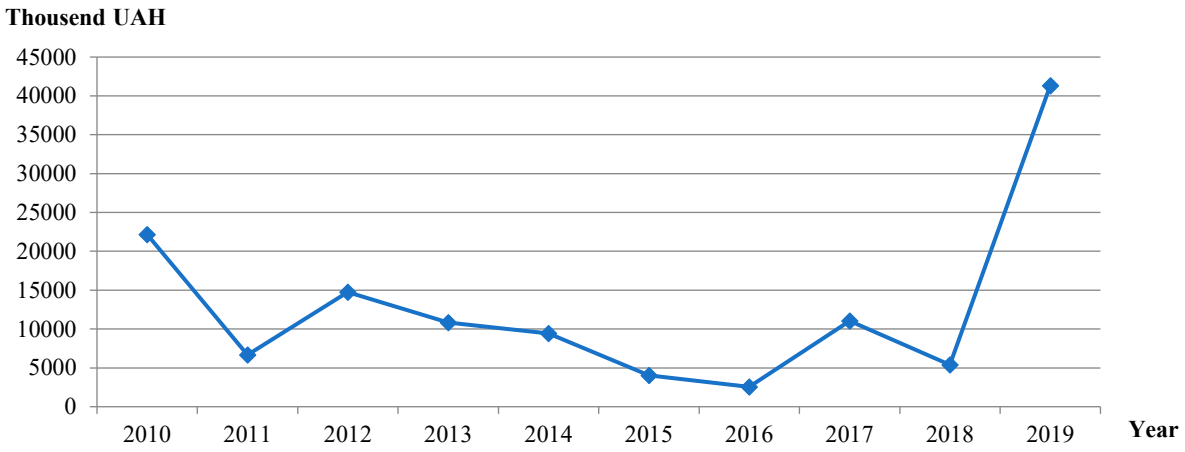


Chart 7. Percentage of enterprises' investments in concessions, patents, licenses, trademarks and similar rights to capital investments in the agricultural, forestry and fisheries sectors

Source: calculated by the authors for: State Statistics Service of Ukraine (n.d.), *Capital investments of enterprises...*

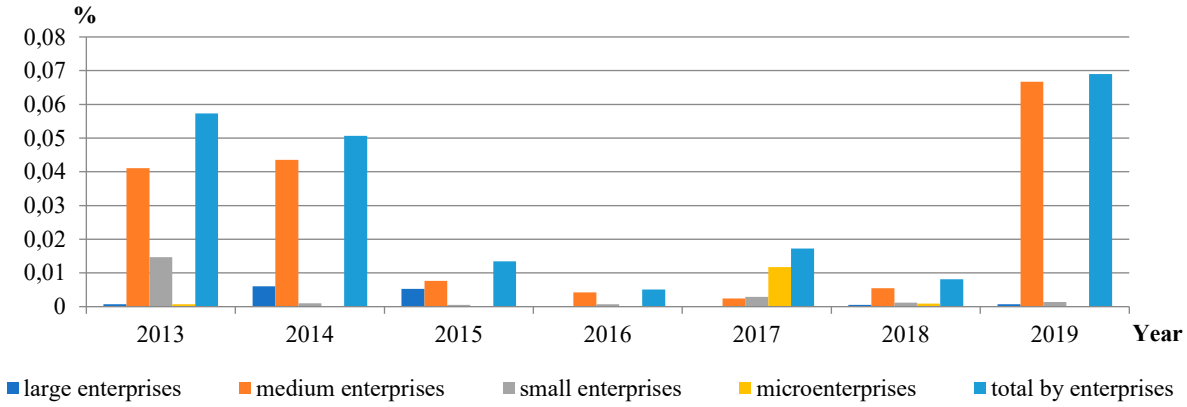


Chart 8. Contribution of enterprises of various sizes to investments in concessions, patents, licenses, trademarks and similar rights in the agricultural, forestry and fisheries sectors

Source: calculated by the authors for: State Statistics Service of Ukraine (n.d.), *Capital investments of enterprises...*

It is most appropriate to determine the coefficient of knowledge intensity of production, which can be defined as the ratio of the cost of science (innovation) to the total amount of production costs (Hariv 2003).

This ratio can be adapted to determine the scientific capacity of the production sector that is by the formula:

$$S = E_I/E_C, \quad (2)$$

where:
S – the sector's knowledge intensity coefficient;
$E_I$ – innovation expenditure;
$E_C$ – capital investment.

Since the state statistical observation "Innovative activity of enterprises" considers only data on enterprises with an average number of employees of 10 people or more, the subsequent calculation uses capital investments of large, medium and small enterprises, not considering microenterprises which include organizations with an average number of employees that is up to 10 people (*Defining the category of enterprises…* n.d.). The source of information was the state statistical observation "Innovative activity of enterprises".

The calculation used data for the following industrial sectors: food production, textile production, leather and related products production. Based on the calculation results, it can be concluded that the "Food production" sector is characterized by the highest knowledge intensity with an indicator of 11.28 % (Table 5).

Table 5. The level of knowledge intensity of industrial sectors related to the processing link of the agro-industrial complex of Ukraine

| | Code of NACE, Rev.2 | $E_I$ | $E_C$ | S |
|---|---|---|---|---|
| Manufacturing | C | 11,002,539.6 | 105,091,812.0 | 10.47 |
| Manufacture of food products | 10 | 2,869,776.0 | 25,452,029 | 11.28 |
| Textile industry | 13 | 47,285.9 | 827,895 | 5.71 |
| Manufacture of leather and related products | 15 | 3,613.5 | 274,264 | 1.30 |

Sources: State Statistics Service of Ukraine (n.d.), *Capital investment by type of economic activity*; State Statistics Service of Ukraine (2019).

When assessing the level of innovation activity of an enterprise, it is important to analyze the provision of a rational ratio between own and acquired developments (Hariv 2003). The ratio coefficient is calculated as the ratio of the total number of own developments to the number of purchased ones. It can be adapted to determine the level of innovative independence of the sector:

$$R = A/T, \quad (3)$$

where:
R – the coefficient of innovation independence of the sector;
A – acquisition of new technologies;
T – transfer of new technologies.

The assessment of the level of independence is supposed to be carried out on a scale that reflects three levels of activity: low (< 1), medium (close to 1) and high (> 1), which indicates a low, balanced and high level of innovative independence, respectively.

More than a third of the number of implementations of new advanced technological processes is accounted for by new or significantly improved low-waste and resource-saving technologies, that is, environmentally significant ones. In 2018, this indicator for the production of food, beverages and tobacco products was more than 43%.

The State Statistics Service calculates and distributes statistical data on the innovation activity of enterprises on the basis of the state statistical observation "Innovation Activity of Enterprises", the methodology of which considers the provisions of the Regulation of the EU Commission No. 995/2012 dated 26 October 2012 on the production and development of statistics on science and technology. Currently, the Regulation of the EU Commission No. 995/2012 is not valid, it is canceled by the Regulation (EU) No. 2020/1197 dated 30 July 2020. No new provisions on innovation statistics have been developed, and in accordance with current planning, a proposal for an implementation act on innovation statistics should have been developed by November 2021 (Herzog 2020). Discussion and adoption of the act should be expected in May–July 2022.

The result of the study is the identification of the main strengths and weaknesses of innovation activity in the agricultural sector of Ukraine, which are presented in Table 6. As can be seen from the Chart, the mechanism for developing innovative projects in Ukraine is quite stable, while the mechanism for implementing innovative developments has more weaknesses than strengths.

Table 6. Strengths and weaknesses of innovation activity in the agricultural sector of Ukraine

| Strengths | Weaknesses |
|---|---|
| MECHANISM FOR DEVELOPING INNOVATIVE PROJECTS | |
| High level of provision of the Ukrainian education system training of personnel for the needs of the agro-industrial complex | Unstable patent activity in technical areas indirectly related to the agricultural sector |

| Strengths | Weaknesses |
|---|---|
| The ratio of agricultural research costs to total research costs in comparison with other countries of the world is quite high | Visually low activity of enterprises in innovation activities due to the low level of registration of innovative projects in the State Register |
| There is a system of relations between inventors and international and national investors, industry, and business | The environmental aspects of innovative projects are not sufficiently considered when evaluating them State innovative financial and credit institution |
| There is a system of state financial assistance to performers of innovative projects registered in the State Register | A fairly low level of research and development costs |
| MECHANISM FOR IMPLEMENTING INNOVATIVE DEVELOPMENTS | |
| More than a third of the new technological processes introduced into food production are classified as new or significantly improved, low-waste, resource-saving, i.e. environmentally significant | Outdated methodology of analytical and statistical observation of the state of innovative development of the economy |
| A fairly high level of knowledge intensity of the food production sector | Lack of statistical data on innovative activities of enterprises in the agricultural, forestry and fisheries sectors |
| | Unstable level of investment by enterprises in concessions, patents, licenses, trademarks and similar rights in the agricultural, forestry and fisheries sectors |
| | Lack of a system of state financial assistance to innovatively active enterprises that introduce innovations in the agricultural sector |
| | Lack of innovative independence of the food production sector |

Source: created by the authors.

## Conclusions

1. Ukraine is an agrarian state, a high share of exports of which is accounted for by the products of the agro-industrial complex, so for further stable development of the country, high scientific and innovative activity of this sector of the economy is necessary, and as a result: ensuring sustainable innovation activity is one of the priorities of the state policy of Ukraine.
2. Ukraine has a high human and scientific potential to meet the needs of the agro-industrial complex. It also occupies high positions in the world ranking in comparison with other countries of the world (according to European statistics) in terms of higher education applicants who study in higher educational institutions at agro-industrial complex training programms.

3. Ukraine is characterized by a significant contribution of agricultural science to the results of the country's scientific activities, but at the same time the level of costs for performing research works is quite low.

4. Both inventive activities in technical areas indirectly related to the agricultural sector and patent and investment activities in the agricultural, forestry and fisheries sectors are characterized by instability and the growth trend in recent years can not be traced. The solution may be to strengthen the relationship between the State Enterprise "Ukrainian Institute of Intellectual Property" and the State Innovative Financial and Credit Institution.

5. Some of the weaknesses of the mechanism for implementing innovative developments are related to statistical and methodological support. Since neither EU statistics nor state Ukrainian statistics include the agriculture section in their own statistical research methods. At the moment, it is possible to analyze the mechanism of implementation of innovative developments of only one link of the agro-industrial complex, namely processing. Therefore, it is necessary to include the section A (agriculture, forestry and fisheries) in the state statistical observation of innovative activities of enterprises. It should be noted that the largest share of enterprises in the agricultural, forestry and fisheries sector falls on microenterprises, which also do not appear in the statistical observation, which in any case will distort the analysis of innovative activities of enterprises when using statistics, so it is necessary to expand the statistical observation to microenterprises.

6. In Ukraine, there is no close cooperation between institutions that are part of the state system of legal protection of intellectual property, which would contribute to increasing the level of innovation activity of both enterprises and the country as a whole.

7. The analysis of the strengths and weaknesses of the innovative activity of the agricultural sector of Ukraine shows that both the mechanism for developing innovative projects and the mechanism for implementing innovative developments require structural changes to adapt this process and achieve strategic sustainability in the context of the sustainable development paradigm. The disadvantage of the mechanism for developing innovative projects is insufficient consideration of environmental aspects during their assessment of the SIFCI. Therefore, it is advisable to expand the methodology of scientific and technical expertise with a criterion that will be responsible for quantifying environmental and social benefits at all stages of the project life cycle, based on the environmental and social policy of the European Bank for Reconstruction and Development.

8. Since Ukraine is both a developer of innovations and a user of innovations, state financial assistance should extend in both directions. First of all, assistance should be provided to enterprises that introduce low-waste and resource-saving innovations.

The main criterion, in this case, should be a quantitative assessment of the environmental and social benefits of implemented innovations. Such a system of state assistance will increase the interest of enterprises in introducing innovations, especially of an environmental nature.

9. The above-mentioned adaptation processes will not only allow us to assess the state of the existing mechanism for implementing innovative developments, but also make it possible to develop a sound strategy for innovative development of the sector.

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## References

Commission Implementing Regulation (EU) No. 995/2012 of 26 October 2012 laying down detailed rules for the implementation of Decision No. 1608/2003/EC of the European Parliament and of the Council concerning the production and development of Community statistics on science and technology (2012), "Official Journal of the European Union", OJ L 299.

Commission Implementing Regulation (EU) No. 2020/1197 of 30 July 2020 laying down technical specifications and arrangements pursuant to Regulation (EU) No. 2019/2152 of the European Parliament and of the Council on European business statistics repealing 10 legal acts in the field of business statistics (2020), "Official Journal of the European Union", OJ L 271.

*Defining the category of enterprises (micro, small, medium and large)* (n.d.), https://zakon.help/article/viznachennya-kategorii-pidpriemstv-mikro--mali (accessed: 3.07.2021) [in Ukrainian].

European Commission Database (n.d.), https://ec.europa.eu/eurostat/en/web/main/data/database (accessed: 3.07.2021).

Fonseca, L.M., Domingues, J.P., Dima, A.M. (2020), *Mapping the Sustainable Development Goals Relationships*, "Sustainability", 12, 3359, https://doi.org/10.3390/su12083359

Gremmen, B., Blok, V., Bovenkerk, B. (2019), *Responsible Innovation for Life: Five Challenges Agriculture Offers for Responsible Innovation in Agriculture and Food, and the Necessity of an Ethics of Innovation*, "Journal of Agricultural and Environmental Ethics", 32, pp. 673–679, https://doi.org/10.1007/s10806-019-09808-w

Hariv, P. (2003), *Innovative activity of the enterprise and economic estimation of innovative processes*, Ekonomichna dumka, Ternopil.

Herzog, N. (2020), *Impact of the new European business statistics regulation on the national statistical system*, "Wirtschaft und Statistik. WISTA", 5, pp. 47–58.

*Innovation in agriculture: a key process for sustainable development* (2014), Institutional position paper, Inter-American Institute for Cooperation on Agriculture, San Jose.

Krysko, J. (2009), *Adaptation of the enterprise to the external environment through the mechanism of restructuring*, "Galician Economic Bulletin", 2, pp. 38–42.

Martusenko, I., Pohrishchuk, B. (2015), *Regional Economy*, Krok, Ternopil.

Samilyk, T. (2013), *Staffing of innovative development: status and priorities*, "Investments: Practice and Experience", 11, pp. 11–14.

Sevryukova, S., Sakun, K. (2013), *Formation of an adaptive mechanism for managing agricultural enterprises*, "Scientific works of Poltava State Agrarian Academy. Series: Economic Sciences", 7 (2), pp. 276–283.

State Enterprise Ukrainian Institute of Intellectual Property (2021), *Annual Report 2020*, https://ukrpatent.org/atachs/zvit-ukr-2020-1.pdf (accessed: 3.07.2021).

State Statistics Service of Ukraine (n.d.), *Capital investment by type of economic activity*, https://ukrstat.gov.ua/operativ/menu/menu_u/sze_20.htm (accessed: 3.07.2021) [in Ukrainian].

State Statistics Service of Ukraine (n.d.), *Capital investments of enterprises by type of economic activity divided into large, medium, small and microenterprises in 2010–2019*, https://ukrstat.gov.ua/operativ/menu/menu_u/sze_20.htm (accessed: 4.07.2021) [in Ukrainian].

State Statistics Service of Ukraine (2019), *Scientific and Innovative Activities*, Kiev.

*Strategy of Development of the Sphere of Innovative Activity for the Period Till 2030* (2019), No. 526-p, https://zakon.rada.gov.ua/laws/show/526-2019-%D1%80 (accessed: 3.07.2021) [in Ukrainian].

The Ministry of Education and Science of Ukraine (n.d.), *State Register of Innovative Projects*, https://mon.gov.ua/ua/nauka/innovacijna-diyalnist-ta-transfer-tehnologij/innovacijni-proekti/derzhavnij-reyestr-innovacijnih-proektiv (accessed: 3.07.2021) [in Ukrainian].

## Ukraiński sektor rolno-spożywczy w kontekście globalnych wzorców rozwoju innowacji środowiskowych

W artykule rozważono i przeanalizowano strukturę procesu wprowadzania innowacyjnych technologii w sektorze rolniczym, pozycję konkurencyjną Ukrainy w światowych rankingach rozwoju nauk rolniczych oraz szkolenia kadr na potrzeby kompleksu rolno-przemysłowego. Zbadano naukową i patentowo-inwestycyjną działalność przedsiębiorstw kompleksu rolno-przemysłowego Ukrainy. Przeanalizowano metodologię dostosowania mechanizmu analitycznej i statystycznej obserwacji stanu innowacyjnego rozwoju gospodarczego do standardów Organizacji Współpracy Gospodarczej i Rozwoju oraz UE. Zidentyfikowano główne mocne i słabe strony działalności innowacyjnej sektora rolnego Ukrainy. W wyniku przeprowadzonych badań autorzy proponują zmiany adaptacyjne w procesie wdrażania innowacji środowiskowych w racjonalnym wykorzystaniu zasobów naturalnych w sektorze rolnym.

Słowa kluczowe: kompleks rolno-przemysłowy, innowacyjność, statystyka, zrównoważony rozwój, wydatki

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# Public Debt Management Experience: The Case of EECCA Countries

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## Abstract

The aim of this study is to cluster the most widely used public debt management tools peculiar to the EECCA (Eastern Europe, Caucasus, and Central Asia) markets. Overall, the results show that the volume of EECCA countries' public debt relative to GDP declined from 2000 to 2015. However, as their public debt enhanced after 2016 and until 2020, inclusive, the need to choose proper tools for its management intensified. The main cause of public debt in most EECCA countries is the state budget deficit (Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Uzbekistan).



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The second place was taken by the balance of payments deficit (Armenia, Belarus). The only unique country was Azerbaijan, since it is likely to use public debt to finance economic and infrastructure development projects. No less interesting is that not all EECCA member states generate internal public debt. Kyrgyzstan, Moldova, and Uzbekistan have external public debt exclusively due to the lack of free resources that can be attracted from within the economy. In general, the investigation revealed that the main tool for managing internal public debt in EECCA countries is public bonds issued in national and foreign currencies. As for external public debt management, the top position is taken by external public bonds and international loans. The study has only two limitations: methodological and implementation. Other macroeconomic indicators of economic development were not considered, even though they may change the assessment of the effectiveness of the selected tools of public debt management. Meanwhile, the results can only be applied to those countries whose financial market is already formed and who have access to international financial markets. Otherwise, the tools of public debt management are limited.

Keywords: internal debt, external debt, debt management, public debt management tools, developing economies

JEL: H63, O11

## Introduction

In this day and age, public debt has become a common phenomenon in the world economy. Since the financial crisis of 2008–2009, many countries have experienced a notable public debt increase. This issue is especially acute for EECCA (Eastern Europe, Caucasus, and Central Asia) member states represented by emerging economies. As the EECCA countries do not have excessive funds in state budgets, they have to search for financial resources outside the national economy. The main reasons for the state budget deficit and public debt formation are the lack of financial resources due to the balance of payments deficit, a significant share of the shadow economy, and specialization in the production and export of products with low added value. The problem of compensating for the decline in budget revenues became particularly urgent in 2020–2021 after the fall in world oil prices. And often, such compensation is accompanied by an increase in public debt.

It is undisputed that public debt management is paramount for national economic security. Public debt must be repaid, and the terms and value of the debt largely depend on the tools chosen to manage it. The central goals of public debt management are debt repayment (which can be conducted in many ways, from debt restructuring and re-crediting to the sale of government property), minimization of the cost of borrowing in the medium or long term, and complete renunciation of new borrowings to cover the state budget deficit or to finance socio-economic programs.

Choosing the tools of public debt management is quite complicated as it is possible to identify several methods and processes that can be applied in parallel, depending

on the amount and structure of the debt and the government's decision. Different instruments make it possible to achieve different public debt management effects. For example, loans from the International Monetary Fund (IMF) or other international organizations make it possible to form a certain level of confidence in the state as a borrower, which may reduce the cost of lending by private creditors. But negotiating the loan terms can take a long time, and the loan itself has an intended purpose, limiting the possibilities for its usage.

Turning to external public bonds makes it possible to raise the necessary funds in a relatively short period, but the cost of such debt will be determined by the market and can be quite high. In light of this, it is not infrequent when the government resorts to restructuring existing debts or, in fact, re-crediting.

The financial markets of EECCA economies (if they exist) do not always allow for the efficient borrowing of funds for the state budget. The rationale for this is simple: in addition to an institutionally formed financial market in the country's economy, there should also be savings that can be transformed into investments. The population and businesses must have free money, which can be used to purchase public bonds. Nevertheless, the practice shows that in emerging states, particularly EECCA countries, people often do not have significant amounts of savings, which leads to a lack of domestic investment. In view of the above, it seems reasonable to study which public debt management tools are used in EECCA countries and cluster them to provide comprehensive data that can be beneficial when improving the process and outcomes of public debt management.

The relevance of clustering external debt management tools is emphasized by the Global Sovereign Debt Monitor (Misereor 2020) and the report published by the United Nations (UN) (United Nations 2021). They argue that during the COVID–19 pandemic, the state budget deficit, as well as the public debt in EECCA countries, increased drastically. According to the UN report, Russia's government has focused on borrowing in domestic financial markets and issuing local-currency debt securities. It also noted that the stimulus packages enacted by Russia for 2020 and 2021 are cumulatively equivalent to about 7% of GDP, which is a high level of indebtedness. In order to balance fiscal spending in 2020–2021 in the face of low oil prices, some components of the fiscal rule were temporarily relaxed, and the application of certain articles of the Budget Code of the Russian Federation was extended to 2021, thereby allowing the government to allocate funds to finance anti-crisis measures without making changes to the budget.

Most papers on the matter do not address the clustering of public debt management tools. Most of them cover public debt dynamics, its structure, and implications for macroeconomic and fiscal policy. The theoretical gap of all the analyzed studies is that the attention paid to public debt management tools is insufficient, and no attempts have been made to gather such instruments for EECCA countries, for which this problem is highly relevant.

Thus, the purpose of the current work is to cluster public debt management tools peculiar to the EECCA markets. The choice of EECCA members as the research object is explained by the fact that all of them are emerging economies whose public debt tended to grow after 2016. In addition, EECCA countries are successor states of the former Soviet Union. Correspondingly, they have similar development environments and problems in national economies, which conditioned the emergence of public debt.

## Materials and methods

In order to cluster the tools of public debt management inherent in the EECCA markets, this study was conducted in several stages. The first stage analyzed the dynamics of public debt for all EECCA states. This allowed us to identify general trends in the volume of public debt and select countries for a more in-depth examination.

The second stage thoroughly analyzed public debt dynamics in EECCA countries in terms of internal and external public debt. The most recent information available on the websites of the Ministries of Finance of the following EECCA countries was used: Armenia (2012–2020), Azerbaijan (2011–2020), Belarus (2013–2020), Kazakhstan (2015–2019), Kyrgyzstan (2016–2020), Moldova (2013–2020), Russia (2013–2019), Tajikistan (2014–2018), and Uzbekistan (2016–2020). The public debt management tools were analyzed in the context of internal and external public debt since their formation conditions and management tools differ. After all the necessary data were collected, the internal and external public debt management tools were clustered.

All information necessary for the investigation was taken from official statistical data sources. Data on the dynamics of public debt as a percentage of GDP for all EECCA countries analyzed for the period 1992–2016 were retrieved from the official website of the World Bank (2021). Data on the dynamics of internal public debt and external public debt, as well as on the instruments of public debt formation and management, were extracted from the corresponding official websites of the Ministries of Finance and central banks: Azerbaijan (Ministry of Finance Republic of Azerbaijan 2021), Russia (Ministry of Finance of the Russian Federation 2021a; 2021b; 2021c), Kazakhstan (The Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market 2021), Belarus (Ministry of Finance of the Republic of Belarus 2021a; 2021b; 2021c; 2021d), Tajikistan (Ministry of Finance of the Republic of Tajikistan 2021), Uzbekistan (Ministry of Finance of the Republic of Uzbekistan 2021), Moldova (National Bank of Moldova 2021), and Kyrgyzstan (National Statistical Committee of the Kyrgyz Republic 2021). The calculations and diagrams were created in Microsoft Excel.

## Results

All EECCA countries share a common initial characteristic of the development of national economies – at some point, each of them was part of the Soviet Union. Nevertheless, the economies of these countries have developed according to their own model and have faced their own problems for 30 years. As a result, the EECCA states differ in terms of their public debt formation and instruments for its management. The following figures provide a closer look at how each EECCA country manages its public debt, what tools it uses, and how effective such activity is in terms of debt repayment.

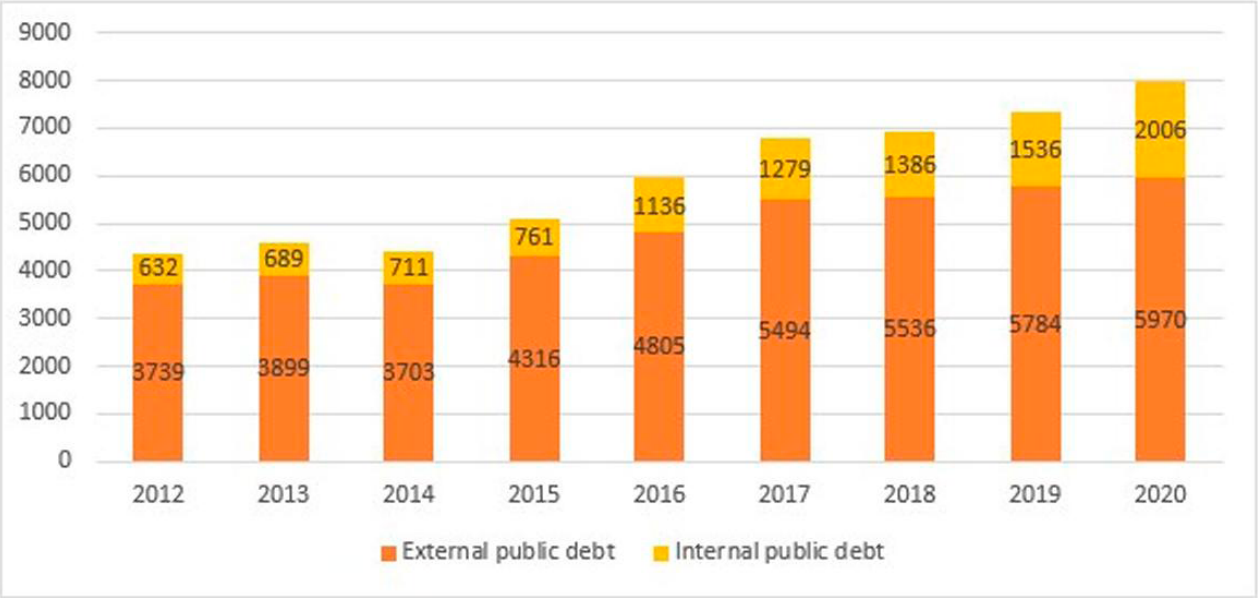


Figure 1. Public debt dynamics for Armenia, 2012–2020, million USD

Source: developed by the authors based on data retrieved from the Statistical Committee of the Republic of Armenia (2021).

Since 2012, Armenia has seen an increase in the volume of public debt (Figure 1). Its external debt is formed of the debt of the government and the debt of the Central Bank. However, it is worth noting that the external debt of the Central Bank of Armenia does not exceed 10% of the public debt during the whole analyzed period. The primary tools for external public debt formation and management in Armenia are external public bonds and international loans.

In general, the formation of Armenian external debt began after the crisis of 2008 when the government needed to finance state projects to support and revitalize the economy. A closer consideration of the structure of its external public debt makes it evident that 30–35% of its overall volume falls on loans from international organizations and governments of other countries, whereas 65–70% is debt on state external public bonds.

At the same time, about 85% of external debt is owed to international financial organizations, particularly the IMF.

Armenia's internal debt is formed by internal bonds, both in national and foreign currency. The fact that the government issues internal bonds in foreign currency shows that its amount is insufficient for economic activity. This is the consequence of a balance of payments deficit, which necessitates the accumulation of foreign currency to repay external debt. Analyzing Armenia's external debt dynamics shows that the amount grows yearly. Given the deficit of the balance of payments and low volumes of debt repayment during the last two years, one may assume that the volume of external debt will continue its upward trend. As a consequence, the permissible public debt-to-GDP ratio, which currently stands at 60%, may increase. Against this background, the IMF's credit policy towards Armenia may be revised, and the cost of servicing international loans may grow.

Azerbaijan's external public debt also tends to rise (Figure 2). However, unlike Armenia, loans embody the primary tool for managing external debt. The reason for this is that this country tends to attract funds not to cover the deficit in the balance of payments or the state budget but to finance projects. Public debt finances economic reforms, the restoration and reconstruction of infrastructure, the construction and repair of power plants and roads, as well as improving the water supply, aviation, railway, and production and energy sectors. The main sources of financing here are international financial organizations such as the World Bank, the Japan International Cooperation Agency, the Asian Development Bank, the Islamic Development Bank, and the European Bank for Reconstruction and Development (EBRD).

As the aim of public debt is not to solve economic problems but to finance projects, the tendency for it to increase can be viewed from different perspectives. On the one hand, it is a fully negative event because the time for the compulsory repayment will inevitably come, laying an additional burden on the state budget. On the other hand, state debt boosts the country's economic infrastructure and promotes economic reforms. Since the maturity of loans is ten years and more, in the near future, part of them is expected to be repaid, which explains the decrease in external debt in 2019–2020.

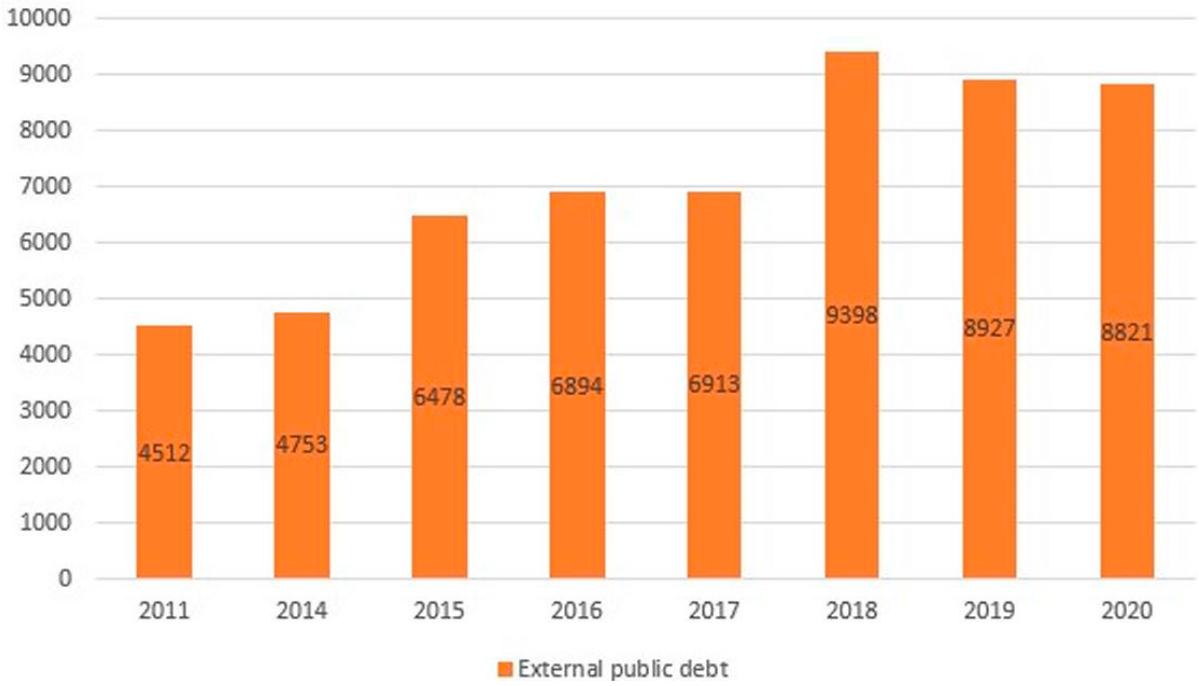


Figure 2. Public debt dynamics for Azerbaijan, 2011–2020, million USD

Source: developed by the authors based on data retrieved from the Ministry of Finance Republic of Azerbaijan (2021).

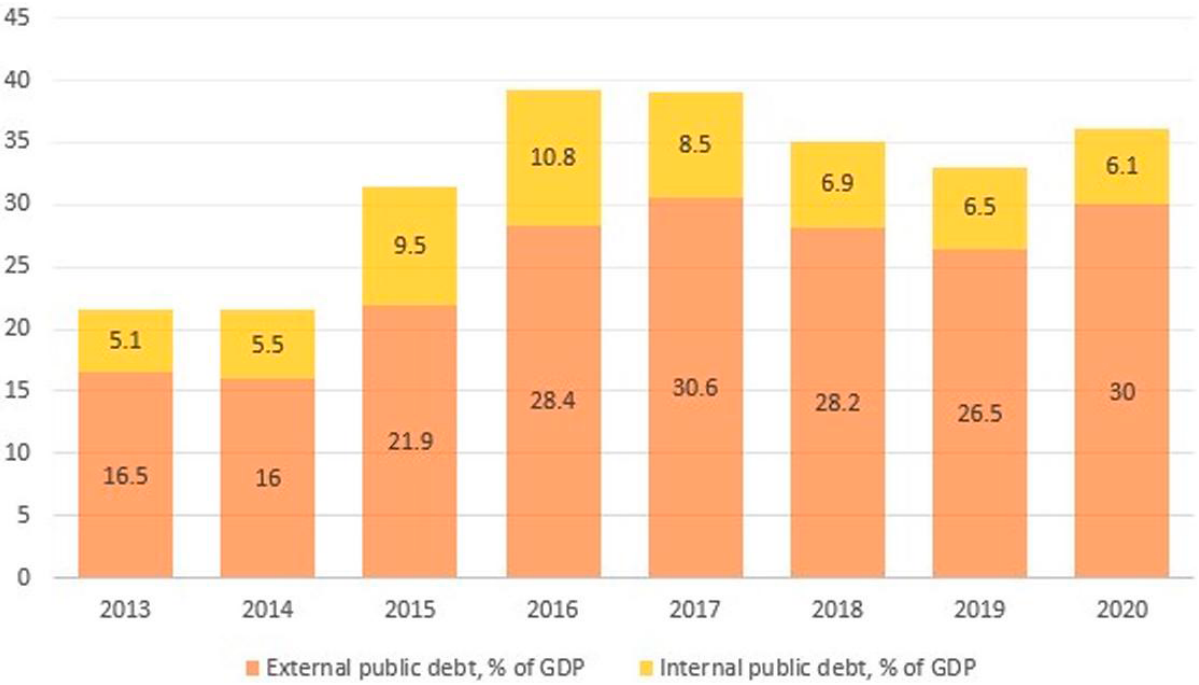


Figure 3. Public debt dynamics for Belarus, 2013–2020

Source: developed by the authors based on data retrieved from the Ministry of Finance of the Republic of Belarus (2021c).

Belarus witnessed a rise in internal and external public debt from 2013 to 2017 (the total public debt increased from 21% to 39% of GDP). According to a report by the Ministry of Finance, Belarus' external public debt grew by 3.1 billion USD in 2017 (equivalent to an enhancement of 22.6%) to 16.7 billion USD as of January 1, 2018 (Ministry of Finance of the Republic of Belarus 2021c). In 2017, Belarus attracted 4.04 billion USD in external public bonds and used loans to raise funds and cover its balance of payments deficit. In more precise terms, the Russian government and banks issued 1.3 billion USD, the Eurasian Fund for Stabilization and Development (EFSD) issued 800 million USD, Chinese banks issued 306.6 million USD, the International Bank for Reconstruction and Development (IBRD) issued 159.4 million USD, and the EBRD and the Nordic Investment Bank (NIB) issued a total of 65.2 million USD. In sum, Belarus' external debt in 2017 was repaid with 1.3 billion USD, including 364.3 million USD to the Russian government, 353.1 million USD to the EBRD, 245.8 million USD to Chinese banks, 62.1 million USD to the IBRD, 3.6 million USD to US banks, and 500,000 USD to the EBRD and NIB (Ministry of Finance of the Republic of Belarus 2021c).

Correspondingly, as of 2017, Belarus' internal debt expanded by 1.1 billion BYR (equivalent to 10.3%) and reached 9.2 billion BYR (as of 2017, 1 BYR = 0.51 USD). In 2017, the Ministry of Finance placed 449.9 million USD and 200 million BYR worth of internal foreign currency public bonds for legal entities and individuals. Additionally, 1.3 billion USD and 189.7 million BYR was used to repay foreign exchange and ruble bonds of entities and persons (Ministry of Finance of the Republic of Belarus 2021c). Consequently, in 2017, the country's total debt increased by 5.2 billion BYR and reached 42.2 billion BYR. The 2017 external debt of Belarus amounted to 13.6 billion USD, i.e., it grew by 9.6% over 2016, while internal debt rose by 10.2 billion BYR (an increase of almost 5%).

Belarus's public debt is formed mainly by external debt, which generally determines the choice of tools for managing it. According to the Ministry of Finance, external borrowings in the international financial markets are carried out through external public bonds. Today, Belarus issues external public bonds in two currencies: US dollars (in the financial markets of Western European countries) and Russian rubles (in the financial market of Russia). In fact, bonds are the only external public debt management instrument in this country.

As concerns the domestic market, the central public debt management instrument is also represented by bonds, which have been actively used, e.g., in particular, in 2012–2013 (issued in USD). Most likely, the issuance of USD-denominated internal public bonds was due to the need to repay external bonds whose maturity was coming to an end. Thus, it can be inferred that both internal and external public debt in Belarus is managed by a single instrument – public loan bonds.

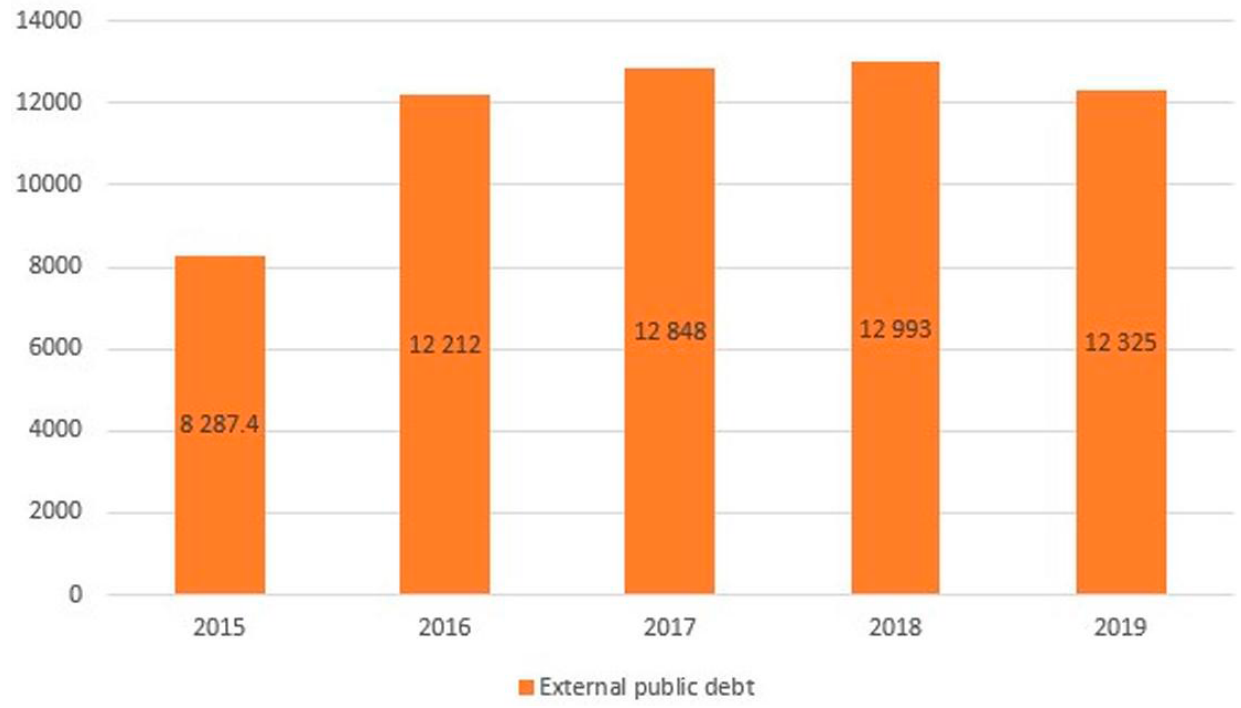


Figure 4. Public debt dynamics for Kazakhstan, 2015–2019, million USD

Source: developed by the authors based on data retrieved from The Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market (2021).

Almost 80% of Kazakhstan's external public debt consists of loans and borrowings, and 20% of liabilities on government securities. Its major creditor countries are the Netherlands, Great Britain, the US, France, China, and Russia. Credit resources are mainly used for financing programs for the development of the economy. In turn, the primary reason for the emergence of public debt is the constant state budget deficit experienced in the 1990s, which needed to be covered with international loans.

The dynamics of Kazakhstan's external public debt are positive since, over the last four years, there has been not only no growth in the volume of debt but also a slight decrease. Considering that the country's gold and foreign currency reserves for 2021 will cover 11 months of imports, it is expected that the national debt repayment will not be tough for the budget of this country.

Almost 80% of Kyrgyzstan's public debt is formed by external public debt and only 20% from internal debt. The main public debt management tool of is government securities, i.e., bonds. The reason for the emergence and increase in Kyrgyzstan's public debt is a weak economy. It took international loans to combat COVID–19, which led to a significant boost in external public debt in 2020. Kyrgyzstan may soon face complications with external debt repayment as the negative economic consequences of the COVID–19 are far from over. Currently, Kyrgyz authorities are negotiating the possibility of restructuring the debt and postponing its repayment.

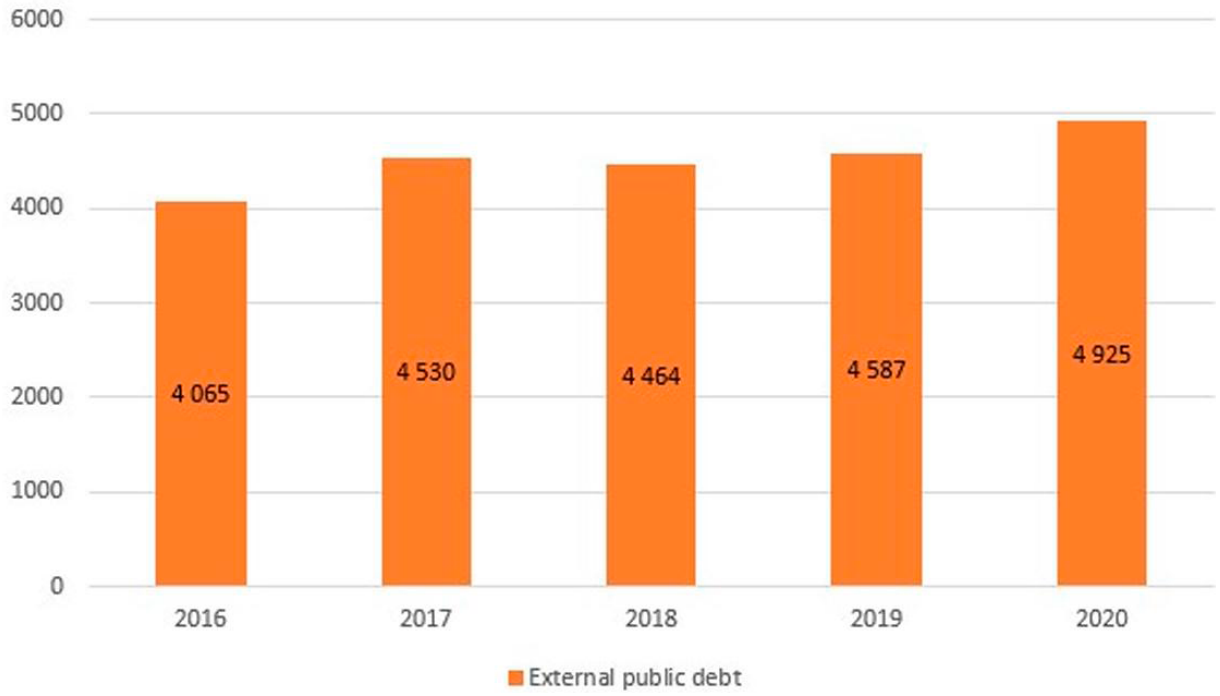


Figure 5. Public debt dynamics for Kyrgyzstan, 2016–2020, million USD

Source: developed by the authors based on data retrieved from the National Statistical Committee of the Kyrgyz Republic (2021).

The primary external public debt management tool in Moldova is multilateral loans from international financial institutions. The central creditors of Moldova are the European Investment Bank, the Development Bank of the Council of Europe, the European Union (EU), the EBRD, the IBRD, the International Development Association, the IMF, and the International Fund for Agricultural Development. The main internal public debt management tool is the public bonds.

The principal reason for the increase in Moldovan public debt is the state budget deficit and the need to cover it. The year 2016 was momentous for the country. In view of the conversion of state guarantees granted to the National Bank of Moldova and the issuance of bonds by the country's Ministry of Finance to accumulate funds for state guarantees on loans, Moldova's internal public debt expanded significantly. For this reason, in the next few years, we should not expect a significant decrease in its public debt. The Ministry of Finance continues looking for new ways to restructure debts against the background of a systematic increase in public debt to GDP, which is already over 40% as of the year 2021.

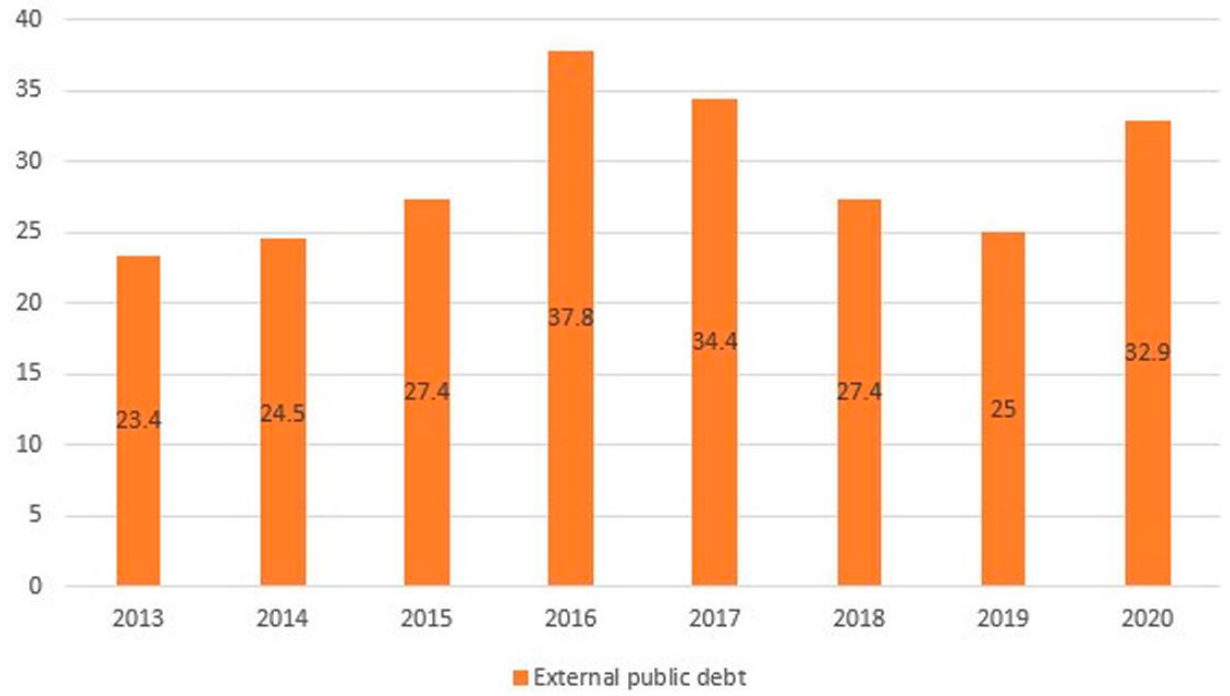


Figure 6. Public debt dynamics for Moldova, 2013–2020, % of GDP

Source: developed by the authors based on data retrieved from the National Bank of Moldova (2021).

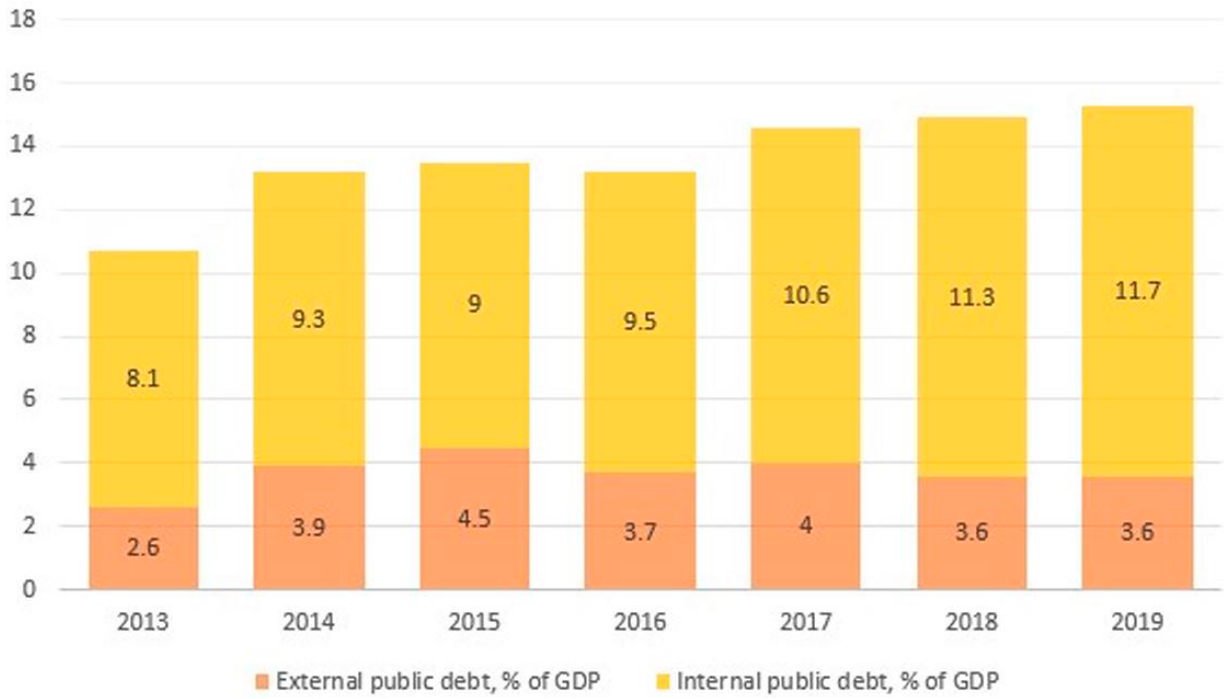


Figure 7. Public debt dynamics for the Russian Federation, 2013–2019

Source: developed by the authors based on data retrieved from the Ministry of Finance of the Russian Federation (2021a).

The situation in Russia (Figure 7) shows that between 2013 and 2019, the state experienced a slight increase in public debt from 10.7% to 14.9% of GDP. Although public debt was projected to rise to 21% of GDP by the end of 2020, this value is still much lower than that of most emerging economies. The state budget deficit is predominantly financed by domestic borrowing, especially from large domestic banks. Not so long ago, the government issued 2 billion EUR worth of Eurobonds in two tranches, with a yield of 1.125% for the 7-year tranche and 1.850% for the 12-year tranche.

In sum, about 70% of public debt in Russia is internal public debt. This can generally provide more flexibility in the public debt management policy and allow different management tools to be used. Among all the tools utilized by the Ministry of Finance of the Russian Federation for external debt management, bonds of different types prevail, depending on the conditions under which the government raises funds. The top three are federal loan bonds with discount amortization, federal loan bonds with a variable discount, and federal loan bonds with a variable coupon. Through these three instruments, the Ministry of Finance has formed almost 85% of the internal public debt. Apart from bonds, Russia's external debt is financed by loans from foreign governments and loans from multilateral development banks. However, bonds still play the leading role as the main external debt management tool.


Figure 8. External public debt management tools, by share, for the Russian Federation, %.

Source: developed by the authors.

As can be seen from the figure above, bonds account for more than 90% of Russia's external public debt. Less than 4% is represented by foreign governments loans and less than 3% by development banks loans. In dynamics, the share of loans from foreign countries and development banks decreased significantly after 2014, and, as of 2019, the aggregate share

was less than 3%. This situation can be related to the sanctions of the US and EU countries limiting lending to the Russian economy. Back in 2014, the EU and the US suspended investment cooperation with Russia, and the European Investment Bank stopped financing projects in Russia. Thus, the placement of government bonds is currently the only possible tool for public debt management.

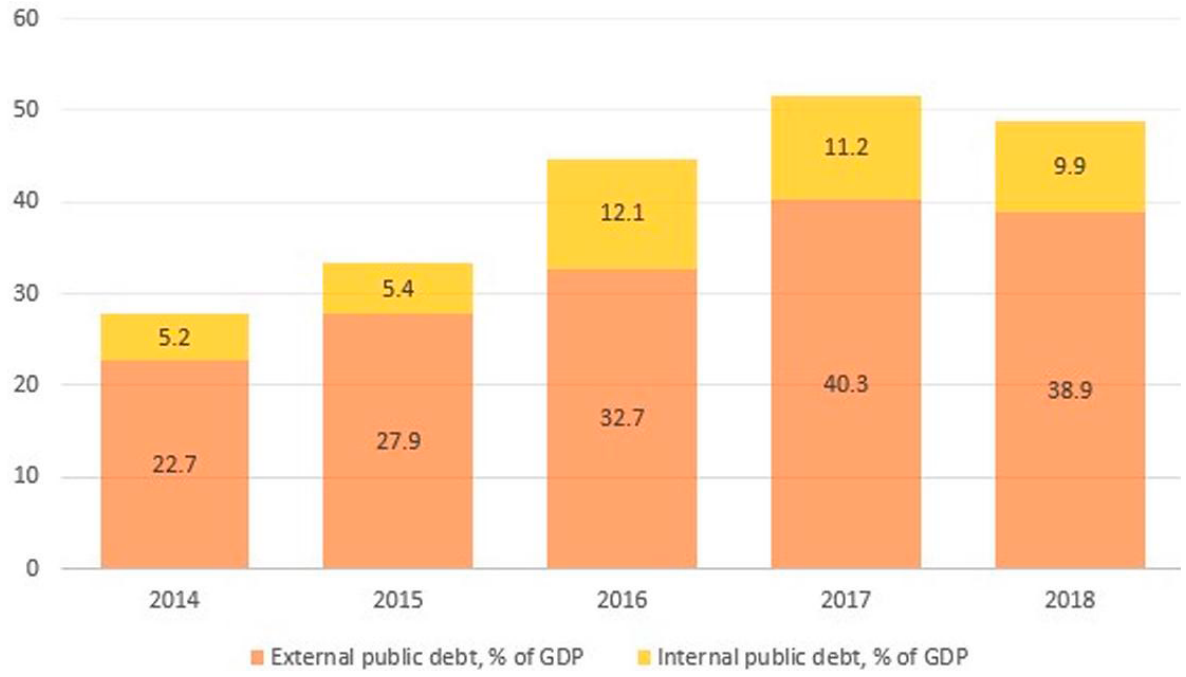


Figure 9. Public debt dynamics for Tajikistan, 2014–2018

Source: developed by the authors based on data retrieved from the Ministry of Finance of the Republic of Tajikistan (2021).

The main reason for the increase in Tajikistan's public debt is the need to finance the state budget deficit. To achieve this goal, the country's government also benefits from international loans. Tajikistan's main creditors are the World Bank, the Asian Development Bank, the IMF, the Islamic Development Bank, the EBRD, the Fund of the Organization of the Petroleum Exporting Countries (OPEC), the Anti-Crisis Fund of the Eurasian Economic Union (EAEU), the European Investment Bank, the International Fund for Agricultural Development, and the Asian Infrastructure Investment Bank.

To manage the internal public debt, Tajikistan uses state treasury bills, which cover more than 90% of the total internal public debt. Since 2014, there has been a steady increase in both external and internal public debt. In order to effectively manage it, the government has implemented the Program of State External Borrowings. According to the Ministry of Finance's forecasts, the rise in the volume of public debt is not critical at the moment and will amount to 40% of GDP in 2021. In any case, the government plans to continue using loan agreements to cover the state budget deficit and support the country's economy. Thuswise, the repayment of the existing debt might take

place at the expense of new loans, as the country's budget cannot cover these debts on its own. Under the current conditions, the public debt is not expected to decrease, and the continuation of its upward trend may cause problems in the medium term after its volume exceeds the critical indicator (60% of GDP).

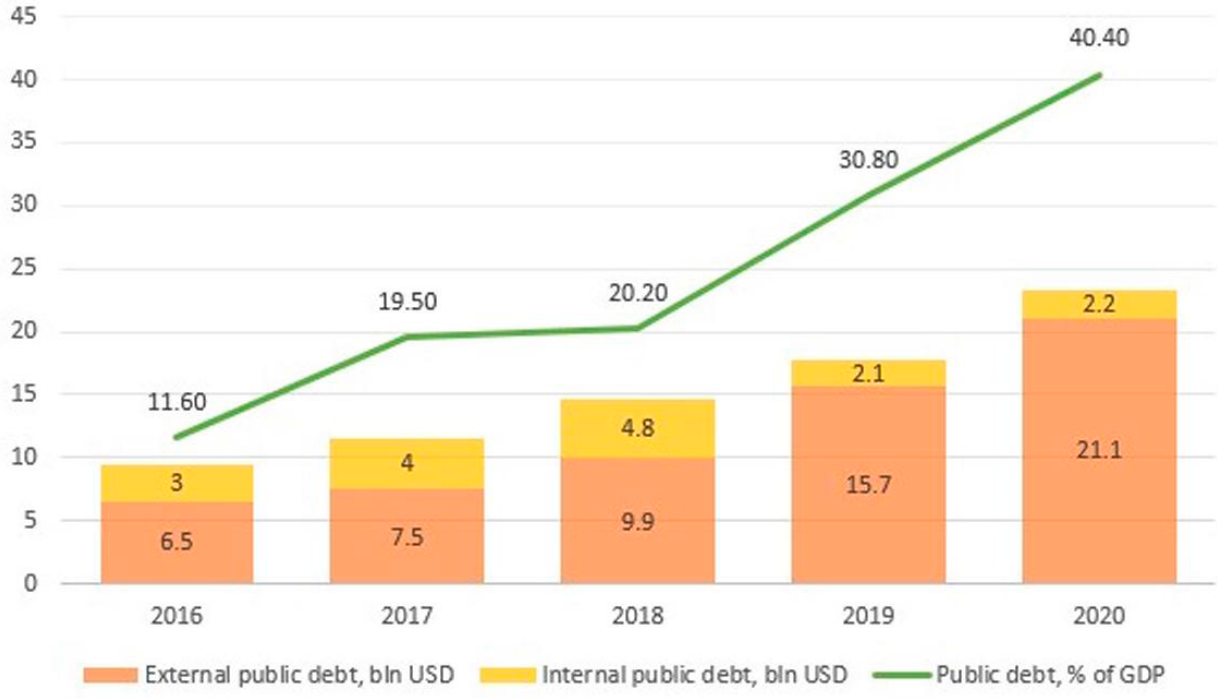


Figure 10. Public debt dynamics for Uzbekistan, 2016–2020

Source: developed by the authors based on data retrieved from the Ministry of Finance of the Republic of Uzbekistan (2021).

External debt accounts for the bulk of Uzbekistan's public. The main creditors of Uzbekistan are the Asian Development Bank, the World Bank, the State Development Bank of China, the Export-Import Bank of China (China Exim Bank), the Japan International Cooperation Agency, the Economic Development Cooperation Fund, the Islamic Development Bank, and the Japan Bank for International Cooperation. The chief reasons for the increase in Uzbekistan's public debt are financing the state budget deficit and supporting different sectors of the economy. The systematic growth of the budget deficit is the major challenge of public debt management, and the government is trying to reduce it to 2% of GDP.

Uzbekistan relies most on loans as the principal public debt management tool. As long as this country has a good payment history and an acceptable level of public debt to GDP of 40%, one can assume that it should not have significant problems with debts payment in the foreseeable future. Nevertheless, the COVID–19 pandemic has significantly weakened the country's economy and will require additional resources, which Uzbekistan

does not have. Thus, it is anticipated that the government will use crediting programs to resolve economic issues.

The by-country results provide enough data to cluster public debt management tools typical for EECCA countries based on the frequency of their application (Figure 11) and characterize the general state of public debt management in the EECCA states (Figure 12).

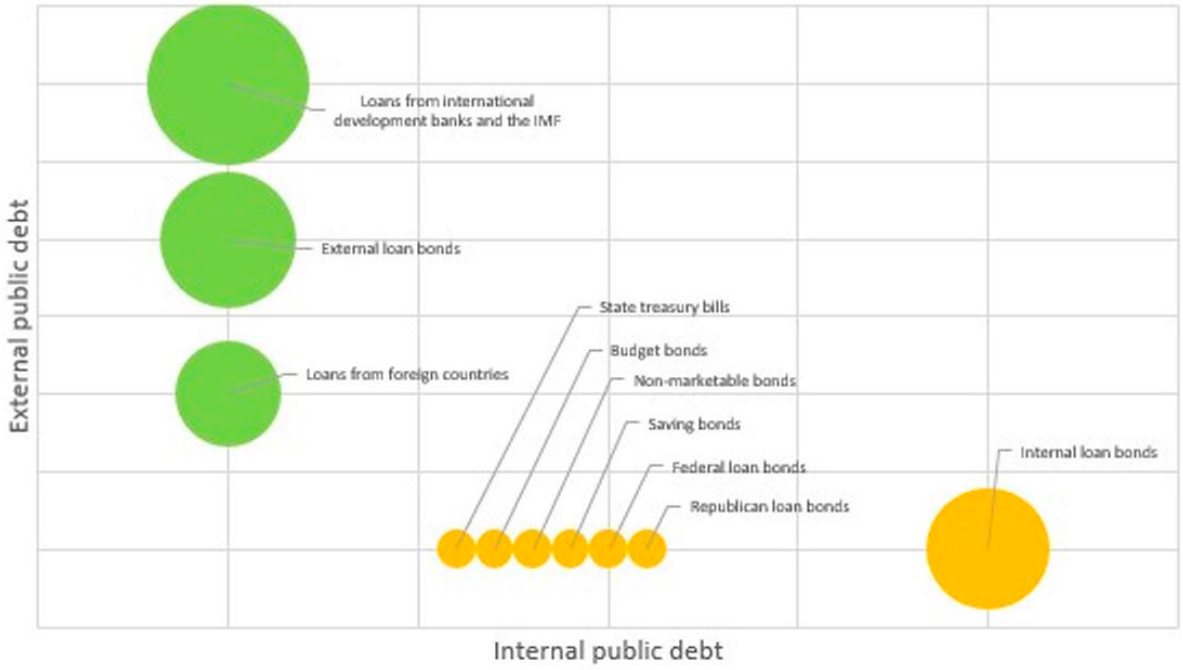


Figure 11. Public debt management tools used in EECCA member states

Source: developed by the authors.

The data summarized in Figure 11 indicate that among all of the external public debt management tools used in EECCA countries, loans from international development banks and the IMF are the most popular. This is explained by the problems of EECCA members with the state budget and balance of payments deficits, which are covered by credit resources. At the same time, external loan bonds can be used only by those countries that have confidence in the international financial market and whose state-issued securities are in demand. Loans from the governments of other states are the least frequently used as they attract the least amount of funds.

As for the internal public debt, in most cases, it is managed with internal bonds. This tool is used in all countries that have internal public debt. Additionally, the government can issue bonds in both domestic and foreign currencies. Other types of bonds as an instrument of public debt management are used in Russia, and only Tajikistan takes advantage of state treasury bills.

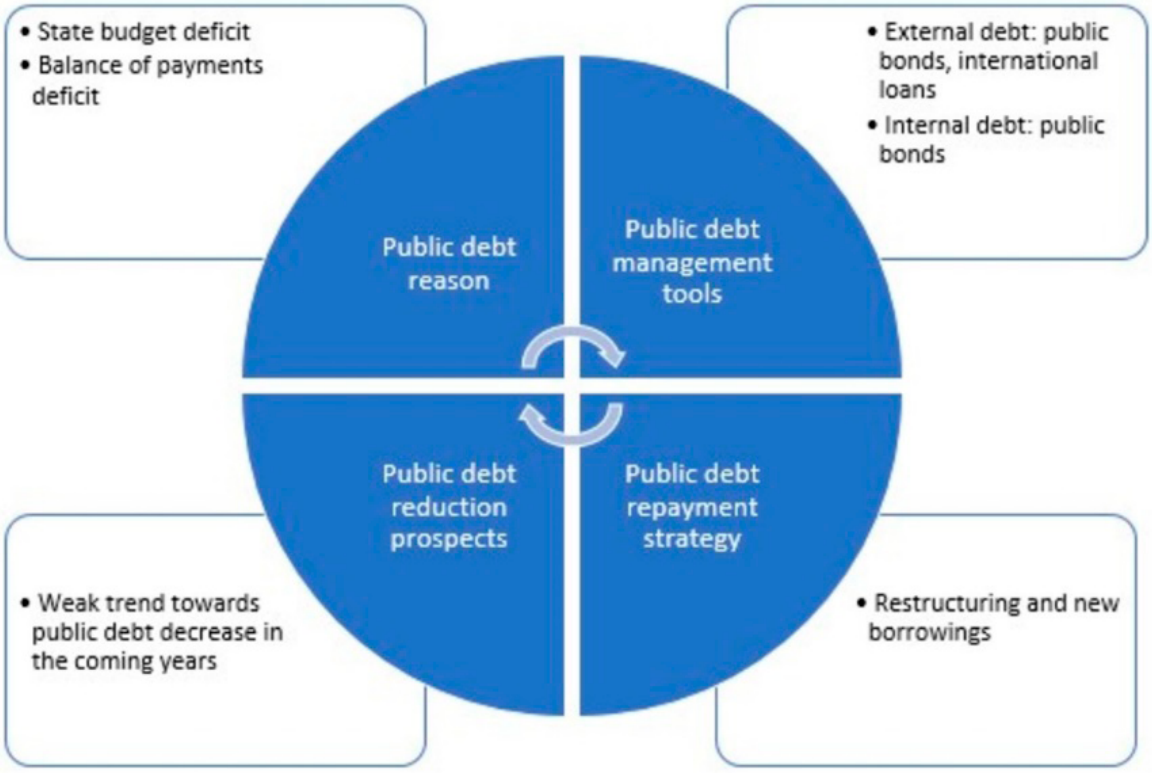


Figure 12. Main characteristics of public debt management in EECCA member states

Source: developed by the authors.

The developed approach to clustering public debt management instruments can be used by both EECCA governments and public debt researchers. EECCA governments, as well as state authorities involved in public debt management, can employ the data to introduce new public debt management tools that are not yet used in a particular country. In addition, this clustering can be useful in terms of diversifying the sources of financing the state budget deficit, the balance of payments, or other development goals of a country's economy. It can be taken advantage of by researchers for the further study of issues related to the public debt management infrastructure, for instance, to discover why external public debt is mostly formed through loans and not through bonds placement. Along with this, the predominant use of bonds to manage internal public debt, while other instruments are not used at all, also requires further research.

The study findings revealed that bonds are the foremost tool for managing both external and internal public debt. This can be explained by the fact that bonds are debt securities and can be traded in the financial markets, making them attractive to investors. At the same time, bond liabilities are government-guaranteed and, therefore, have low risks and high reliability, allowing the country that issues them to manage public debt effectively.

## Discussion

Comparing the results with other studies showed that the clustering of public debt management tools used in EECCA nations encompasses all means ever applied in these countries. The report on the state of Belarus's economy (Anokhov 2020) demonstrates that this state has a relatively good debt situation – it was given a credit rating of "B". At the date of the report's preparation, the government had access to international financial markets, and in the first half of 2020, there were two government bond placements: 10 billion RUB in the Russian capital market and 1.25 billion USD of Eurobonds. The last Eurobonds issue was four times oversubscribed, indicating high demand for the country's national debt. However, the growing spread between US dollar-denominated Belarusian bonds and US government bonds indicates that international investors are increasingly aware of the country's risks. The report data confirm that the main tool for managing external public debt is represented by bonds, which the Ministry of Finance places on both Western and Russian financial markets.

Examining the external debt and macroeconomic balance in Belarus, Dayneko (2017, pp. 33–38) suggested several measures to reduce liquidity risks for the country's economy. In particular, he proposed using amortizable bonds and limiting the annual volume of bonds issued in foreign currency for the domestic market. His findings and proposals are fully consonant with the outcomes of this work and confirm the conclusions made for Belarus.

In his study of the demand for internal public debt in Russia, Belyakov (2017, p. 43) examined the structure of Russia's internal debt from the perspective of investors and the context of its formation. The results of his investigation coincide with the outcomes presented in this research and prove that the Russian government uses bonds in the domestic market. Depending on the objectives, different types of bonds are used, and they are the primary internal debt management tool.

While analyzing the effect of public debt on Russia's budget system Parasotskaya and Yakovlev (2019, pp. 61–69) argued that attracting additional funds into the budget to finance government programs can be carried out through receiving loans from other states or international financial organizations, and by placing bonds issued by the state on the international financial market. These arguments are also in line with the findings of the present research.

In another study devoted to the issues of public debt in Russia, Tsvirko (2014) criticized the policy of the Ministry of Finance after 2014. In her opinion, the most promising instrument for covering the federal budget deficit is the additional issuing and placement of state loan bonds in the domestic financial market. According to Tsvirko, a rapid increase in government debt can lead to problems that already occurred in 1998. Indeed, this statement deserves further investigation as this problem is still relevant today.

While investigating the structure of the Russian Federation's public debt, Vilkova and Cheplakova (2017, pp. 106–114) found the same results as those given in this paper. Internal public debt is fully formed with public bonds of various types, maturities, terms of premium, discount, and amortization. External debt is also formed by bonds, but not them alone.

The practical value of this paper lies in the fact that the results of clustering can be used for a detailed analysis of the structure of instruments and their comparison in different countries. In particular, national economic security will depend on the prevalence of one or another external debt management tool insofar as all of them presuppose obtaining finances on different terms and conditions. What is more, the collected data open up broad opportunities for further developments on this topic, specifically the study of the effect of the choice of one or another public debt management tool on the country's macroeconomic indicators and its fiscal policy.

## Conclusions

Collectively, the investigation outcomes show that the ratio of internal and external public debt varies across EECCA states. However, in the majority of countries, external public debt accounts for more than 80% of the total public debt. The only exception is Russia, which has more than 70% of its public debt as internal, which may indicate that only the Russian economy has a significant amount of free funds that the government can accumulate to finance the state budget deficit. All other EECCA countries need external financial assistance.

The collected data suggest that the central tools for internal public debt management are represented by internal bonds (Armenia, Belarus, Russia) and state treasury bills (Tajikistan). The main tools of external public debt management are external bonds (Armenia, Belarus, Kyrgyzstan, Russia) and international loans (Azerbaijan, Kazakhstan, Moldova, Tajikistan, Uzbekistan). The prime reasons for public debt are the state budget and the balance of payments deficit. The exception in this respect is Azerbaijan, which finances economic development and development projects with international loans.

The major limitations of this study are its methodology and how it was implemented. The first lies in the fact that this work considered only public debt indicators without additional considering the macroeconomic peculiarities of the EECCA countries' economic development. Consideration of inflation, national currency exchange rate, the balance of trade, foreign exchange reserves, and the burden of public debt servicing on the country's budget may change the understanding of the effectiveness of public debt management tools. The implementation limitation is explained by the fact that the conclusions can only be applied to countries with a developed domestic financial market.

A poorly-developed financial market means that the state is restricted in the choice of public debt management tools, and only loans from international financial institutions are available to it.

## References

Anokhov, D. (2020), *Research Report on Belarus*, Raexpert, https://raexpert.eu/reports/Research_report_Belarus_10.07.2020.pdf (accessed: 2.09.2021).

Belyakov, I. (2017), *Prospects of Demand for Russia's Ruble-Denominated Debt*, "Financial Journal", 1, pp. 39–51, https://ideas.repec.org/a/fru/finjrn/170103p39-51.html (accessed: 2.09.2021).

Dayneko, A. (2017), *Foreign borrowings and macroeconomic balance in Belarus*, "Bank Bulletin", 2017, pp. 33–38, https://elibrary.ru/item.asp?id=37206715 (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Belarus (2021a), *Government bonds denominated in foreign currency on the domestic financial market*, http://www.minfin.gov.by/ru/public_debt/bonds/postedissues/doc/ (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Belarus (2021b), *Government bonds of the Republic of Belarus placed on foreign financial markets*, http://www.minfin.gov.by/upload/gosdolg/vneshniy/evrobonds_new.pdf (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Belarus (2021c), *On public debt of the Republic of Belarus*, http://www.minfin.gov.by/upload/gosdolg/publication/report_2020.pdf (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Belarus (2021d), *Public debt of the Republic of Belarus*, http://www.minfin.gov.by/ru/public_debt/condition/archive/ (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Tajikistan (2021), *Public debt*, http://minfin.tj/index.php?do=static&page=gosdolg (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Republic of Uzbekistan (2021), *The review of the state and dynamics of the public debt of the Republic of Uzbekistan*, https://www.imf.org/-/media/Files/Publications/CR/2022/Russian/1UZBRA2022001.ashx (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Russian Federation (2021a), *Central directions of the public debt policy of the Russian Federation for 2017–2019*, https://minfin.gov.ru/ru/perfomance/public_debt/policy/?id_39=117428-osnovnye_napravleniya_gosudarstvennoi_dolgovoi_politiki_rossiiskoi_federatsii_na_2017-2019_gg (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Russian Federation (2021b), *Domestic debt by type of securities*, https://minfin.gov.ru/ru/perfomance/public_debt/internal/structure/duty/ (accessed: 2.09.2021) [in Russian].

Ministry of Finance of the Russian Federation (2021c), *Public debt of the Russian Federation in 2013–2019*, https://minfin.gov.ru/ru/perfomance/public_debt/policy/ (accessed: 2.09.2021) [in Russian].

Ministry of Finance Republic of Azerbaijan (2021), *External debt*, http://www.maliyye.gov.az/en/search/index?search=debt (accessed: 2.09.2021) [in Russian].

Misereor (2020), *Global sovereign debt monitor*, https://www.misereor.org/fileadmin/user_upload_misereororg/publication/en/shaping_economic_processes/global-sovereign-debt-monitor-2020.pdf (accessed: 2.09.2021).

National Bank of Moldova (2021), *Public debt*, https://www.bnm.md/ru/search?search_name=государственный%20долг (accessed: 2.09.2021) [in Russian].

National Statistical Committee of the Kyrgyz Republic (2021), *Public debt*, http://www.stat.kg/ru/opendata/category/34/ (accessed: 2.09.2021) [in Russian].

Parasotskaya, N.N., Yakovlev, N.D. (2019), *Pros and cons of public borrowing and public debt for the Russian budget system*, "Accounting. Analysis. Auditing", 6 (4), pp. 61–69, https://doi.org/10.26794/2408-9303-2019-6-4-61-69 [in Russian].

Statistical Committee of the Republic of Armenia (2021), *Publications by year*, https://www.armstat.am/ru/?nid=82&year=2020 (accessed: 2.09.2021) [in Russian].

The Agency of the Republic of Kazakhstan for Regulation and Development of Financial Market (2021), *External Debt*, https://www.gov.kz/memleket/entities/ardfm/press/article/details/59315?lang=ru (accessed: 2.09.2021) [in Russian].

The World Bank (2021), *Central government debt*, https://data.worldbank.org/indicator/GC.DOD.TOTL.GD.ZS?locations=AZ-BY-KZ-KG-MD-RU-TJ-UZ (accessed: 2.09.2021).

Tsvirko, S.E. (2014), *Problems of public debt management system in Russia*, https://www.jsdrm.ru/jour/article/view/199?locale=ru_RU (accessed: 2.09.2021) [in Russian].

United Nations (2021), *World Economic Situation and Prospects: Economies in Transition*, https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2021_CH3_EIT.pdf (accessed: 2.09.2021).

Vilkova, S.G., Cheplakova, P.Yu. (2017), *Analysis of structure and dynamics of national debt of Russian Federation*, "Bulletin of the Samara Municipal Institute of Management", 2, pp. 106–114, https://www.imi-samara.ru/wp-content/uploads/2017/03/Vilkova_Cheplakova_106-114-.pdf (accessed: 2.09.2021) [in Russian].

## Doświadczenia w obszarze zarządzania długiem publicznym: przypadek krajów EWKAŚ (Europy Wschodniej, Kaukazu i Azji Środkowej)

Celem tego opracowania było zestawienie najczęściej stosowanych narzędzi zarządzania długiem publicznym, charakterystycznych dla rynków EWKAŚ. Ogólnie rzecz biorąc, wyniki przedstawione w niniejszym opracowaniu wskazują, że wielkość długu publicznego krajów EWKAŚ w relacji do PKB zmniejszyła się w latach 2000–2015. Ponieważ jednak ich dług publiczny wzrastał po 2016 r., aż do 2020 r. włącznie, zwiększyła się potrzeba doboru odpowiednich narzędzi zarządzania długiem. Odkryto, że główną przyczyną długu publicznego w większości krajów EWKAŚ jest deficyt budżetu państwa (Kazachstan, Kirgistan, Mołdawia, Rosja, Tadżykistan, Uzbekistan). Kolejną przyczyną jest deficyt bilansu płatniczego (Armenia, Białoruś). Jedynym krajem, który w tym kontekście charakteryzował się dość wyjątkową sytuacją, był Azerbejdżan,

który prawdopodobnie wykorzysta dług publiczny do finansowania projektów przyczyniających się do rozwoju gospodarczego i infrastrukturalnego. Nie mniej interesujący jest również fakt, że nie wszystkie państwa członkowskie EWKAŚ generują wewnętrzny dług publiczny. Kirgistan, Mołdawia i Uzbekistan mają zewnętrzny dług publiczny wyłącznie ze względu na brak wolnych zasobów, które można pozyskać z gospodarki. Przeprowadzone badanie ujawniło, że centralnym narzędziem zarządzania wewnętrznym długiem publicznym w krajach EWKAŚ są obligacje publiczne emitowane w walutach krajowych i obcych. Jeśli chodzi o zarządzanie zewnętrznym długiem publicznym, to pierwsze miejsce zajmują zewnętrzne obligacje publiczne i pożyczki zagraniczne. Obecne badanie ma tylko dwa ograniczenia, metodologiczne i wdrożeniowe. Pierwsze z nich to fakt, że nie uwzględniono innych makroekonomicznych wskaźników rozwoju gospodarczego, choć mogą one zmienić ocenę skuteczności wybranych narzędzi zarządzania długiem publicznym. Drugie polega na tym, że uzyskane wyniki można zastosować tylko do tych krajów, których rynek finansowy jest już uformowany i które mają dostęp do międzynarodowych rynków finansowych. W przeciwnym razie narzędzia zarządzania długiem publicznym mają ograniczone zastosowanie.

Słowa kluczowe: dług wewnętrzny, dług zewnętrzny, zarządzanie długiem, narzędzia zarządzania długiem publicznym, gospodarki rozwijające się

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# Credit Guarantee Schemes – Are They Efficient? Experience from European Union Countries

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## Abstract

The paper aims to assess selected elements of the business models of credit guarantee schemes (CGSs) implemented in 20 European Union countries within the financial framework between 2007 and 2013. This paper focuses on the CGSs' financial additionality that depends mainly on how these programs are managed, the institutions implementing them, the objectives set and their distribution constraints. We analyse the implementation costs and the use of the funds allocated to implement the schemes. To reach the goal, we used several methods: the Kruskal-Wallis by ranks, the median test, discriminant analysis, multidimensional scaling, and correlation. We also did the power analysis. We discovered that the efficiency of CGS implemented by non-governmental organisations, mutual guarantee funds and regional agencies is related to the level of regional development. The relationship is not visible only when banks are engaged, which may be due to the impossibility of assigning a bank's activities to a single region. However, we did not find differences in efficiency between types of organisations that implement CGSs. The answers to the research questions posed in the article can help policymakers



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and researchers conclude whether it is cost-effective to continue supporting CGSs and whether the management of these schemes should change. The paper contributes to the economic policy theory in the area of state aid to SMEs and public finance.

Keywords: credit guarantee schemes, business model, European Union, efficiency, non-governmental organisations, small and medium enterprises

JEL: G21, G23, G28, M21

# Introduction

The main barriers for SMEs in accessing bank loans include the lack of sufficient collateral and the high-risk SMEs face from credit institutions. Loan guarantees increase SMEs' creditworthiness, decrease the risk of insolvency, and indirectly lower the cost of financing to reduce differences in the availability of external capital for companies of different sizes (Song, Zhang, and Zhao 2020). Credit Guarantee Schemes (CGSs) reduce financing obstacles and improve a firm's ability to access bank financing, especially for small and micro companies (Caselli et al. 2019). As Pergelova and Angulo-Ruiz (2014) stated, government guarantees directly affect new firms' competitive advantage and indirectly impact their performance. Mkhaiber and Werner (2021) and D'Ignazio and Menon (2020) contradict these findings, pointing to the greater importance of the length of the relationship between the borrower and the bank rather than collateral, including guarantees, especially for small (cooperative) banks. D'Ignazio and Menon (2020) added that firms rarely tend to swap banks or look for better opportunities.

Credit Guarantee Schemes (CGSs) are implemented and conducted by various government institutions, NGOs, financial institutions, and business associations to provide SMEs with better access to loans. They aim to increase SMEs' creditworthiness by guaranteeing the loans provided by financial institutions. Some authors state that CGSs reduce SMEs' borrowing costs and financing constraints (Zecchini and Ventura 2009). However, expectations about the effects of guarantee schemes can be contradictory. On the one hand, guarantees are expected to be given to companies that are most likely to experience growth and be profitable to pay back their loans (Ben-Yashar, Krausz, and Nitzan 2018). On the other hand, guarantee schemes are expected to target companies with the most difficulties in obtaining a bank loan on a commercial basis. When applying for a loan, such companies often do not guarantee rapid growth or are even characterised by high investment risk. Some authors (e.g., Agnese, Rizzo, and Vento 2019) even state that CGSs may increase the probability of SME bankruptcies.

As some studies indicate (Leonello 2018; Shan and Tang 2019), CGSs are an effective instrument to increase the availability of loans to SMEs with relatively little guaranteed capital. However, there are also opposing opinions that CGSs only theoretically reduce SMEs' barriers to accessing credit (Yang and Zhang 2013). According to Cowling

et al. (2018a; 2018b), banks use guarantees under CGSs to secure loans that would have been provided otherwise. It results in lower additionality compared to loans secured by guarantees provided to companies with the highest risk of defaults, such as microenterprises that have been operating in the market for less than five years. On the other hand, Saito and Tsuruta (2018) opt for a reduction in the coverage rate, which is positively correlated with the default rate. They believe that too high a guaranteed coverage (above 80% of the loan) makes guarantee schemes cover too many risky borrowers, resulting in inefficient resource allocation.

CGSs are financed by the government, the European Union (EU), and private sources. The business models of CGSs vary and may affect the amount of support offered to SMEs. Given the recommendations of the European Commission (EC) for self-financing guarantee schemes, it is reasonable to assume that not-for-profit institutions and banks will achieve different effects. According to the EC recommendation, "The premiums charged have to cover the normal risks associated with granting the guarantee, the administrative costs and a yearly remuneration on the necessary capital" (Commission Notice on the application of Articles 87 and 88 2008). If costs (guarantee fees) are too high (Song, Zhang, and Zhao 2020), it may negatively affect the additionality of CGSs and overstate the cost of obtaining funding. However, according to some, delegating the task of implementing CGS to banks increases the program's efficiency as there is more excellent rationalisation of loans (Jia 2013). State or EU subsidisation of CGS programs results in excessive lending and increased losses. The cost of lending and collateral, such as guarantees, would then also depend on external factors such as the economic outlook, and they would differ over time.

The efficiency of CGSs can be assessed in three dimensions: financial sustainability, economic additionality, and financial additionality (Panetta 2012). The first two areas concern two issues. One is the impact of guarantees on lending conditions, such as the cost of a loan or the amount of financing provided (Boschi, Girardi, and Ventura 2014). The other is connected with the indirect effects of guarantees, such as the SMEs' survival, financial performance (Caselli et al. 2019), employment (Caselli et al. 2019), and the impact on the economy (Lee 2018; Yang et al. 2021).

This paper focuses on the third aspect, which is the program implementation costs and the use of the funds allocated for their implementation. The financial additionality of CGSs depends mainly on how these programs are managed, the institutions that implement them, the objectives set, and their distribution constraints. Our goal is to evaluate if the efficiency of CGSs implemented in 20 European Countries between 2007 and 2013 (data as of the end of 2017) depends on selected elements of their business models. The answers to the research question posed in the article can help policymakers and researchers conclude whether it is cost-effective to continue supporting CGSs and whether the management of these schemes should change.

## Public choice theory to explain the existence of guarantee schemes

Public choice theory assumes that although people in politics show some concern for others, their main motive is self-interest, whether they are voters, politicians, lobbyists or bureaucrats. Therefore, the efficiency of guarantee programs can depend on policymakers' decisions, i.e., how the programs are implemented.

According to Buchanan, James, and Tullock (1962), this theory 'replaces romantic and illusory ideas about how governments work with ideas that embody more scepticism'. Economists have used market failure theory to argue that the best way to reduce them is by government intervention. However, proponents of public choice theory point out that there are reasons why government intervention does not succeed in achieving the desired effect. One of the main reasons is that there is no incentive for citizens to effectively monitor initiatives introduced by the government. Although politicians and public sector employees may originally intend to spend taxpayers' money wisely, effective decisions will not allow them to increase their wealth. There is no direct reward for efforts and actions to provide benefits to a public that is not even aware of those benefits or who granted them. Therefore, the incentives for good governance in the public interest are weak. And this is why the EU seeks to involve the private sector as much as possible in implementing initiatives within operational programmes.

Although proponents of public choice theory have focused mainly on analysing government failures, they have also suggested ways to correct problems. For example, they argue that if government action is required, it should occur at the local level whenever possible (Boyne 1997). At the local level, people feel more connected to the effects of their work because it affects their immediate environment. For this reason, in some countries, guarantee schemes are implemented by regional agencies or cooperative banks rather than by a national institution.

Arping, Gyöngyi, and Morrison (2010) showed that, according to public choice theory, loan guarantees are a more effective support instrument and are less costly than direct loans. This is because, unlike non-bank loans and grants, the decision to provide loan guarantees lies with the (private) lender. The efficiency of guarantee schemes can only be reduced by the government's additional criteria, such as sectoral or geographical restrictions (Beck, Klapper, and Mendoza 2010). The decision-making power of the private investor is then limited.

Hence, we believe that the efficiency of guarantee programs may be connected with the region where it is offered (set criteria and rules by policymakers) and the type of institution providing guarantees under the program.

## Distribution of guarantees for SMEs and hypothesis development

It has been claimed that private sector participation in guarantee schemes contributes to better outcomes. Simultaneously, the involvement of government entities should be limited to these schemes' early implementation phase and provide adequate funding for the schemes (Panetta 2012). However, Beck, Klapper, and Mendoza (2010) point out that the most significant default rate level is recorded when the government is involved in risk assessment and recovery. Cowling et al. (2018a; 2018b) indicate that banks are reluctant to finance working capital secured by guarantees, seeing current liquidity problems as a threat to a going concern. Thus, commercial loans that the bank decides to guarantee may have a lower loss ratio. However, Caselli et al. (2021) stress that mutual guarantee institutions, through peer monitoring and peer screening, are better able to mitigate the risk of default. As others point out, the ineffectiveness of guarantee schemes may be due to inadequate and unrealistic additionality effects and, therefore, difficulties in attracting the appropriate group of beneficiaries. Also, supporting mainly short-term lending may not allow the desired results to be achieved (Benavides and Huidobro 2008).

Guarantee schemes are organised in two ways: mutual guarantee schemes or public guarantee programs. The former is based on the capital paid in by members of the guarantee fund who can benefit from the fund's guarantees (Columba, Gambacorta, and Mistrulli 2009). Mutual guarantee funds have developed in countries with a long tradition of sectorial organisations facing economic problems (Camino, Cardone 1999), i.e. France and Italy. Other countries have created guarantee schemes funded with public money, mainly EU funds. In many countries, guarantees for SMEs are distributed by banking institutions or government agencies, such as Austria Wirtschaftsservice GmbH (AWS) and Osterreichische Hotel und Tourismusbank GmbH (OHT) in Austria.

The guarantee distribution model influences not only the effects of guarantee schemes but also the possibility of measuring them. Organisations that secure the granted guarantees with the possessed guarantee capital can give a lot of information about the effectiveness of using these funds, as opposed to the managers of guarantee programs, who only are intermediaries between the guarantee institution and entrepreneurs. A lack of responsibility resulting from the involvement of own capital may also increase the level of risk secured by guarantees (Molina Sánchez et al. 2018).

Some state that private capital and a private share in the risk decrease the loan losses and then paid guarantees, while others claim that when a decision is left to government employees, less attention may be paid to a fair risk assessment (Beck, Klapper, and Mendoza 2010). Additionally, private institutions may help achieve better financial performance (revenues and the use of resources) due to the support provided by the private

shareholder, like an advisor to SMEs, promotion of the scheme, and additional inflows of capital.

On the other hand, Woźniak and Matejun (2018) found that schemes that offer additional support were less cost-effective. Zwane (2019) posits that the main reason for the low effectiveness of guarantee schemes in some countries is poor promotion. He indicates that most entrepreneurs learn about the possibility of receiving a guarantee from a bank. Thus, separating and delegating the task of providing guarantees to governmental organisations or NGOs may result in lower outcomes (the number and value of guarantees provided). Another problem may be the duplication of tasks (in a bank and an organisation providing guarantees), resulting in a longer process and discouraging entrepreneurs from applying for a guarantee and a loan (Zwane 2019). Therefore, we form our first hypothesis:

**H1. There is a difference in the efficiency between various types of distribution and countries**

The proxy for the ***efficiency*** of CGS is the leverage ratio (the granted volume/capital of guarantees for guarantees) in the guarantee schemes in the financial perspective of the EU between 2007 and 2013. We use three main ***types of guarantee distribution*** channels based on their structure and ownership criteria, distinguished by Beck, Klapper, and Mendoza (2010).

However, as other researchers note, the banks' goals may differ from those of the founders of guarantee schemes. Private institutions may use guarantee programs to cover administrative costs or, as with banks in Japan, to secure loans already granted but with little collateral (Reutemann, Twiname, and Samujh 2012). Banks can increase their customer base due to intermediation in the distribution of guarantees since, as shown by other studies, many customers remain with their CGS bank as commercial customers. On the other hand, banks risk governments not providing adequate support when CGSs loans are defaulted (Reutemann, Twiname, and Samujh 2012).

Further research indicates that a significant number of western banks are reluctant to participate in CGSs because they believe that guarantees increase loan default probability. It results from the fact that guarantees provided within governmental schemes allow projects to be financed with a risk level that would not have been targeted before (Chatzouz et al. 2017). Ben-Yashar, Krausz, and Nitzan (2018) pointed out that the efficiency of guarantee distribution may depend on the structure of decision-making in the bank or organisation providing the guarantee (centralised or a decentralised decision rule). Meanwhile, Green (2003) found that in over-centralised schemes, the programs are less effective.

Waniak-Michalak, Michalak, and Turała (2021) suggested that the support schemes for SMEs should be designed based on organisational capacity, the needs of entrepreneurs, and available sources of finance and that they should take into account and in-

volve the private sector. The banking sector should be involved in distributing funds to small and micro-entrepreneurs. It is due to better access to beneficiaries (contact base, number of outlets) and experience in the financial instruments market. Non-profit organisations may have a supportive role, but banks or other financial institutions should deal with entrepreneurs' financial services. The same is true in other countries, such as France, where entrepreneurs using Socama's (mutual guarantee funds in France) services are directed to cooperative banks, with which the organisation has an agreement and where they undergo a credit assessment procedure, receive a loan and pay their liabilities. According to the OECD (2013), guarantees are most efficient "in those countries where a network of local or sectoral guarantee institutions is well-established."

The efficiency of CGSs may depend on different factors, not only the type of distribution. The effectiveness of the CGSs differs in rural and urban areas (Wardhono, Modjo, and Utami 2019), as do the characteristics of borrowers (size, age, industry, and financial data), loan purposes, loan size, and maturity (Caselli et al. 2021). Ughetto, Scellato, and Cowling (2017) stated that better credit conditions are offered for loans of larger amounts and longer durations, for service firms, larger firms, and those located in well-developed regions. Other effects can be expected in times of crisis. As Gonzalez-Uribe and Wang's (2020) study pointed out, during an economic crisis, guarantees may be granted to support operating activities and maintain employment, but mainly in companies where workers are costly to train and hire. Corredera-Catalán, di Pietro, and Trujillo-Ponce (2021) indicated that guarantee schemes vary in different countries and regions due to the different economic and historical backgrounds and legal contexts. Waniak-Michalak, Michalak, and Turała (2021) demonstrated the impact of regional development and economic situation on organisations' financial stability by providing guarantees.

This study will examine if the place of guarantees' distribution (country) and level of economic development measured by SHDI (Subregional Human Development Index) influence guarantee schemes' efficiency. Therefore, the second hypothesis is formulated below:

**H2. There is a relationship between efficiency and the level of regional development**

In order to verify our research hypotheses, we used the EC's report on EU-funded guarantee schemes between 2007 and 2013. The European Commission report (European Commission 2017) allowed us to collect data for 20 EU countries where CGSs were implemented on: funds provided by the EU, other public funds, funds involved in supporting SMEs, the number of guarantees granted under the schemes, the names of institutions that implement the schemes, and the costs of managing the schemes. Using these institutions' websites, other information necessary for the survey, such as the type of institution implementing the programme, was obtained, e.g., the region

in which the institution operated, and using the globaldatalab.com website, the economic level of development of the region.

A preliminary analysis of the structure revealed different levels of the use of EU support. In some countries (France, Italy, Poland, and Greece), where guarantees are the primary tool for supporting SMEs and eliminating the equity gap, the guarantees provided exceeded several times the guarantee capital received. In other countries, the effects of implementing guarantee schemes were much lower; often, less than 100% of the support provided was used. In France, where the value of granted guarantees was the highest, most programmes were implemented by the Socama, Oseo, and Siagi mutual guarantee funds. Only two organisations achieved an effectiveness rate of less than 100% in France, an NGO and a bank. The average effectiveness of guarantee schemes for all countries exceeded 100%; however, there were some schemes where the utilisation of EU funds did not exceed 2%.

## Methodology and data analysis

In the first stage, we used a method of grouping statistical data. As a result, three groups were created. The first consists of data for non-governmental organisations and regional agencies. The second includes only information about CGSs offered by banks. The third consists of data for mutual guarantee funds. Then, the following control variables were chosen: the period of functioning, the level of regional development, and the origin country. After that, the additional variables were selected: money of operating program paid to the fund or set aside in case of guarantees, managerial costs and fees, number of guarantees, operating program contributions invested in final recipients, and efficiency.

In the next phase, we tested if there was a normal distribution of the data. Therefore, three tests were conducted: Lilliefors, Kolmogorov-Smirnov, and Shapiro-Wilk. The last test is particularly important for small samples, such as in this research. Moreover, one needs to compare a histogram of the sample data to produce a normal probability curve.

In order to verify hypothesis H1, we chose the Kruskal-Wallis by ranks and the median test, as the type of CGSs is a qualitative variable. Both tests are appropriate to make comparisons in more than two groups. Moreover, they are non-parametric alternatives to between-groups one-way analysis of variance. The interpretation of the Kruskal-Wallis test (1) is identical to the parametric one-way ANOVA (Wheelan 2014). However, it is based on ranks and not means. It is calculated as follows:

$$H = \left[\frac{12}{n*(n+1)} * \sum_{j=1}^{c} \frac{T_j^2}{n_j}\right] - 3*(n+1), \tag{1}$$

where:
$n$ – the sum of sample sizes for all samples;
$c$ – the number of samples;
$T_j$ – the sum of ranks in the $j$th sample;
$n_j$ – the size of the $j$th sample.

The median test is a basic version of the Kruskal-Wallis test as it frames the computation in terms of a contingency table. The number of cases in each sample that falls above or below the standard median is calculated. Then, one computes the Chi-square value for the resulting 2 x k samples contingency table. The null hypothesis assumes that all samples come from populations with identical medians. It is expected that about 50% of all cases in each sample will fall above or below the common median. The median test is especially useful when the scale contains artificial limits. Therefore, many cases fall at either extreme of the scale. It is the only appropriate tool for comparing samples in this case. The formula (2) is as follows:

$$x^2 = \frac{n*\left(|ad-bc| - \frac{n}{2}\right)^2}{(a+b)*(c+d)*(a+c)*(b+d)}, \tag{2}$$

where:
$a$, $b$, $c$, $d$ – substituting values from a different group;
$n$ – the number of cases.

Post hoc tests are required if the results of these methods are positive. They should enable multiple comparisons of mean ranks for all groups (Siegel and Castellan Jr. 1988). The first selected test contains the z-test statistic values for each pair of compared groups $u$ and $v$. The second one was the two-tailed p-levels with Bonferroni's correction for each pair compared.

In the next step, discriminant analysis was conducted, which is a type of multivariate analysis. It is used to decide which variables best divide a given set of cases into naturally occurring groups. It is very similar to the analysis of variance (ANOVA). However, the main idea underlying discriminant function analysis is verifying whether groups vary due to the average of a particular variable and then using that variable to predict group membership, for instance, in new cases (TIBCO Software Inc. 2017). The first stage includes the selection of the grouping variable and independent variables. The variable grouping must contain codes (text labels) which clearly define the group's cases.

The method of building a model most often consists of a stepwise (forward or backward step analysis) approach to build a classification function, whose value makes it possible to assign an observation to a given class. In this research, the stepwise forward method was chosen. The forward-stepping procedure is controlled by the appropriate values of the *F* statistic. Sequence variables with the highest value of *F* are included in the model. That suggests their statistical significance in the discrimination of groups, which is the contribution of an individual variable to the prediction of group membership. The variables are selected for the model as long as the corresponding *F* statistic values for those variables are higher than those specified by the researcher (TIBCO Software Inc. 2017).

The Wilks lambda value can range from 0 (perfect discrimination) to 1 (no discrimination). The partial Lambda Wilks test statistics are related to the appropriate variable's contribution to the obtained model's discriminant power. The *p* level is the test probability level corresponding to the F value of the input. A given variable's tolerance value is calculated as one minus the R-squared statistic value that describes this variable's correlation with other variables included in the model. Thus, tolerance is a measure of the redundancy of a given variable. For example, a tolerance of 0.10 means that a given variable is 90% redundant in relation to other variables included in the model. 1-Tolerance ($R^2$) is a value of R-squared statistics that describes a variable's interdependence with other variables included in the model (TIBCO Software Inc. 2017).

The Wilks lambda statistic (3) is calculated as follows (Dobosz 2004):

$$\lambda = \frac{\det g}{\det\left(g + h\right)}, \tag{3}$$

where:
$g$ – intragroup variance-covariance matrix;
$h$ – intergroup variance-covariance matrix.

The above statistic takes values in the range <0, 1>. If the λ statistic's value is closer to zero, their intergroup variability explains the greater part of the variables' general variability. Moreover, it proves the high discriminant ability of a model. When verifying the discriminant function, it is necessary to evaluate the discriminant ability of those included individual variables. When assessing the discriminant ability of the $X_k$ variable, we use the partial Wilks (4) coefficient (Hadasik 1998):

$$\lambda_k^{cz} = \frac{\lambda^1}{\lambda^0}, \tag{4}$$

where:

$\lambda^1$ – the value of the Wilks lambda coefficient for the model after introducing the variable to it;
$\lambda^0$ – the value of the Wilks lambda coefficient for the model before introducing the given variable.

The coefficient value $\lambda_k^{cz}$ takes values in the range <0, 1> and describes the contribution of a given variable to group discrimination. The closer this value is to zero, the greater the contribution of this variable to discrimination. The appropriate test statistic (5) is calculated as follows (Hadasik 1998):

$$F_k = \frac{N-K-I}{K-1}\frac{1-\lambda_k^{cz}}{\lambda_k^{cz}}, \tag{5}$$

where:
$N$ – the total number of objects in the sample;
$K$ – the number of variables;
$I$ – the number of considered populations.

This statistic has an F-Fisher distribution with $K - 1$ and $N - K - I$ degrees of freedom. The probability level of the above test statistic indicates the significance of a variable's contribution to the discriminant function (Kasjaniuk 2006).

We then conducted multidimensional scaling to verify **hypothesis H2**. This analysis aims to discover meaningful hidden dimensions that allow the researcher to explain observed similarities or dissimilarities – distances – between the tested objects. Multidimensional scaling aims to arrange variables in a space with a given number of dimensions, most often two-dimensional, to recreate the observed distances. The most commonly used measures of goodness of fit are *stress* (Kruskal 1978) and the alienation coefficient (Guttman 1968).

Stress is the most common measure used to estimate how well a given configuration reproduces the observed distance matrix. The raw value of the Phi stress (6) for a given configuration is defined as:

$$Phi = \sum[d_{ij} - f\left(\delta_{ij}\right)]^2. \tag{6}$$

In this formula, $d_{ij}$ is the reproduced distances given the number of dimensions, and $\delta_{ij}$ is the input data – observed distances. The expression $f\left(\delta_{ij}\right)$ indicates a non-metric monotonic transformation of the observed input data (distances) (TIBCO 2017).

The alienation coefficient is a slightly modified version of the stress measure. One can plot the reproduced distances for a given number of dimensions relative to the observed inputs (distances). Such a scatter plot is known as a Shepard diagram. This plot shows

the reconstructed distances plotted on the vertical (Y) axis against the original similarities plotted on the horizontal (X) axis. Hence, there is a generally negative slope. The graph also shows a step function. This line represents the result of the monotonic transformation $f\left(\delta_{ij}\right)$ of the input data. If all reconstructed distances were on the step line, the appropriate solution-dimensional model would accurately reproduce the rank order of distances (or similarities). Deviations from the step line indicate a lack of fit (TIBCO Software Inc. 2017).

The correlations were then calculated. In case of a lack of normal distribution for data, a non-parametric method must be used. There are three commonly used correlation coefficients: Spearman's R, Kendall Tau, and Gamma. We chose the first method. It assumes that the variables under consideration are measured on at least an ordinal scale, that is, that the individual observations can be ranked into two-ordered series (Siegel and Castellan 1988). The advantage of this method is the similarity to Pearson's correlation in terms of interpretation.

There are two methods to calculate Spearman's correlation (7), connected with tied ranks of data. When there are no tied ranks, the formula is as follows:

$$p = 1 - \frac{6 * \sum d_i^2}{n * \left(n^2 - 1\right)}, \tag{7}$$

where:
$d_i$ – difference in paired ranks;
$n$ – number of cases.
When there are tied ranks, the formula (8) is as follows:

$$p = \frac{\sum_i \left(x_i - \overline{x}\right) * \left(y_i - \overline{y}\right)}{\sqrt{\sum_i \left(x_i - \overline{x}\right)^2 * \sum_i \left(y_i - \overline{y}\right)^2}}, \tag{8}$$

where:
$i$ – paired score.

Furthermore, in every case, a scatter graph was scrutinised. All the above statistical calculations were done with the Statistica program.

In order to make a post hoc power analysis, the procedure for differences between two independent means for two groups was used. The following assumption was made: alpha level = .05. The effect size (d Cohen) was calculated according to the following procedure for the t-test for independent samples:

$$Es = (\mu 1 - \mu 2) / \sigma, \quad (9)$$

where:
*Es* – effect size;
$\mu 1$ – the mean in subgroup 1;
$\mu 2$ – mean in subgroup 2;
$\sigma$ – standard deviation in the whole group.

The effect size is related to the power of the test. In the chosen test, the higher the differences between the subgroups, the higher the effect size. According to Cohen (1992), one should assume the following interpretations of the size effect: d = .2 – little effect; d = .5 – average effect; d = .8 – big effect.

## Results

Based on the Lilliefors, Kolmogorov-Smirnov, and Shapiro-Wilk tests, we determined that there is no normal distribution for the analysed variables. Because the samples for groups are relatively small (<100), we used non-parametric methods.

Based on the Kruskal-Wallis test, there are no differences in *efficiency* between the following groups of CGSs: NGO or regional agencies, banks, and mutual guarentee funds (H = .2661242; p = .8754). The median test ($\chi 2$ = 2.143169; df = 2; p = .3425) produces a similar conclusion.

The differences in *efficiency* in various countries give statistically significant results for both the Kruskal-Wallis (H = 40.55; p = .00) and the Median ($\chi^2$ = 29.92; df = 18; p = .04) tests. However, the post hoc test shows a significant difference only in one case – between Portugal and France. In all other cases, the results are statistically insignificant.

The next step of our research was the discriminant analysis. The results suggest that the model is correct. The lambda test's value is .55, which means an average match. Six of the eight explanatory variables were included in the model. However, only three justify the division into groups represented by the *type* of CGSs, i.e., *development of region, costs and fees, and efficiency.* It is confirmed by the lambda Wilks, partial lambda Wilks, and the *F* statistic tests, which do not change significantly after introducing the following variables into the model. Furthermore, the tolerance and $R^2$ values for efficiency mean that 84.6% of the information brought to the model by this variable is connected with two other variables already included in the model.

The three other variables do not contribute much to the model. However, the *F* statistics for *amounts of support* for one guarantee and *amounts of OP (operating program)* are insignificant.

In this study, eight quantitative variables were scaled to test their mutual similarity – spatial distribution. A standard *Guttman-Lingoes* configuration was chosen as the initial configuration. This procedure is equivalent to principal component analysis and, in most cases, provides the correct initial configuration for the iterative matching procedure (TIBCO Software Inc. 2017) (Raw stress = 0.8246739; Alienation = 0.1133315; D2: Crude stress = 0.3584455; Stress = 0.0748379). The conclusion is that the model is correct, as evidenced by the alienation and stress coefficient's relatively low values. They were calculated, respectively, for the transformed input data values calculated according to Guttman's rank procedure (D*) and according to the monotone regression procedure (D^).

The results of multidimensional scaling, shown in Figure 1, suggest that the analysed variables are diversified. They are not close together, except for *amounts of OP* and *OP contributions*. Therefore, they are suitable for other statistical analyses. However, the most comparable variable to *efficiency* is *regional development* (Figure 2).

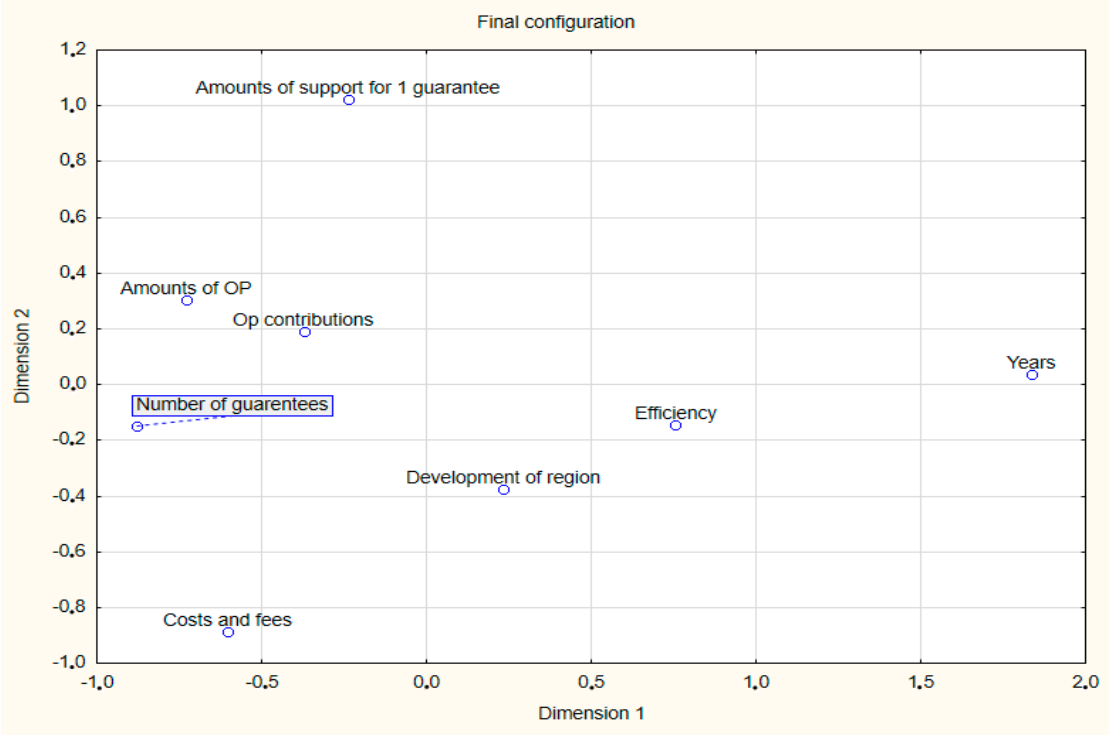


Figure 1. Final configuration

Source: own elaboration.

The Shepard diagram indicates a good reproduction of the real distances.

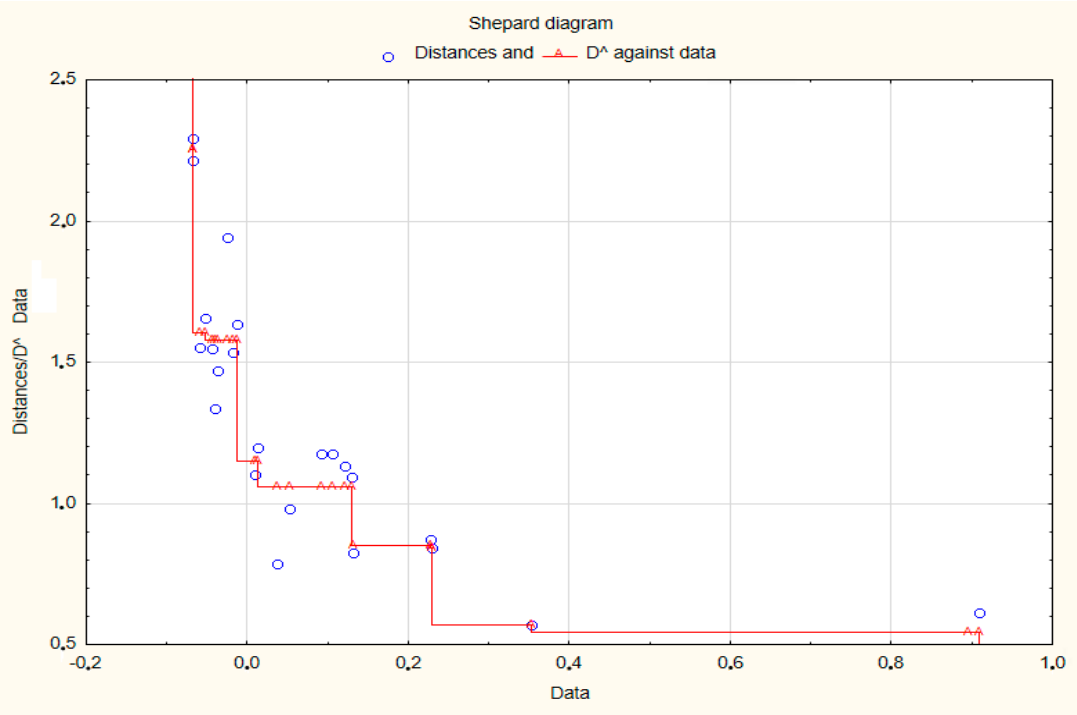


Figure 2. Shepard diagram

Source: own elaboration.

In the next phase, we used the Spearman correlation. The results show only a weak positive correlation between *efficiency* and *regional development* for all types of guarantees ($r = .25$, $p < .05$).

There is also a weak positive relationship between efficiency and regional development for schemes run by non-governmental organisations and regional agencies ($r = .30$, $p < .05$). However, there is no correlation for CGSs distributed by banks. It may be due to the impossibility of assigning a bank's activities to a single region. Banks often operate nationwide (with branches in different regions), as well as internationally. The last analysed type of CGSs were mutual guarantee funds. Interestingly, there is a strong positive correlation between *efficiency* and *regional development* ($r = .61$, $p < .05$). The correlation coefficient is much higher than in the previous examples.

We also performed the t-test power analysis with the G * Power 3.1 program, analysing *regional development of region, cost and fees* and *efficiency*. They contributed the most to the differentiation based on type. Three subgroups with the following frequencies were then defined: Type 1 (Non-governmental organisations and regional agencies) – 61 observations; Type 2 (Banks) – 35 observations; Type 3 (Mutual guarantee funds) – 12 observations. The results suggest that the test power is average. It exceeds 90% only in two cases, both of which concern subgroups

of the *regional development* variable, which means that the test was the most reliable. Therefore, the variable best differentiates the data set based on type. The lower power of the test in the remaining cases may be connected with a small number of cases in subgroups 1 and 2 and outliers. In our research, only in two cases was the size effect negligible.

Furthermore, we did the post hoc power analysis for correlation. The results of the test reveal quite high values for the relationship between regional development and efficiency for all types of guarantee funds (0.7484), non-governmental organisations and regional agencies (0.6798), and mutual guarantee funds (0.617500). Only for banks is the power low (0.0809).

## Conclusions

This paper focused on the financial additionality of guarantee programs, which may depend on the management of these programs, the institutions implementing them, the objectives set, and the constraints on their distribution. We aimed to assess the relationship between selected elements of the business models of CGS programs implemented between 2007 and 2013 (data as of the end of 2017) and the effectiveness of CGSs measured by the ratio of guarantees granted to resources engaged in the implementation of CGSs.

Based on a literature review, we set the following hypotheses:

**H1. There is a difference in efficiency between various types of distribution and countries and**

**H2. There is a relationship between efficiency and the level of regional development.**

The results of the statistical analysis are inconclusive. There are differences in efficiency based on the type of distribution. However, the tests revealed that these differences are not statistically significant. Moreover, there was only one example of disparities in efficiency between countries: France and Portugal. All other results are statistically insignificant.

Nevertheless, the discriminant analysis suggests that efficiency is one of three variables that justify the division into groups represented by type of distribution. Therefore, this issue requires more research, and we cannot confirm that public choice theory applies in every case. This may be due to a failure to recognise many variables that relate to political circumstances in a particular country or differences in program management from one country to another.

The discriminant analysis results confirm hypothesis 2. Multidimensional scaling analysis revealed that regional development is related to efficiency. Moreover, there is a correlation between these two variables, although it is weak. However, the detailed results suggest different intensities of this relationship. There is a strong correlation between efficiency and regional development for mutual guarantee funds, a weak correlation for NGO and regional agencies, but no correlation regarding banks.

The paper has some constraints. The available data are for a relatively short period. Moreover, there are only a few indicators about the activities of CGSs and none about the performance of the beneficiaries. Therefore, there is a need to acquire more detailed information, which will enable the use of more advanced research methods such as counterfactual analysis. This approach should be used in future studies to obtain more reliable results. The answers to the research questions posed in the paper can help policymakers and researchers to infer whether it is cost-effective to continue supporting CGSs and whether the management of these schemes should change. In our opinion the paper contributes to the economic policy theory in the area of state aid to SMEs and public finance.

## References

Agnese, P., Rizzo, M., Vento, G.A. (2019), *The impact of Credit Guarantee Schemes on SMEs bankruptcies: an international overview*, "Journal of Applied Finance & Banking", 9 (4), pp. 1–9, https://www.scienpress.com/journal_focus.asp?main_id=56&Sub_id=IV&Issue=966287 (accessed: 28.09.2022).

Arping, S., Gyöngyi, L., Morrison, A. (2010), *Public initiatives to support entrepreneurs: Credit guarantees versus co-funding*, "Journal of Financial Stability", 6 (1), pp. 26–35, https://doi.org/10.1016/j.jfs.2009.05.009

Beck, T., Klapper, L.F., Mendoza, J.C. (2010), *The typology of partial credit guarantee funds around the world*, "Journal of Financial Stability", 6 (4), pp. 10–25, https://doi.org/10.1016/j.jfs.2008.12.003

Ben-Yashar, R., Krausz, M., Nitzan, S. (2018), *Government loan guarantees and the credit decision-making structure*, "Canadian Journal of Economics", 51 (2), pp. 607–625, https://doi.org/10.1111/caje.12332

Benavides, G., Huidobro, A. (2008), *Are Loan Guarantees Effective? The Case of Mexican Government Banks*, "SSRN Electronic Journal", https://doi.org/10.2139/ssrn.637385

Boschi, M., Girardi, A., Ventura, M. (2014), *Partial credit guarantees and SMEs financing*, "Journal of Financial Stability", 15, pp. 182–194, https://doi.org/10.1016/j.jfs.2014.09.007

Boyne, G.A. (1997), *Public choice theory and local government structure: An evaluation of reorganisation in Scotland and Wales*, "Local Government Studies", 23 (3), pp. 56–72, https://doi.org/10.1080/03003939708433876

Buchanan, J.M., Tullock, G. (1962), *The Calculus of Consent. Logical Foundations of Constitutional Democracy*, University of Michigan Press, Ann Arbor, https://delong.typepad.com/files/calculus-of-consent.pdf (accessed: 5.10.2022).

Camino, D., Cardone, C. (1999), *The valuation and cost of credit insurance schemes for SMEs: the role of the loan guarantee associations*, "International Small Business Journal", 17 (4), pp. 13–31.

Caselli, S., Corbetta, G., Cucinelli, D., Rossolini, M. (2021), *A survival analysis of public guaranteed loans: Does financial intermediary matter?*, "Journal of Financial Stability", 54, 100880, https://doi.org/10.1016/j.jfs.2021.100880

Caselli, S., Corbetta, G., Rossolini, M., Vecchi, V. (2019), *Public Credit Guarantee Schemes and SMEs' Profitability: Evidence from Italy*, "Journal of Small Business Management", 57 (S2), pp. 555–578, https://doi.org/10.1111/jsbm.12509

Chatzouz, M., Gereben, A., Lang, F., Torfs, W. (2017), *Credit Guarantee Schemes for SME lending in Western Europe*, "EIB Working Papers", 2017/42, https://www.eif.org/news_centre/publications/eif_wp_42.pdf (accessed: 5.05.2021).

Cohen, J. (1992), *A Power Primer*, "Psychological Bulletin", 112 (1), pp. 155–159, https://doi.org/10.1037/0033-2909.112.1.155

Columba, F., Gambacorta, L., Mistrulli, P.E. (2009), *The effects of mutual guarantee consortia on the quality of bank lending*, Bank of Italy, https://mpra.ub.uni-muenchen.de/17052/1/MPRA_paper_17052.pdf (accessed: 5.05.2021).

Commission Notice on the application of Articles 87 and 88 of the EC Treaty to State aid in the form of guarantees, 2008/C 155/02, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:155:0010:0022:en:PDF (accessed: 28.09.2022).

Corredera-Catalán, F., Pietro, F. di, Trujillo-Ponce, A. (2021), *Post-COVID–19 SME financing constraints and the credit guarantee scheme solution in Spain*, "Journal of Banking Regulation", 22 (3), pp. 250–260, https://doi.org/10.1057/s41261-021-00143-7

Cowling, M., Ughetto, E., Lee, N. (2018a), *The innovation debt penalty: Cost of debt, loan default, and the effects of a public loan guarantee on high-tech firms*, "Technological Forecasting and Social Change", 127, pp. 166–176, https://doi.org/10.1016/j.techfore.2017.06.016

Cowling, M., Robson, P., Stone I., Allinson, G. (2018b), *Loan guarantee schemes in the UK: the natural experiment of the enterprise finance guarantee and the 5 year rule*, "Applied Economics", 50 (20), pp. 2210–2218, https://doi.org/10.1080/00036846.2017.1392004

D'Ignazio, A., Menon, C. (2020), *Causal Effect of Credit Guarantees for Small-and Medium-Sized Enterprises: Evidence from Italy*, "The Scandinavian Journal of Economics", 122 (1), pp. 191–218, https://doi.org/10.1111/sjoe.12332

Dobosz, M. (2004), *Computer-assisted statistical analysis of researching results*, AOW EXIT, Warsaw.

European Commission (2017), *Financial Instruments in Cohesion Policy/Annual Summaries*, https://ec.europa.eu/regional_policy/en/funding/financial-instruments/ (accessed: 5.05.2021).

Gonzalez-Uribe, J., Wang, S. (2020), *The Effects of Small-Firm Loan Guarantees in the UK: Insights for the COVID–19 Pandemic Crisis*, "Financial Markets Group Discussion Papers", DP 795, https://www.fmg.ac.uk/publications/discussion-papers/effects-small-firm-loan-guarantees-uk-insights-covid-19-pandemic (accessed: 5.05.2021).

Green, A. (2003), *Credit guarantee schemes for small enterprises: An effective instrument to promote private sector-led growth?*, "UNIDO SME Technical Working Papers Series", No. 10, https://www.unido.org/credit-guarantee-schemes-small-enterprises (accessed: 5.05.2021).

Guttman, L. (1968), *A general non-metric technique for finding the smallest coordinate space for a configuration of points*, "Psychometrika", 33, pp. 469–506, https://doi.org/10.1007/BF02290164

Hadasik, D. (1998), *Bankruptcy of enterprises in Poland and methods of its forecasting*, Akademia Ekonomiczna in Poznań, Poznań.

Jia, Y.G. (2013), *Small business loan guarantees as insurance against aggregate risks*, "BE Journal of Macroeconomics", 13 (1), https://doi.org/10.1515/bejm-2012-0110

Kasjaniuk, M. (2006), *Application of discriminant analysis to modeling and forecasting the condition of enterprises*, "Regional Barometer", 2 (6), pp. 298–308.

Kruskal, J.B., Wish, M. (1978), *Multidimensional scaling*, Sage Publications, Beverly Hills, https://doi.org/10.4135/9781412985130

Lee, Y.S. (2018), *Government guaranteed small business loans and regional growth*, "Journal of Business Venturing", 33 (1), pp. 70–83, https://doi.org/10.1016/j.jbusvent.2017.11.001

Leonello, A. (2018), *Government guarantees and the two-way feedback between banking and sovereign debt crises*, "Journal of Financial Economics", 130 (3), pp. 592–619, https://doi.org/10.1016/j.jfineco.2018.04.003

Mkhaiber, A., Werner, R.A. (2021), *The relationship between bank size and the propensity to lend to small firms: New empirical evidence from a large sample*, "Journal of International Money and Finance", 110, 102281, https://doi.org/10.1016/j.jimonfin.2020.102281

Molina Sánchez, H., Pombo González, P., Ramirez Sobrino, J.N., Fernando Figueiredo, J. (2018), *Conceptual framework for information on the outreach, additionality and financial sustainability of Public Credit Guarantee Schemes (CGSs)*, Latin American Association of Development Financing Institutions (ALIDE), https://aecm.eu/wp-content/uploads/2018/12/Libro-Garant%C3%ADas-Versi%C3%B3n-Final.pdf (accessed: 5.05.2021).

OECD (2013), *SME and Entrepreneurship Financing: The Role of Credit Guarantee Schemes and Mutual Guarantee, Societies in supporting finance for small and medium-sized enterprises,* https://one.oecd.org/document/CFE/SME(2012)1/FINAL/en/pdf (accessed: 5.10.2022).

Panetta, I.C. (2012), *An Analysis of Credit Guarantee Schemes: Suggestions Provided by literature*, [in:] P. Leone, G.A. Vento (eds.), *Credit Guarantee Institutions and SME Finance*, Palgrave Macmillan Studies in Banking and Financial Institutions, London, pp. 11–37, https://doi.org/10.1057/9780230362321_2

Pergelova, A., Angulo-Ruiz, F. (2014), *The impact of government financial support on the performance of new firms: the role of competitive advantage as an intermediate outcome*, "En-

trepreneurship & Regional Development", 26 (9–10), pp. 663–705, https://doi.org/10.1080/08985626.2014.980757

Reutemann, J., Twiname, L., Samujh, R.-H. (2012), *Credit Guarantee Schemes Supporting Small Enterprise Development: A Review*, "Asian Journal of Business and Accounting", 5 (2), pp. 21–40.

Saito, K., Tsuruta, D. (2018), *Information asymmetry in small and medium enterprise credit guarantee schemes: evidence from Japan*, "Applied Economics", 50 (22), pp. 2469–2485, https://doi.org/10.1080/00036846.2017.1400651

Shan, C., Tang, D.Y. (2019), *Outsourcing bank loan screening: The economics of third-party loan guarantees*, "SSRN Electronic Journal", https://doi.org/10.2139/ssrn.2024425

Siegel, S., Castellan, N.J. Jr. (1988), *Non-parametric statistics for the behavioral sciences*, Mcgraw-Hill Book Company, New York.

Song, P., Zhang, H., Zhao, Q. (2020), *Innovative Credit Guarantee Schemes with Equity-for-Guarantee Swaps*, "Electronic Journal", https://doi.org/10.2139/ssrn.3652179

TIBCO Software Inc. (2017), *Statistica (data analysis software system), version 13.*, http://statistica.io. (accessed: 5.05.2021).

Ughetto, E., Scellato, G., Cowling, M. (2017), *Cost of capital and public loan guarantees to small firms*, "Small Business Economics", 49 (2), pp. 319–337, https://doi.org/10.1007/s11187-017-9845-y

Waniak-Michalak, H., Michalak, J., Turała, M. (2021), *Performance of nonbanking organisations granting guarantees within cohesion policy*, "Investigaciones Regionales – Journal of Regional Research", 49, pp. 5–26, https://doi.org/10.38191/iirr-jorr.21.008

Wardhono, A., Modjo, M.I., Utami, E.W. (2019), *The Role of Credit Guarantee Schemes for Financing MSMEs: Evidence from Rural and Urban Areas in Indonesia*, Asian Development Bank Institute, http://hdl.handle.net/11540/10435 (accessed: 5.05.2021).

Wheelan, C. (2014), *Naked Statistics*, W.W. Norton & Company, New York.

Woźniak, M., Matejun, M. (2018), *Cost-effectiveness Analysis of Financial Support Instruments for Small and Medium-sized Enterprises in the European Union*, "Acta Universitatis Lodziensis. Folia Oeconomica", 6 (339), pp. 41–56, https://doi.org/10.18778/0208-6018.339.03

Yang, J., Tang, Z., Yuan, Q., Xu, B. (2021), *The economic and social benefits of the government-backed credit guarantee fund under the condition of an economic downturn*, "Technological Forecasting and Social Change", 166, https://doi.org/10.1016/j.techfore.2021.120632

Yang, Z., Zhang, H. (2013), *Optimal capital structure with an equity-for-guarantee swap*, "Economics Letters", 118 (2), pp. 355–359, https://doi.org/10.1016/j.econlet.2012.11.023

Zecchini, S., Ventura, M. (2009), *The impact of public guarantees on credit to SMEs*, "Small Business Economics", 32, pp. 191–206, https://doi.org/10.1007/s11187-007-9077-7

Zwane, M. (2019), *Economic Impact Analysis of Credit Guarantee Schemes in Eswatini: A Case of the Small Scale Enterprise Loan Guarantee Scheme (SSELGS)*, https://www.africaportal.org/publications/economic-impact-analysis-credit-guarantee-schemes-eswatini-case-small-scale-enterprise-loan-guarantee-scheme-sselgs/ (accessed: 5.05.2021).

## Czy programy gwarancji kredytowych są efektywne? Doświadczenia krajów Unii Europejskiej

Celem artykułu jest ocena wybranych elementów modeli biznesowych programów poręczeń kredytowych (CGS) wdrażanych w 20 krajach Unii Europejskiej w ramach perspektywy finansowej 2007–2013. W artykule skupiono się na dodatkowości finansowej programów poręczeń kredytowych, która zależy głównie od sposobu zarządzania tymi programami, instytucji je wdrażających, wyznaczonych celów oraz ograniczeń dystrybucyjnych. Analizie poddano poziom kosztów wdrażania i wykorzystania funduszy przeznaczonych na realizację programów. W celu weryfikacji hipotezy zastosowaliśmy kilka metod: Kruskala-Wallisa, test mediany, analizę dyskryminacyjną, skalowanie wielowymiarowe, korelację. Przeprowadziliśmy również analizę mocy. Stwierdziliśmy, że efektywność systemów gwarancji kredytowych wdrażanych przez organizacje pozarządowe, fundusze poręczeń wzajemnych i agencje regionalne jest związana z poziomem rozwoju regionalnego. Zależność ta nie jest widoczna tylko w przypadku zaangażowania banków w realizację programów gwarancyjnych. Może to wynikać z braku możliwości przypisania działalności banku do jednego regionu. Nie stwierdziliśmy natomiast różnic w efektywności pomiędzy typami organizacji wdrażających programy gwarancji kredytowych. Odpowiedzi na postawione w artykule pytania badawcze mogą pomóc decydentom i badaczom w ustaleniu, czy dalsze wspieranie systemów gwarancji kredytowych jest opłacalne i czy należy zmienić sposób zarządzania tymi programami.

Słowa kluczowe: programy gwarancji kredytowych, model biznesowy, Unia Europejska, efektywność, organizacje pozarządowe, małe i średnie przedsiębiorstwa

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# Knowledge-Intensive Business Services Employment Structure and Economic Development in EU Regions

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## Abstract

The study presents the results of grouping EU NUTS 2 regions based on the share of employment in particular sectors (knowledge-intensive high-technology services, knowledge-intensive market services and other knowledge-intensive services), as well as GDP per capita, in 2008 and 2018. The grouping of regions was done by clustering methods (for structure data), including Ward's method to determine the number of groups and the k-means for the final partition. GDP groups were defined using a sample mean and one standard deviation. To assess the similarity of the classifications and, consequently, to evaluate correlations between the employment structures and the level and pace of economic development, the similarity measure for partitions proposed by Sokołowski was used.

Keywords: structures of employment, GDP per capita, regions of NUTS 2, similarity

JEL: E24, J21, R11



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## Introduction

The development of civilization and successive industrial revolutions have changed the economic structures at a different pace. Various methods of production, administration, and management in business, along with evolving customer service methods, have resulted in the emergence of knowledge-intensive employment, which has replaced traditional structures (with a predominance of agriculture and the significance of industry and complementary services).

In primitive civilizations, the share of people working in agriculture was 80%. However, Fourastié (1972) predicted that at the beginning of the third millennium, the share of people working in services in developed economies would reach almost 80%, while agriculture and industry would account for the remaining 20%. Indeed, in 2018, in the European Union (EU), the share of people working in services was 74%, industry and construction 22%, and agriculture 4% (Eurostat 2021c). The transformation in employment structure is also a result of the increasing reliance of both manufacturing and services on knowledge. The share of employment is continuously growing in the sections of knowledge-intensive high-technology services and knowledge-intensive market services. The diversification of the countries and regions of the EU in the employment shares in those sections is highly significant, as are the changes in these structures over time. The countries and regions of the EU also differ in the level and pace of development.

Therefore, the purpose of the study is to investigate the correlation between employment shares in the knowledge-intensive sections and the changes in these shares related to the level and pace of economic development, and to identify groups of regions with similar levels and paths of change.

## Literature overview

Clark (1940), Fisher (1952), and Fourastié (1972) are considered the pioneers of structural change assessment, proposing the concept of three sectors in the economy. Their studies represent the first attempt to grasp the regularities and reasons for the transformations in employment structures. Further research was conducted in economics by Kuznets, Fuchs, Chenery, Sauvy, Menz, and Stigler (Kwiatkowski 1982). Structural changes are analyzed from the historical perspective (Pasinetti 1981; 1993; Schmenner 2009; Timmer 2009; Gabardo, Pereima, and Einloft 2017), but also to identify structural changes in the World Economy (Memedovic and Iapadre 2010; Lewis et al. 2022), the role of manufacturing and services in economic growth (Attiah 2019; Institute 2021), employment polarization (Bárány and Siegel 2018), industrial growth, economic integration and structural change (Kallioras and Petrakos 2010;

Cutrini 2019). There have also been comparative analyses of employment structures (Sepp, Kaldaru, and Eerma 2009; Cheba and Bąk 2019; Markowska, Strahl, and Sobczak 2019; Pacana and Siwiec 2019; Bumberova and Kanovska 2020), a decomposition of changes in structure and trends in employment (Markowska 2017; Kouvavas et al. 2019; Luquini et al. 2019), and the assessment of sector share in the diversification of employment structures and trends in sector structure changes of employment (Markowska and Sokołowski 2017).

Correlations between the level of development, economic growth, and employment structures have been assessed in terms of structural change and economic growth (Laitner 2000; Bianchi, Valle, and Tapia 2021) and employment growth in knowledge-intensive business services (KIBS) (Chadwick, Glasson, and Smith 2008; Amancio et al. 2021; Zięba 2021). Research has investigated different territories, like China (Cai and Wang 2010) and US Metropolitan Areas (Bieri 2012), as well as smaller territories, including Romanian NUTS 3 regions (Jula and Jula 2013), the NUTS 3 regions of the V4 Group (Szakálné Kanó and Lengyel 2021), the Madrid city-region (de Ávila Serrano 2020), and larger economic systems, i.e., OECD countries (Dietrich 2012).

As a result of the increasing importance of knowledge in development, changes in employment in the industry sector and knowledge-based services are also research subjects. They are assessed in terms of the determinants of market extension and regional innovation systems (Bettiol et al. 2013; Lewandowska, Pater, and Cywiński 2019), testing the growth effects of structural change (Hartwig 2012), the geographical distribution and regional specialization of KIBS (Delgado-Márquez and García-Velasco 2013; Gallego and Maroto 2015; de Ávila Serrano 2019), employment growth in KIBS (Chadwick, Glasson, and Smith 2008), business services as a production factor (Drejer 2002), KIBS: prospects and policies (Miles 2005), exploring the financial consequences of the servitization of manufacturing (Neely 2007), business services location and market factors (Rubalcaba et al. 2013; Colaço and de Abreu e Silva 2021), knowledge-intensive services in a core industrial economy (Strambach 2004), innovation and productivity growth in services sector (Uppenberg and Strauss 2010; Börsch-Supan, Hunker, and Weiss 2021; Kurbonov 2021; Vujanovic 2021;), knowledge-intensive services and a restructuring economy (Wood 2004a), knowledge-intensive services: the diversity of processes and policies (Wood 2004b), the significance of KIBS (Wood 2006), and the business service revolution (Wood 2004a).

Europe, as a community of countries, is covered by the research addressing the specialization in KIBS (Marelli 2004; Gallego and Maroto 2015; Sisi and Zubiaurre 2021), the evolution of employment structures (Marelli 2004; Markowska, Sokołowski, and Strahl 2019), similarities in employment structures (Sepp, Kaldaru, and Eerma 2009; Markowska, Strahl, and Sobczak 2019; Godlewska-Dzioboń 2020), innovation and productivity growth in the EU services sector (Uppenberg and Strauss 2010; Georgescu and Herman 2019; Börsch-Supan,

Hunker, and Weiss 2021), the business service revolution (Wood 2004c), the significance of KIBS in Europe (Wood 2006), and the diversity of processes and policies in knowledge-intensive services (Wood 2004b).

Analysis lower than the country level covers NUTS 2 regions, in which the research focuses on, among other things, the geographical distribution and regional specialization of KIBS (Delgado-Márquez and García-Velasco 2013; Markowska, Kusterka-Jefmańska, and Jefmański 2016, Sisi and Zubiaurre 2020), industrial growth, economic integration, and structural change (Kallioras and Petrakos 2010), the decomposition of changes in structure and employment trends (Markowska 2017) and the correlations between KIBS and the regional importance of KIBS (Wood 2006).

## Method

In order to cluster EU NUTS 2 regions concerning KIBS employment and GDP level, and to compare both classifications, the following procedure was used: 1) the set of variables that refer to employment structures and the level of development were defined, 2) the research objects and years of analysis were identified (2008 and 2018), 3) for the data on employment structures, Ward's method (Ward 1963) was used to determine the number of groups, and the k-means method (MacQueen 1967) was used for final partition, 4) for the data on the level of development, regions were divided into four groups based on the sample mean and standard deviation of GDP per capita, 5) groups and mean values of variables in the groups were identified, the composition and changes in the groups were assessed, 6) the similarity of the partitions were assessed.

## Research objects and variables

The analysis required that the variables be determined and statistical data be collected. The changes in employment structures in KIBS sectors were assessed using variables selected from the Eurostat database (Eurostat 2021a):

- HT – employment share in the knowledge-intensive high-technology services section,
- M – employment share in the knowledge-intensive market services section (except for financial intermediation and high-technology services),
- O – employment share in the other knowledge-intensive services section.

Two hundred and seventy-two out of 281 EU regions (i.e., 96.8%) at the NUTS 2 level (Commission Commission Regulation (EU) No. 2016/2066) were covered by the research. Due to data unavailability, the analysis did not cover the overseas regions

of France (Guadeloupe, Martinique, Guyana, La Réunion, Mayotte), Portugal (Região Autónoma dos Açores, Região Autónoma da Madeira), or Spain (Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla).

The assessment of the basic statistics of the employment structure variables (HT, M and O) revealed that in 2018, for each variable, the mean and median values were higher than in 2008. Additionally, an increase in characteristics was recorded for the maximum employment shares in knowledge-intensive high-technology services and other knowledge-intensive services sections. Increases were also noted for the minimum and standard deviation for employment shares in knowledge-intensive high-technology services and knowledge-intensive market services sections. However, the minimum and standard deviation for employment shares in other knowledge-intensive services were lower. The coefficient of variation was lower for all variables.

It is also interesting to find that the number of regions in which the employment shares in 2018 significantly changed compared to 2008. And so, the employment share of the HT variable increased in 180 regions, for M in 214 regions, and for O in 206 regions. A higher employment share in 2018 dynamics, which exceeded 150%, was observed for HT (42 regions), M (17 regions), and O (1 region). Additionally, HT in 9 regions and M in 2 regions exceeded 200%. There was a decline in employment shares in 2018 to, at most, 90% of 2008's level for HT in 42 regions, for M in 28 regions, and for O in six regions.

The second set of variables covers the indicators that describe the level of development – GDP per capita (GDPpc) in thousand Euro PPS (Purchasing Power Standard). Interestingly, the regions with the highest (UKI3) and the lowest (BG31) GDPpc are the same in both years. In 2018, the borderline (maximum and minimum) mean and median values were higher. Twenty regions in 2018 had lower dynamics of changes in GDPpc. For two of them, NL11 and EL41, it amounted to only 80% of the 2008 level. By contrast, for 116 regions, it exceeded 120%, for 19 regions, it reached over 150%, and for one Irish region – Southern – it was more than 200% (Eurostat 2021b).

## Classification of regions in terms of the employment structure in the KIBS sections

### 2008 results

With Ward's agglomerative hierarchical clustering method, the number of groups of regions was identified by looking at the first big increase in agglomerative distance. Then the k-means method was used to obtain the final partitions. The characteristics of the groups of regions are presented in Table 1, and the regions included in these

groups are shown in Table 2. Full names of regions together with acronyms are given in the Appendix.

Table 1. Characteristics of the groups – 2008

| Group | Number of regions | Mean values of the variable | | | Sum of mean values | GDPpc – values in the group | | |
|---|---|---|---|---|---|---|---|---|
| | | HT | M | O | | mean | min. | max. |
| A | 13 | 6.8 | 11.5 | 29.3 | 47.6 | 47.9 | 30.4 | 147.5 |
| B | 39 | 4.4 | 7.8 | 29.6 | 41.8 | 33.3 | 18.6 | 68.4 |
| C | 83 | 2.2 | 5.0 | 32.6 | 39.8 | 24.8 | 16.6 | 48.2 |
| D | 70 | 1.9 | 5.2 | 24.4 | 31.5 | 25.4 | 10.2 | 44.8 |
| E | 67 | 1.3 | 3.3 | 19.3 | 23.9 | 17.1 | 7.3 | 34.0 |

Source: authors' compilation.

Table 1 also summarizes the mean and borderline values of GDPpc, calculated for the regions in the groups. The decreasing average employment share in knowledge-intensive high-technology services and knowledge-intensive market services sections is accompanied by a decreasing average level of GDP per capita (excluding group D).

Table 2. Number of regions from a given country and regions in the groups in 2008 – breakdown by employment structure

| Group | Regions – acronym and number of regions from a given country |
|---|---|
| D (70) | DE (19), EE (1), IE (1), EL (3), ES (7), FR (2), HR (1), IT (17), CY (1), LV (1), HU (3), AT (6), PL (2), PT (1), FI (1), UK (4) |
| | DE11, DE13, DE14, DE23, DE24, DE25, DE26, DE27, DE91, DE93, DE94, DEA1, DEA3, DEA4, DEA5, DEB3, DED4, DEE0, DEG0; EE00; IE05; EL52, EL54, EL63; ES12, ES21, ES41, ES43, ES51, ES61, ES70; FRD2, FRF1; HR03; ITC1, ITC3, ITC4, ITH1, ITH2, ITH3, ITH4, ITH5, ITI1, ITI2, ITF1, ITF2, ITF3, ITF4, ITF5, ITF6, ITG2; CY00; LV00; HU12, HU23, HU32; AT11, AT12, AT21, AT22, AT32, AT33; PL42, PL63; PT18; FI1C; UKD1, UKF2, UKF3, UKM5 |
| B (39) | BE (3), BG (1), DK (1), DE (7), EL (1), IT (1), LT (1), LU (1), MT (1), NL (5), AT (1), PT (1), RO (1), SI (1), SE (3), UK (9) |
| | BE10, BE24, BE31; BG41; DK01; DE12, DE21, DE30, DE60, DE71, DEA2, DED5; EL30; ITI4; LT01; LU00; MT00; NL23, NL31, NL32, NL33, NL41; AT13; PT17; RO32; SI04; SK01; SE12, SE22, SE23; UKD6, UKH2, UKH3, UKI5, UKI6, UKJ2, UKJ3, UKK1, UKM8 |
| E (67) | BG (5), CZ (7), DE (1), EL (8), ES (9), HR (1), IT (1), LT (1), HU (4), AT (2), PL (14), PT (3), RO (7), SI (1), SK (3) |
| | BG31, BG32, BG33, BG34, BG42; CZ02, CZ03, CZ04, CZ05, CZ06, CZ07, CZ08; DE22; EL51, EL53, EL61, EL62, EL64, EL65, EL42, EL43; ES11, ES13, ES22, ES23, ES24, ES42, ES52, ES53, ES62; HR04; ITI3; LT02; HU21, HU22, HU31, HU33; AT31, AT34; PL21, PL22, PL41, PL43, PL51, PL52, PL61, PL62, PL71, PL72, PL81, PL82, PL84, PL92; PT11, PT15, PT16; RO11, RO12, RO21, RO22, RO31, RO41, RO42; SI03; SK02, SK03, SK04 |

| Group | Regions – acronym and number of regions from a given country |
|---|---|
| C (83) | BE (8), DK (4), DE (11), IE (1), EL (1), FR (19), IT (2), NL (7), FI (2), SE (4), UK (24) |
| | BE21, BE22, BE23, BE25, BE32, BE33, BE34, BE35; DK02, DK03, DK04, DK05; DE40, DE50, DE72, DE73, DE80, DE92, DEB1, DEB2, DEC0, DED2, DEF0; IE04; EL41; FRB0, FRC1, FRC2, FRD1, FRE1, FRE2, FRF2, FRF3, FRG0, FRH0, FRI1, FRI2, FRI3, FRJ1, FRJ2, FRK1, FRK2, FRL0, FRM0; ITC2, ITG1; NL11, NL12, NL13, NL21, NL22, NL34, NL42; FI19, FI1D; SE21, SE31, SE32, SE33; UKC1, UKC2, UKD3, UKD4, UKD7; UKE1, UKE2, UKE3, UKE4, UKF1, UKG1, UKG2, UKG3, UKH1, UKJ4, UKK2, UKK3, UKK4, UKL1, UKL2, UKM6, UKM7, UKM9, UKN0 |
| A (13) | CZ (1), IE (1), ES (1), FR (1), HU (1), PL (1), FI (2), SE (1), UK (4) |
| | CZ01; IE06; ES30; FR10; HU11; PL91; FI1B, FI20; SE11; UKI3, UKI4, UKI7; UKJ1 |

Source: authors' compilation.

The names of groups A-E correspond to the decreasing intensity related to the sum of mean values in the groups of regions. Group A, which covers 13 regions, has the highest average employment share in the knowledge-intensive high-technology services and knowledge-intensive market services sections. The subsequent groups, due to employment shares in these sections, mostly have regressively lower values. The most numerous group – group C – which covers 83 regions, shows the highest average employment share in the knowledge-intensive services section.

## 2018 results

In this section, the k-means method was again used to cluster the EU regions into the number of groups identified in Ward's dendrogram. The initial characteristic of the groups of regions identified based on employment shares in the analyzed sections is provided in Table 3, and the regions assigned to these groups are shown in Table 4.

Table 3. Characteristics of the groups – 2018

| Group | Number of regions | Mean values of the variable | | | Sum of mean values | GDPpc – values in the group | | |
|---|---|---|---|---|---|---|---|---|
| | | HT | M | O | | mean | min. | max. |
| A | 17 | 7.6 | 11.3 | 28.3 | 47.2 | 55.6 | 25.4 | 190.5 |
| B | 43 | 4.2 | 9.1 | 31.1 | 44.4 | 37.2 | 14.4 | 80.9 |
| C | 66 | 2.4 | 5.9 | 34.6 | 42.9 | 27.8 | 14.9 | 46.3 |
| D | 81 | 1.9 | 4.8 | 27.8 | 34.5 | 28.8 | 14.1 | 69.2 |
| E | 65 | 1.9 | 4.6 | 20.5 | 27.0 | 22.6 | 10.3 | 43.9 |

Source: authors' compilation.

Table 4. Number of regions from a given country and regions in the groups in 2018 – breakdown by employment structure

| Group | Regions – acronym and number of regions from a given country |
|---|---|
| A (17) | BE (1), BG (1), CZ (1), IE (1), ES (1), FR (1), HU (1), PL (1), RO (1), SK (1), FI (1), SE (1), UK (5) |
| | BE10; BG41; CZ01; IE06; ES30; FR10; HU11l; PL91; RO32; SK01; FI1B; SE11; UKI3, UKI4, UKI6, UKI7; UKJ1 |
| B (43) | BE (3), DK (1), DE (5), EL (2), FR (1), IT (2), CY (1), LT (1), MT (1), NL (7), AT (1), PT (1), SI (1), FI (1), SE (3), UK (11) |
| | BE21, BE24, BE31; DK01; DE21, DE30, DE60, DE71, DEA2; EL30, EL41; FRJ2; ITC3, ITI4; CY00; LT01; LU00; MT00; NL11, NL22, NL23, NL31, NL32, NL33, NL41; AT13; PT17; SI04; FI20; SE12, SE22, SE23; UKD3, UKD6, UKG1, UKH1, UKH2, UKH3, UKI5, UKJ2, UKJ3, UKK1, UKL2 |
| C (66) | BE (7), DK (4), DE (6), EL (1), FR (14), IT (1), NL (3), FI (3), SE (4), UK (23) |
| | BE22, BE23, BE25, BE32, BE33, BE34, BE35; DK02, DK03, DK04, DK05; DE40, DE50, DE72, DED2, DED5, DEF0; EL54; FRB0, FRC1, FRC2, FRD2, FRE1, FRE2, FRH0, FRI1, FRI2, FRJ1, FRK1, FRK2, FRL0, FRM0; ITC2; NL12, NL13, NL21; FI19, FI1C, FI1D; SE21, SE31, SE32, SE33; UKC1, UKC2, UKD1, UKD4, UKD7, UKE2, UKE3, UKE4, UKF1, UKF2, UKF3, UKG2, UKG3, UKJ4, UKK2, UKK3, UKK4, UKL1, UKM6, UKM7, UKM8, UKM9, UKN0 |
| D (81) | DE (27), EE (1), IE (2), EL (4), ES (9), FR (6), HR (1), IT (8), LV (1), LT (1), HU (4), NL (2), AT (6), PL (2), PT (3), SK (2), UK (2) |
| | DE11, DE12, DE13, DE14, DE22, DE23, DE24, DE25, DE26, DE27, DE73, DE80, DE91, DE92, DE93, DE94, DEA1, DEA3, DEA4, DEA5, DEB1 Koblenz, DEB2 Trier, DEB3, DEC0, DED4, DEE0, DEG0; EE00; IE04, IE05; EL51, EL52, EL53, EL61; ES11, ES12, ES13, ES21, ES24, ES41, ES42, ES43, ES61; FRD1, FRF1, FRF2, FRF3, FRG0, FRI3; HR03; ITH1, ITH2, ITF2, ITF3, ITF5, ITF6, ITG1, ITG2; LV00; LT02; HU23, HU31, HU32, HU33; NL34, NL42; AT11, AT12, AT21, AT22, AT32, AT33; PL42, PL62; PT15, PT16, PT18; SK03, SK04; UKE1, UKM5 |
| E (65) | BG (5), CZ (7), EL (6), ES (7), HR (1), IT (10), HU (3), AT (2), PL (14), PT (1), RO (7), SI (1), SK (1) |
| | BG31, BG32, BG33, BG34, BG42; CZ02, CZ03, CZ04, CZ05 CZ06, CZ07, CZ08; EL62, EL63, EL64, EL65, EL42, EL43; ES22, ES23, ES51, ES52, ES53, ES62, ES70; HR04; ITC1, ITC4, ITH3, ITH4, ITH5, ITI1, ITI2, ITI3, ITF1, ITF4; HU12, HU21, HU22; AT31, AT34; PL21, PL22, PL41, PL43, PL51, PL52, PL61, PL63, PL71, PL72, PL81, PL82, PL84, PL92; PT11; RO11, RO12, RO21, RO22, RO31, RO41, RO42; SI03; SK02 |

Source: authors' compilation.

Group A comprises 17 regions and is characterized by the highest mean values of the HT and M variables. In the subsequent groups, the mean values of these variables get smaller. Group C, with 66 regions, has the highest share in the Other knowledge-intensive services section. The table also shows the mean and borderline values of GDPpc for the regions in these groups.

Like the classification for 2008, the decreasing average employment share in the knowledge-intensive high-technology services and knowledge-intensive market services sections accompanies the decreasing average level of GDPpc (except for group D). Table 4 provides the list of regions included in the groups.

# Regional clustering by GDP per capita

## 2008 results

In order to define the groups of EU regions at the NUTS 2 level based on GDPpc, we are using the mean value and standard deviation. The first group covers the regions where the GDPpc is higher than the average plus standard deviation. The second group comprises the regions for which the variable value is lower than this limit but higher than the mean value. The third group includes regions characterized by a GDPpc that is below the average but higher than the mean value minus standard deviation. The fourth group consists of the regions where the GDPpc is lower than the mean value minus standard deviation. Table 5 presents the characteristics of the groups of regions.

The groups of NUTS 2 regions identified in terms of GDPpc values are characterized by the fact that the increasingly lower ranges of GDPpc level go along with the decreasing mean values of employment shares in the sections of knowledge-intensive high-technology services, knowledge-intensive market services and other knowledge-intensive services. The sums of average shares in the groups I-IV were, respectively, 43.1, 36.2, 33.7, and 23.9.

Table 5. Characteristics of the groups – 2008

| Group | Number of regions | Group limits | GDPpc value in the group | | | Values of variables in the groups identified according to the level of GDPpc | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | HT | | | M | | | O | | |
| | | | mean | max | min | mean | max | min | mean | max | min | mean | max | min |
| I | 24 | >37.1 | 48.5 | 147.5 | 37.5 | 4.8 | 7.8 | 1.3 | 9.1 | 19.7 | 4.4 | 29.2 | 36.3 | 22.9 |
| II | 97 | 25.4–37.1 | 30.0 | 36.5 | 25.4 | 2.8 | 7.8 | 0.9 | 6.0 | 13.0 | 3.4 | 27.4 | 27.4 | 16.5 |
| III | 121 | 13.6–25.4 | 21.0 | 25.1 | 14.0 | 1.9 | 6.7 | 0.4 | 4.7 | 9.1 | 1.6 | 27.1 | 27.1 | 12.7 |
| IV | 30 | <13.6 | 12.6 | 13.4 | 7.3 | 1.1 | 1.9 | 0.6 | 2.8 | 5.3 | 1.0 | 20.0 | 20.0 | 11.7 |

Source: authors' compilation.

The technique used to determine the "ranges" for including regions in particular groups imposed their progressively lower mean values, as well as the decreasing values of these ranges.

## 2018 results

The previously described technique for determining ranges used in grouping the regions according to GDPpc was also used for the data from 2018 (cf. Table 6).

Table 6. Characteristics of the groups – 2018

| Group | Number of regions | Group limits | GDPpc value in the group | | | Values of variables in the groups identified according to the level of GDPpc | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | HT | | | M | | | O | | |
| | | | mean | max | min | mean | max | min | mean | max | min | mean | max | min |
| I | 24 | >44.5 | 59.5 | 190.5 | 44.6 | 5.6 | 9.6 | 1.9 | 9.6 | 17.0 | 4.3 | 28.5 | 37.0 | 22.3 |
| II | 89 | 30.0–44.5 | 35.6 | 44.5 | 30.1 | 3.1 | 9.1 | 1.0 | 6.9 | 15.5 | 3.2 | 29.5 | 42.9 | 18.4 |
| III | 143 | 15.5–30.0 | 23.4 | 29.7 | 15.5 | 2.2 | 6.9 | 0.7 | 5.3 | 13.6 | 2.6 | 28.0 | 41.7 | 13.2 |
| IV | 16 | <15.5 | 13.7 | 15.4 | 10.3 | 1.6 | 4.8 | 0.7 | 3.5 | 6.4 | 1.4 | 23.1 | 30.3 | 10.7 |

Source: author's compilation.

In 2018, the regions grouped by GDPpc regarding the HT and M variables were characterized by increasingly lower ranges of GDPpc and decreasing mean values of employment shares in the two sections. The sums of average shares in groups I-IV were, respectively, 43.7, 39.5, 35.3 and 28.2.

# Changes and similarities in regional clustering

## Based on the employment structure in 2008 and 2018

Compiling the results of grouping the EU regions by employment structure allows us to assess changes in the classifications. Table 7 presents the number of regions that were included in groups with similar employment structures (i.e., average shares) in both classifications in both years.

Table 7. Number of regions in the groups according to employment structure – 2008 and 2018 classifications

| Specification | A 2018 | B 2018 | C 2018 | D 2018 | E 2018 | Total |
|---|---|---|---|---|---|---|
| A 2008 | 12 (92.31) | 1 (7.69) | | | | 13 |
| B 2008 | 5 (12.82) | 31 (79.49) | 2 (5.13) | 1 (2.56) | | 39 |
| C 2008 | | 9 (10.84) | 58 (69.88) | 16 (19.28) | | 83 |
| D 2008 | | 2 (2.86) | 6 (8.57) | 48 (68.57) | 14 (20.0) | 70 |
| E 2008 | | | | 16 (23.88) | 51 (76.12) | 67 |
| Total | 17 | 43 | 66 | 81 | 65 | 272 |

Note: row % are given in parenthesis.
Source: author's compilation.

After adding the number of regions that were included in the groups characterized by similar "parameters" of employment structures in both years, the total number reached 200, i.e., 73.5% of all the assessed regions. Table 8 lists the regions that changed position. Of the 272 regions, 72 i.e. 26.5% changed position.

Table 8. Regions that changed classification positions in terms of employment structures in the respective sections in 2018

| Group in year | | Number of regions | Regions (acronym) |
|---|---|---|---|
| 2008 | 2018 | | |
| A | B | 1 | FI20 |
| B | A | 5 | BE10, BG41, SK01, UKI6 |
| | C | 2 | DED5, UKM8 |
| | D | 1 | DE12 |
| C | B | 9 | BE21, EL41, FRJ2, NL11, NL22, UKD3, UKG1, UKH1, UKL2 |
| | D | 16 | DE73, DE80, DE92, DEB1, DEB2, DEC0, IE04, FRD1, FRF2, FRF3, FRG0, FRI3, ITG1, NL34, NL42, UKE1 |
| D | B | 2 | ITC3, CY00 |
| | C | 6 | EL54, FRD2, FI1C, UKD1, UKF2, UKF3 |
| | E | 14 | EL63, ES51, ES70, ITC1, ITC4, ITH3, ITH4, ITH5, ITI1, ITI2, ITF1, ITF4, HU12, PL63 |
| E | D | 16 | DE22, EL51, EL53, EL61, ES11, ES13, ES24, ES42, LT02, HU31, HU33, PL62, PT15, PT16, SK03, SK04 |

Source: author's compilation.

## Based on the GDPpc in 2008 and 2018

Initially, the similarity of the regional classifications was assessed by comparing the number of regions that had the same GDP values per capita regarding similar parameters in both years. Group III was the most numerous and most stable in terms of the number of regions covered in both years, followed by group II (Table 9).

Table 9. Regions in the groups according to GDP per capita – 2008 and 2018 classifications

| Specification | I 2018 | II 2018 | III 2018 | IV 2018 | Total |
|---|---|---|---|---|---|
| I 2008 | 20 (83.3) | 4 (16.7) | | | 24 |
| II 2008 | 4 (4.1) | 80 (82.5) | 13 (13.4) | | 97 |
| III 2008 | | 5 (4.1) | 113 (93.4) | 3 (2.5) | 121 |

| | | | | | |
|---|---|---|---|---|---|
| IV 2008 | | | 17 (56.7) | 13 (43.3) | 30 |
| Total | 24 | 89 | 143 | 16 | 272 |

Note: % from the row is given in parenthesis.
Source: authors' compilation.

Twenty regions were moved to a "lower" group and 26 to a "higher" one, which means that 226 regions, i.e., over 83%, were included in the same groups of regions in terms of GDPpc parameters. Twenty regions in both years were always listed in group I, 80 in group II, 113 in group III, and 13 in group IV (Table 10).

Table 10. Regions in the groups identified in terms of GDPpc in 2008 and 2018

| Group in year | | Number of regions | Regions (acronym) |
|---|---|---|---|
| 2008 | 2018 | | |
| I | | 20 | BE10, CZ01, IE06, FR10, SK01, SE11, UKI3, UKI4, DK01, DE21, DE60, DE50, DE11, DE71, LU00, NL31, NL32, AT13, ITH1, AT32 |
| II | I | 4 | HU11, PL91, RO32, IE05 |
| I | II | 4 | FI1B, UKJ1, NL11, UKM5 |
| II | | 80 | BE21, BE24, BE31, BE23, BE25, PT17, SI04, FI20, SE12, SE22, SE23, SE21, SE31, SE32, SE33, UKD6 UKH2, UKJ2, UKJ3, UKI7, UKK1, DK03, DK04, DK05, DE72, DEF0, FRK2, FI19, FI1C, UKM7, DE12, DE13, DE14, DE22, DE23, DE24, DE25, DE26, DE27, DE73, DE91, DE92, DE94, DEA1, DEA3, DEA4, DEA5, DEB1, DEB3, DEC0, DE30, DEA2, NL34, NL42, NL22, NL33, NL41, NL21, AT12, AT21, AT22 S, AT33, AT31, AT34, ES22, ES51, ES53, ES21, ES24, ES30, ITC1, ITC4, ITH3, ITH4, ITH5, ITI1, ITC3, ITI4, ITH2, ITC2 |
| III | II | 5 | LT01, MT00, NL23, UKG1, DED5 |
| II | III | 13 | UKI6, EL30, CY00, UKH1, NL12, NL13, FI1D, UKE2, UKM6, EL42, ES23, ITI2, ITI3 |
| III | | 113 | BG41, FRJ2, UKD3, UKH3, UKI5, UKL2, BE22, BE32, BE33, BE34, BE35, DK02, DE40, DED2, FRB0, FRC1, FRC2, FRD2, FRE1, FRE2, FRH0, FRI1, FRI2, FRJ1, FRK1, FRL0, FRM0, UKC1, UKC2 UKD1, UKD4, UKD7, UKE3, UKE4, UKF1, UKF2, UKF3, UKG2, UKG3, UKJ4 Kent, UKK2, UKK3, UKK4, UKL1, UKM8, UKM9, UKN0, DE80DE93, DEB2 Trier, DED4, DEE0, DEG0, EE00, IE04, EL52, EL53, EL61, ES11, ES12, ES13, ES41, ES42, ES43, ES61, FRD1, FRF1, FRF2, FRF3, FRG0, FRI3, HR03, ITF2, ITF3, ITF5, ITF6, ITG1, ITG2, LV00, AT11, PT15, PT16, PT18, SK03, UKE1, CZ02, CZ03, CZ04, CZ05, CZ06, CZ07, CZ08, EL62, EL63, EL64, EL65, EL43, ES52, ES62, ES70, HR04, ITF1, ITF4, HU12, HU21, HU22, PL22, PL41, PL51, PT11, RO42, SI03, SK02 |
| IV | III | 17 | LT02, HU33, PL42, SK04, PL21, PL43, PL52, PL61, PL63, PL71, PL72, PL84, PL92, RO11, RO12, RO22, RO31 |
| III | IV | 3 | EL41, EL54 , EL51 |

| Group in year | | Number of regions | Regions (acronym) |
|---|---|---|---|
| 2008 | 2018 | | |
| IV | | 13 | HU23, HU31, HU32, PL62, BG31, BG32, BG33, BG34, BG42, PL81, PL82, RO21, RO41 |

Source: author's compilation.

## Similarity of classifications

The assessment of the classification similarity was performed using the similarity measure proposed by Sokołowski (1976; see also Rand 1971), as shown in Table 11. The similarity coefficients demonstrate what portion of pairs of objects were identically classified (pair of objects together or separately) in both classifications. The study focused on assessing the similarity of the groups of EU NUTS 2 regions based on the employment structure in KIBS sections, and the level of development assessed using GDPpc.

Table 11. The similarity of classifications

| Specification | Sections 2008 | Sections 2018 | GDPpc 2008 | GDPpc 2018 |
|---|---|---|---|---|
| Sections 2008 | 1 | 0.799 | 0.625 | 0.605 |
| Sections 2018 | 0.799 | 1 | 0.615 | 0.595 |
| GDPpc 2008 | 0.625 | 0.615 | 1 | 0.807 |
| GDPpc 2018 | 0.605 | 0.595 | 0.807 | 1 |

Source: author's compilation.

The assessment was performed from different perspectives, i.e., sections, level of development and years. The largest similarity of divisions (0.807) is characteristic for the regions grouped according to the level of development in 2008 and 2018, followed by employment in the service sections regarding the intensity of using knowledge in 2008 and 2018, and next groups of regions from the EU countries in 2008 in terms of the employment structure in the analyzed sections and the level of development (0.625). Generally, the level of similarity of analyzed partitions can be evaluated as moderate.

## Conclusions

The multivariate data analysis methods made it possible to identify groups of regions that are similar due to their employment structures in KIBS sections and the level of development, and changes and similarities in the classifications for 2008 and 2018. It also made it possible to assess these regions' allocation in relation to the shifts and similarities, covering the countries that have joined the EU since 2004.

The shifts of regions to "better" mean an increase in employment share in KIBS sections (38 regions), and to the groups with the smallest numbers, there is an increase in the GDPpc (26 regions). At the same time, no changes in classification were observed for 200 regions regarding the employment structure in KIBS sections in both analyzed years, or for 226 regions regarding GDPpc. In total, 172 EU regions were simultaneously in the same groups in terms of employment structure and GDPpc, i.e., over 63%. This situation means that in the analyzed period, the majority of EU regions recorded stagnation in the structure and level of development.

There are many regions (34) – covering whole countries, including Austria, Denmark, Czechia, Croatia, Sweden and Slovenia, and three country-regions, i.e., Estonia, Luxembourg and Latvia – which were allocated to the same groups in terms of employment structure and development level in both years. The regions from Belgium, Bulgaria, France, and Portugal (25 in total) are included in the same groups based on development level in both years. Malta is a country-region that, based on the employment structure, was placed in the same group in both years.

More than half of the regions (32 out of 61) from the countries that joined the EU in 2004 were placed in the same group in both years in terms of employment structure and development level:

- CZ01 was in group A and group I.
- SI02 was in group B and group II.
- SI04, HR03, EE00, and LV00 were in group D and group III.
- The remaining 7 Czech regions (CZ02–CZ08), three Polish regions (PL22, PL41, and PL51), as well as two Hungarian (HU21 and HU22), one Slovak (SK02), one Romanian (RO04), one Croatian (HR04) and one Slovenian (SI03) region were in group III and group E.
- Two Hungarian regions (HU23 and HU32) were in group D and group IV.
- Five Bulgarian (BG31, BG32, BG33, BG34, and BG42), two Polish (PL81 and PL82) and two Romanian (RO21 and RO41) regions were in group IV and group E.

**The movement to "better"** groups was recorded for 38 regions in terms of:

1. **both classification systems** for five EU regions, including four that joined the EU in 2004.
   - RO32 moved from group B to A and from group II to I;
   - UKG1 moved from group C to B and from group III to II;
   - LT02, HU33, and SK04 moved from group E to D and from group IV to III;
2. **the level of development for 26 regions:**
   - four regions moved from group II to I, including three that joined the EU in 2004: HU11, PL91 (the capital region), RO32 and IE05 from group A;
   - five regions moved from group III to II, including one that joined the EU in 2004: LT01, MT00, NL23 (group B in terms of the employment structure), DED5 (it went from B to C), and UKG1 (from group C to B);
   - 17 regions moved from group IV to III, including twelve that joined the EU in 2004 and which were classified E in terms of employment structure: eight Polish regions (PL21, PL43, PL52, PL61, PL71, PL72, PL84, PL92) and four Romanian regions (RO11, RO12, RO22, RO31);
3. **the employment structure for 38 regions:**
   - five regions moved from group B to A, including three that joined the EU in 2004: BE10, SK01 (group I), RO32 (from II to I), UKI6 (although it moved from group II to III), BG41 (stable level of development);
   - nine regions moved from group C to B: NL11 (group I to II), BE21 and NL22 (stable in group II), UKH1 (although it moved from group II to III), UKG1 (group III to II), FRJ2, UKD3, UKL2 (stable in group III), and EL41 (although it moved from group III to IV);
   - two regions moved from group D to B, including one new EU member – this is the only "leap" by two groups: ITC3 (stable in group II), CY00 (group II to III);
   - six regions moved from group D to C: FRD2, UKD1, UKF2, UKF3, and FI1C (stable in group III), and EL53 (although it moved from group III to IV);
   - 16 regions moved from group E to D, including six new EU members: DE22 and ES24 (stable in group II), EL53, EL61, ES11, ES13, ES42, PT15, PT16, and SK03 (stable in group III), HU31 and PL62 (stable in group IV), EL51 (although it moved from group III to IV), and LT02, HU33, and SK04 (group IV to III).

**Negative changes** occurred for 34 regions:

1. **the Italian region ITI2 moved for both classification systems, from group D to E and from II to III;**
2. **in terms of the level of development:**
   - four regions moved from I to II: FI1B and UKJ1 (both in group A), NL11 (although it moved from group C to B), and UKM5 (stable in group D);
   - 13 regions moved from II to III, including one new EU region: NL12, NL13, FI1D, UKE2, and UKM6 (stable in group C), EL42, ES23, ITI3 (stable in group E), EL30 (stable in group B), UKI6 (although it moved from B to A), UKH1 (although it moved from C to B), CY00 (although it moved from D to B), and ITI2 (from D to E);
   - three regions moved from III to IV, although they all improved in terms of employment structure: EL41 (from C to B), EL54 (from D to C), and EL51 (from E to D);
3. **in terms of employment structure:**
   - region FI20 from A to B (stable in group II);
   - two regions moved from B to C: UKM8 (stable in group III) and DED5 (although it moved from group III to II);
   - one moved from B to D: DE12 (stable in group II);
   - 16 regions moved from C to D: DE73, DE92, DEB1, DEC0, NL34, NL42 (stable in group II), and DE80, DEB2, IE04, FRD1, FRF2, FRF3, FRG0, FRI3, ITG1, and UKE1 (stable in group III);
   - 14 regions moved from D to E: ES51, ITC1, ITC4, ITH3, ITH4, ITH5, and ITI1 (stable in group II), EL63, ES70, ITF1, ITF4, and HU12 (stable in group III), ITI2 (from group II to III), and PL63 (from III to IV).

The main finding observed in the 2008 and 2018 classifications of Central and Eastern Europe regions (i.e., Poland, Czechia, Bulgaria, Hungary, Romania, Slovakia, Slovenia, Latvia, Lithuania, and Estonia) based on the KIBS employment structure is the high level of cluster stability. Eighty-eight percent of the 59 regions were in the same clusters, and most were in groups with lower employment rates in all economic sections. Seven regions improved, moving from group B to A (regions with capital cities, i.e., BG41 Yugozapaden, RO32 Bucuresti – Ilfov, and SK01 Bratislavský kraj) or from E to D (HU31 Észak-Magyarország, SK03 Stredné Slovensko, SK04 Východné Slovensko, and LT01 Lithuania). Generally, the employment structures in Central and Eastern Europe were fixed between 2008 and 2018.

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## References

Amancio, I.R., Sousa Mendes, G.H. de, Moralles, H.F., Fischer, B., Sisti, E. (2021), *The interplay between KIBS and manufacturers: a scoping review of major key themes and research opportunities*, "European Planning Studies", 30 (10), pp. 1919–1941, https://doi.org/10.1080/09654313.2021.1995852

Attiah, E. (2019), *The Role of Manufacturing and Service Sectors in Economic Growth: An Empirical Study of Developing Countries*, "European Research Studies Journal", XXII (1), pp. 112–127, https://doi.org/10.35808/ersj/1411

Ávila Serrano, V. de (2019), *The Intrametropolitan Geography of Knowledge-Intensive Business Services (KIBS): A Comparative Analysis of Six European and U.S. City-Regions*, "Economic Development Quarterly", 33 (4), pp. 279–295, https://doi.org/10.1177/0891242419875498

Ávila Serrano, V. de (2020), *Dynamics and distribution of the knowledge economy in contemporary crisis (2000–2015) in the Madrid city-region*, "Knowledge Management Research & Practice", pp. 1–19, https://doi.org/10.1080/14778238.2020.1855087

Bárány, Z.L., Siegel, Ch. (2018), *Job Polarization and Structural Change*, "American Economic Journal: Macroeconomics", 10 (1), pp. 57–89, https://doi.org/10.1257/mac.20150258

Bettiol, M., De Marchi, V., Di Maria, E., Grandinetti, R. (2013), *Determinants of Market Extension in Knowledge-Intensive Business Services: Evidence from a Regional Innovation System*, "European Planning Studies", 21 (4), pp. 498–515, https://doi.org/10.1080/09654313.2012.722930

Bianchi, M., Valle, I., Tapia, C. (2021), *Material productivity, socioeconomic drivers and economic structures: A panel study for European regions*, "Ecological Economics", 106948, https://doi.org/10.1016/j.ecolecon.2021.106948

Bieri, D.S. (2012), *Regional Structure and Economic Development: Growth Empirics for U.S. Metropolitan Areas*, [in:] P. Schaeffer, E. Kouassi (eds.), *Econometric Methods for Analyzing Economic Development*, IGI Global, Hershey, https://doi.org/10.4018/978-1-4666-4329-1.ch010

Börsch-Supan, A., Hunker, Ch., Weiss M. (2021), *Big Data at Work: Age and Labor Productivity in the Service Sector*, "Journal of the Economics of Aging", 100319, https://doi.org/10.1016/j.jeoa.2021.100319

Bumberova, V., Kanovska, L. (2020), *Sustainable marketing strategy under globalization: a comparison between p-KIBS and t-KIBS sectors*, SHS Web of Conferences 74, 01003, https://doi.org/10.1051/shsconf/20207401003

Cai, F., Wang, M. (2010), *Growth and structural changes in employment in transition China*, "Journal of Comparative Economics", 38 (1), pp. 71–81, https://doi.org/10.1016/j.jce.2009.10.006

Chadwick, A., Glasson, J., Smith, H.L. (2008), *Employment Growth in Knowledge-Intensive Business Services in Great Britain during the 1990s – Variations at the Regional and Sub-Regional Level*, "Local Economy", 23 (1), pp. 6–18, https://doi.org/10.1080/02690940801917384

Cheba, K., Bąk, I.D. (2019), *The Application of Multi-Criteria Taxonomy to Comparative Analysis of Structures of Sustainable Development*, "Acta Universitatis Lodziensis. Folia Oeconomica", 5 (344), pp. 29–48, https://doi.org/10.18778/0208-6018.344.03

Clark, C. (1940), *The Conditions of Economic Progress*, Macmillan, London.

Colaço, R., Abreu e Silva, J.C. de (2021), *Commercial Classification and Location Modelling: Integrating Different Perspectives on Commercial Location and Structure*, "Land", 10 (6), 567, https://doi.org/10.3390/land10060567

Commission Regulation (EU) No. 2016/2066 of 21 November 2016 amending the annexes to Regulation (EC) No. 1059/2003 of the European Parliament and of the Council on the establishment of a common classification of territorial units for statistics (NUTS).

Cutrini, E. (2019), *Economic integration, structural change, and uneven development in the European Union*, "Structural Change and Economic Dynamics", 50, pp. 102–113, https://doi.org/10.1016/j.strueco.2019.06.007

Delgado-Márquez, B.L., García-Velasco, M.M. (2013), *Geographical Distribution and Regional Specialization of Knowledge-Intensive Business Services: An Empirical Investigation Across European Regions*, "Service Industries and Regions", pp. 305–337, https://doi.org/10.1007/978-3-642-35801-2_13

Dietrich, A. (2012), *Does growth cause structural change, or is it the other way around? A dynamic panel data analysis for seven OECD countries*, "Empirical Economics", 43, pp. 915–944, https://doi.org/10.1007/s00181-011-0510-z

Drejer, I. (2002), *Business services as a production factor*, "Economic Systems Research", 4, pp. 389–405, https://doi.org/10.1080/0953531022000024851

Eurostat (2021a), *Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2)*, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=htec_emp_reg2&lang=en (accesed: 30.07.2021).

Eurostat (2021b), *Gross domestic product (GDP) at current market prices by NUTS 2 regions*, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10r_2gdp&lang=en (accesed: 30.07.2021).

Eurostat (2021c), *Employment by sex, age, economic activity and NUTS 2 regions (NACE Rev. 2) (1 000)*, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfst_r_lfe2en2&lang=en (accesed: 30.07.2021).

Fisher, A.G.B. (1952), *A Note on Tertiary Production*, "The Economic Journal", 62 (248), pp. 820–834, https://doi.org/10.2307/2226528

Fourastié, J. (1972), *Myśli przewodnie*, PIW, Warszawa.

Gabardo, F.A., Pereima, J.B., Einloft, P. (2017), *The incorporation of structural change into growth theory: A historical appraisal*, "EconomiA", 18 (3), pp. 392–410, https://doi.org/10.1016/j.econ.2017.05.003

Gallego, J., Maroto, A. (2015), *The Specialization in Knowledge-Intensive Business Services (KIBS) across Europe: Permanent Co-Localization to Debate*, "Regional Studies", 49 (4), pp. 644–664, https://doi.org/10.1080/00343404.2013.799762

Georgescu, M.-A., Herman, E. (2019), *Productive Employment for Inclusive and Sustainable Development in European Union Countries: A Multivariate Analysis*, "Sustainability", 11 (6), pp. 1–19, https://doi.org/10.3390/su11061771

Godlewska-Dzioboń, B. (2020), *Sectoral employment structure in central and eastern European countries compared to highly developed countries in the European Union*, [in:] A. Ujwary-Gil, M. Gancarczyk (eds.), *New Challenges in Economic Policy*, "Business, and Management", pp. 85–105.

Hartwig, J. (2012), *Testing the growth effects of structural change*, "Structural Change and Economic Dynamic", 23 (1), pp. 11–24, https://doi.org/10.1016/j.strueco.2011.09.001

Jula, D., Jula, M.-N. (2013), *Economic Growth and Structural Changes in Regional Employment*, "Romanian Journal of Economic Forecasting", 2, pp. 52–69.

Kallioras, D., Petrakos, G. (2010), *Industrial growth, economic integration and structural change: evidence from the EU new member-states regions*, "Annals of Regional Science", 45, pp. 667–680, https://doi.org/10.1007/s00168-009-0296-5

Kouvavas, O., Kuik, F., Koester, G., Nickel, C. (2019), *The effects of changes in the composition of employment on euro area wage growth*, "European Central Bank Economic Bulletin", 8, https://www.ecb.europa.eu/pub/economic-bulletin/html/eb201908.en.html (accesed: 30.07.2021).

Kurbonov, S. (2021), *Promoting efficient and productive employment in the labor market*, "SAARJ Journal on Banking & Insurance Research", 10 (4), pp. 9–22, https://doi.org/10.5958/2319-1422.2021.00027.8

Kwiatkowski, E. (1982), *Z problematyki genezy teorii trzech sektorów gospodarki*, "Acta Universitatis Lodziensis. Folia Oeconomica", 19, pp. 11–28.

Laitner, J. (2000), *Structural Change and Economic Growth*, "Review of Economic Studies", 67, pp. 545–561, https://doi.org/10.1111/1467-937X.00143

Lewandowska, A., Pater, R., Cywiński, Ł. (2019), *Determinants of business innovation in the Regional Innovation System context. Policy implications for a less developed region*, "Studia Regionalne i Lokalne", 1 (75), pp. 5–27, https://doi.org/10.7366/1509499517501

Lewis, L.T., Monarch, R., Sposi, M., Zhang, J. (2022), *Structural Change and Global Trade*, "Journal of the European Economic Association", 20 (1), pp. 476–512, https://doi.org/10.1093/jeea/jvab024

Luquini, R.H., Sesso Filho, U.A., Brene, P.R.A., Castro, G.H.L., Esteves, E.G.Z. (2019), *Decomposição estrutural do emprego: Um estudo para os países do BRIC*, "A Economia Em Revista – AERE", 26 (1), 6574.

MacQueen, J.B. (1967), *Some Methods for classification and Analysis of Multivariate Observations*, "Proceedings of 5-th Berkeley Symposium on Mathematical Statistics and Probability", 1, pp. 281–297.

Marelli, E. (2004), *Evolution of employment structures and regional specialization in the EU*, "Economic Systems", 28 (1), pp. 35–59, https://doi.org/10.1016/j.ecosys.2004.01.004

Markowska, M. (2017), *Decomposition of changes in structure and trends in employment in Czechia at NUTS2 level*, "GeoScape", 11 (2), pp. 84–92, https://doi.org/10.1515/geosc-2017-0007

Markowska, M., Sokołowski, A. (2017), *Ocena udziału sektorów w zróżnicowaniu struktur zatrudnienia w Warszawie i powiatach sąsiadujących w latach 2005–2014*, „Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego", 31 (4), pp. 25–39, https://doi.org/10.24917/20801653.314.2

Markowska, M., Kusterka-Jefmańska, M., Jefmański, B. (2016), *Analysis of smart specialization in European regions using fuzzy classification*, "Argumenta Oeconomica", 37 (2), pp. 31–65, https://doi.org/10.15611/aoe.2016.2.02

Markowska, M., Sokołowski, A., Strahl, D. (2019), *Dynamiczne skalowanie wielowymiarowe w analizie zmian struktury zatrudnienia w krajach Unii Europejskiej w latach 1999–2016*, "Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego", 33 (1), pp. 7–17, https://doi.org/10.24917/20801653.331.1

Markowska, M., Strahl, D., Sobczak, E. (2019), *Podobieństwo struktur zatrudnienia w krajach Unii Europejskiej w latach 2008–2017 – ocena dynamiki*, "Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego", 33 (4), pp. 283–294, https://doi.org/10.24917/20801653.334.17

Memedovic, O., Iapadre, L. (2010), *Structural Change in the World Economy: Main Features and Trends*, United Nations Industrial Development Organization – Vienna International Centre, Research and Statistics Branch, "Working Paper" 24.

Miles, I. (2005), *Knowledge intensive business services: prospects and policies*, "Foresight", 7 (6), pp. 39–63, https://doi.org/10.1108/14636680510630939

Neely, A. (2007), *Exploring the financial consequences of the servitization of manufacturing*, "Operations Management Research", 1, pp. 103–118, https://doi.org/10.1007/s12063-009-0015-5

Pacana, A., Siwiec, D. (2019), *An analysis of the changes of employment in industry*, "Humanities and Social Sciences", 26 (2), pp. 121–130, https://doi.org/10.7862/rz.2019.hss.19

Pasinetti, L.L. (1981), *Structural Change and Economic Growth: A Theoretical Essay on the Dynamics of the Wealth of Nations*, Cambridge University Press, Cambridge.

Pasinetti, L.L. (1993), *Structural Economic Dynamic: A Theory of the Economic Consequences of Human Learning*, Cambridge University Press, Cambridge.

Rand, W.M. (1971), *Objective criteria for the evaluation of clustering methods*, "Journal of the American Statistical Association", 66 (336), pp. 846–850, https://doi.org/10.1080/01621459.1971.10482356

Rubalcaba, L., Gallego, J., Gallo, M.T., Garrido, R. (2013), *Business services location and market factors in major European cities*, "Cities", 31, pp. 258–266, https://doi.org/10.1016/j.cities.2012.06.022

Schmenner, R.W. (2009), *Manufacturing, service, and their integration: some history and theory*, "International Journal of Operations & Production Management", 29 (5), pp. 431–443, https://doi.org/10.1108/01443570910953577

Sepp, J., Kaldaru, H., Eerma, D. (2009), *Comparative Analysis of Employment Sectoral Structure in European Union Countries*, "International Review of Business Research Papers", 5 (2), pp. 76–88.

Sisi, E., Zubiaurre, A. (2020), *Panel analysis of the creation of new KIBS in Spain: The role of manufacturing and regional innovation system (RIS)*, "Investigaciones Regionales", 48, pp. 37–50, https://doi.org/10.38191/iirr-jorr.20.019

Sokołowski, A. (1976), *Metoda porównywania wyników podziału zbioru skończonego*, XII Konferencja naukowa ekonometryków, statystyków i matematyków z Akademii Ekonomicznych Katowic, Krakowa i Wrocławia, Karpacz.

Strambach, S. (2004), *Germany: knowledge-intensive services in a core industrial economy*, [in:] P. Wood (ed.) *Consultancy and Innovation: The Business Service Revolution in Europe*, Routledge, Taylor and Francis Group, London–New York, pp. 124–151.

Szakálné Kanó, I., Lengyel, I. (2021), *Convergence Clubs of NUTS3 Regions of the V4 Group*, "E&M Economics and Management", 24 (4), pp. 22–38, https://doi.org/10.15240/tul/001/2021-4-002

Timmer, C.P. (2009), *A World Without Agriculture: The Structural Transformation in Historical Perspective*, American Enterprise Institute, Washington.

Uppenberg, K., Strauss, H. (2010), *Innovation and productivity growth in the EU services sector*, European Investment Bank, "EIB Paper".

Vujanovic, N. (2021), *Technological Trends in the Manufacturing and Service Sectors. The Case of Montenegro*, "South East European Journal of Economics and Business", 16 (1), pp. 120–133, https://doi.org/10.2478/jeb-2021-0010

Ward, J.H. (1963), *Hierarchical Grouping of Optimize an Objective Function*, "Journal of the American Statistical Association", 58, pp. 236–244, https://doi.org/10.2307/2282967

Wood, P. (2004a), *The United Kingdom: knowledge-intensive services and a restructuring economy*, [in:] P. Wood (ed.), *Consultancy and Innovation: The Business Service Revolution in Europe*, Routledge, Taylor and Francis Group, London–New York, pp. 175–208.

Wood, P. (2004b), *Knowledge-intensive services: the diversity of processes and policies*, [in:] P. Wood (ed.), *Consultancy and Innovation: The Business Service Revolution in Europe*, Routledge, Taylor and Francis Group, London–New York, pp. 344–364.

Wood, P. (ed.) (2004c), *Consultancy and Innovation: The Business Service Revolution in Europe*, Routledge, Taylor and Francis Group, London–New York, https://doi.org/10.4324/9780203116647

Wood, P. (2006), *The regional significance of knowledge intensive business services in Europe*, "Innovation", 19 (1), pp. 51–66, https://doi.org/10.1080/13511610600607718

Zięba, M. (2021), *KIBS Companies and Their Importance for Economy and Innovation*, [in:] M. Zięba, *Understanding Knowledge-Intensive Business Services. Knowledge Management and Organizational Learning*, Vol. 10. Springer, Cham, pp. 91–121, https://doi.org/10.1007/978-3-030-75618-5_4

## Struktura zatrudnienia w usługach biznesowych opartych na wiedzy a rozwój gospodarczy regionów Unii Europejskiej

Praca przedstawia wyniki grupowania regionów Unii Europejskiej szczebla NUTS 2 dokonanego na podstawie struktury zatrudnienia w usługach biznesowych opartych na wiedzy, rozpatrywanej w trzech sekcjach: usługi wysokich technologii, usługi marketingowe oraz pozostałe usługi biznesowe oparte na wiedzy, w powiązaniu z poziomem PKB na mieszkańca. Analizę przeprowadzono dla lat 2008 i 2018. Do grupowania regionów z punktu widzenia struktury zatrudnienia wykorzystano aglomeracyjną metodę Warda (do identyfikacji liczby grup) oraz metodę k-średnich (dla uzyskania ostatecznego podziału). Dla oceny podobieństwa podziałów oraz związków pomiędzy strukturą zatrudnienia w analizowanych usługach biznesowych a poziomem i dynamiką rozwoju gospodarczego zastosowano miarę podobieństwa podziałów zbioru skończonego.

Słowa kluczowe: struktura zatrudnienia, PKB per capita, region NUTS 2, podobieństwo

## Appendix – list of regions and acronyms

AT11 Burgenland
AT12 Niederösterreich
AT13 Wien
AT21 Kärnten
AT22 Steiermark
AT31 Oberösterreich
AT32 Salzburg
AT33 Tirol
AT34 Vorarlberg
BE10 Région de Bruxelles-Capitale
BE21 Prov. Antwerpen
BE22 Prov. Limburg
BE23 Prov. Oost-Vlaanderen
BE24 Prov. Vlaams-Brabant
BE25 Prov. West-Vlaanderen
BE31 Prov. Brabant Wallon
BE32 Prov. Hainaut
BE33 Prov. Liege
BE34 Prov. Luxembourg
BE35 Prov. Namur
BG31 Severozapaden
BG32 Severen tsentralen
BG33 Severoiztochen
BG34 Yugoiztochen
BG41 Yugozapaden
BG42 Yuzhen tsentralen
CY00 Kypros
CZ01 Praha
CZ02 Střední Cechy
CZ03 Jihozápad
CZ04 Severozápad
CZ05 Severovýchod
CZ06 Jihovýchod
CZ07 Střední Morava
CZ08 Moravskoslezsko
DE11 Stuttgart
DE12 Karlsruhe
DE13 Freiburg
DE14 Tübingen
DE21 Oberbayern
DE22 Niederbayern
DE23 Oberpfalz
DE24 Oberfranken
DE25 Mittelfranken
DE26 Unterfranken
DE27 Schwaben
DE30 Berlin
DE40 Brandenburg
DE50 Bremen
DE60 Hamburg
DE71 Darmstadt
DE72 Gießen
DE73 Kassel
DE80 Mecklenburg-Vorpommern
DE91 Braunschweig
DE92 Hannover
DE93 Lüneburg
DE94 Weser-Ems
DEA1 Düsseldorf
DEA2 Köln
DEA3 Münster
DEA4 Detmold
DEA5 Arnsberg,
DEB1 Koblenz
DEB2 Trier
DEB3 Rheinhessen-Pfalz
DEC0 Saarland
DED2 Dresden
DED4 Chemnitz
DED5 Leipzig
DEE0 Sachsen-Anhalt
DEF0 Schleswig-Holstein
DEG0 Thüringen
DK01 Hovedstaden
DK02 Sjalland
DK03 Syddanmark
DK04 Midtjylland
DK05 Nordjylland
EE00 Esti
EL30 Attiki
EL41 Voreio Aigaio
EL42 Notio Aigaio
EL43 Kriti
EL51 Anatoliki Makedonia, Thraki
EL52 Kentriki Makedonia
EL53 Dytiki Makedonia
EL54 Ipeiros
EL61 Thessalia
EL62 Ionia Nisia
EL63 Dytiki Ellada
EL64 Sterea Ellada
EL65 Peloponnisos

ES11 Galicia
ES12 Principado de Asturias
ES13 Cantabria
ES21 País Vasco
ES22 Comunidad Foral de Navarra
ES23 La Rioja
ES24 Aragón
ES30 Comunidad de Madrid
ES41 Castilla y León
ES42 Castilla-la Mancha
ES43 Extremadura
ES51 Cataluna
ES52 Comunidad Valenciana
ES53 Illes Balears
ES61 Andalucía
ES62 Región de Murcia
ES70 Canarias
FI19 Länsi-Suomi
FI1B Helsinki-Uusimaa
FI1C Etelä-Suomi
FI1D Pohjois-ja Itä-Suomi
FI20 Aland
FR10 Île de France
FRB0 Centre-Val de Loire
FRC1 Bourgogne
FRC2 Franche-Comté
FRD1 Basse-Normandie
FRD2 Haute-Normandie
FRE1 Nord-Pas de Calais
FRE2 Picardie
FRF1 Alsace
FRF2 Champagne-Ardenne
FRF3 Lorraine
FRG0 Pays de la Loire
FRH0 Bretagne
FRI1 Aquitaine
FRI2 Limousin
FRI3 Poitou-Charentes
FRJ1 Languedoc-Roussillon
FRJ2 Midi-Pyrénées
FRK1 Auvergne
FRK2 Rhône-Alpes
FRL0 Provence-Alpes-Côte d'Azur
FRM0 Corse
HR03 Jadranska Hrvatska
HR04 Kontinentalna Hrvatska
HU11 Budapest
HU12 Pest
HU21 Közép-Dunántúl
HU22 Nyugat-Dunántúl
HU23 Dél-Dunántúl
HU31 Észak-Magyarország
HU32 Észak-Alföld
HU33 Dél-Alföld
IE04 Northern and Western
IE05 Southern
IE06 Eastern and Midland
ITC1 Piemonte
ITC2 Valle d'Aosta
ITC3 Liguria
ITC4 Lombardia
ITF1 Abruzzo
ITF2 Molise
ITF3 Campania
ITF4 Puglia
ITF5 Basilicata
ITF6 Calabria
ITG1 Sicilia
ITG2 Sardegna
ITH1 Provincia Autonoma di Bolzano
ITH2 Provincia Autonoma di Trento
ITH3 Veneto
ITH4 Friuli-Venezia Giulia
ITH5 Emilia-Romagna
ITI1 Toscana
ITI2 Umbria
ITI3 Marche
ITI4 Lazio
LT01 Sostines regionas
LT02 Vidurio ir vakaru Lietuvos regionas
LU00 Luxembourg
LV00 Latvija
MT00 Malta
NL11 Groningen
NL12 Friesland
NL13 Drenthe
NL21 Overijssel
NL22 Gelderland
NL23 Flevoland
NL31 Utrecht
NL32 Noord-Holland
NL33 Zuid-Holland
NL34 Zeeland
NL41 Noord-Brabant
NL42 Limburg
PL21 Małopolskie
PL22 Śląskie
PL41 Wielkopolskie

PL42 Zachodniopomorskie
PL43 Lubuskie
PL51 Dolnośląskie
PL52 Opolskie
PL61 Kujawsko-Pomorskie
PL62 Warmińsko-Mazurskie
PL63 Pomorskie
PL71 Łódzkie
PL72 Świętokrzyskie
PL81 Lubelskie
PL82 Podkarpackie
PL84 Podlaskie
PL91 Warszawski stołeczny
PL92 Mazowiecki regionalny
PT11 Norte
PT15 Algarve
PT16 Centro
PT17 Área Metropolitana de Lisboa
PT18 Alentejo
RO11 Nord-Vest
RO12 Centru
RO21 Nord-Est
RO22 Sud-Est
RO31 Sud-Muntenia
RO32 Bucuresti–Ilfov
RO41 Sud-Vest Oltenia
RO42 Vest
SE11 Stockholm
SE12 Östra Mellansverige
SE21 Smaland med öarna
SE22 Sydsverige
SE23 Västsverige
SE31 Norra Mellansverige
SE32 Mellersta Norrland
SE33 Övre Norrland
SI03 Vzhodna Slovenija
SI04 Zahodna Slovenija
SK01 Bratislavský kraj
SK02 Západné Slovensko
SK03 Stredné Slovensko
SK04 Východné Slovensko
UKC1 Tees Valley and Durham
UKC2 Northumberland and Tyne and Wear
UKD1 Cumbria
UKD3 Greater Manchester
UKD4 Lancashire
UKD6 Cheshire
UKD7 Merseyside
UKE1 East Yorkshire and Northern Lincolnshire
UKE2 North Yorkshire
UKE3 South Yorkshire
UKE4 West Yorkshire
UKF1 Derbyshire and Nottinghamshire
UKF2 Leicestershire Rutland and Northamptonshire
UKF3 Lincolnshire
UKG1 Herefordshire Worcestershire and Warwickshire
UKG2 Shropshire and Staffordshire
UKG3 West Midlands,UKH1 East Anglia
UKH2 Bedfordshire and Hertfordshire
UKH3 Essex
UKI3 Inner London-West
UKI4 Inner London-East
UKI5 Outer London-East and North East
UKI6 Outer London-South
UKI7 Outer London-West and North West
UKJ1 Berkshire Buckinghamshire and Oxfordshire
UKJ2 Surrey East and West Sussex
UKJ3 Hampshire and Isle of Wight
UKJ4 Kent
UKK1 Gloucestershire Wiltshire and Bristol/Bath area
UKK2 Dorset and Somerset
UKK3 Cornwall and Isles of Scilly
UKK4 Devon
UKL1 West Wales and The Valleys
UKL2 East Wales
UKM5 North Eastern Scotland
UKM6 Highlands and Islands
UKM7 Eastern Scotland
UKM8 West Central Scotland
UKM9 Southern Scotland
UKN0 Northern Ireland

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# Implementing Sustainable Development Goals within the COVID–19 Pandemic Future Challenges for the 2030 Agenda

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## Abstract

The COVID–19 pandemic has severely changed the world economy and jeopardized the implementation of Sustainable Development Goals on a large scale. Progress in meeting the goals of the 2030 Agenda has been significantly disrupted and stalled, undermining previous efforts of governments and nations. Furthermore, the economic slowdown of the global economy as an effect of COVID–19 has not improved the situation of climate change. The side effects of the pandemic are serious in every sphere of life, especially in the exacerbation of existing social inequalities, which results in threatening the achievements of the Sustainable Development Goals (SDGs).

The aim of this article is to present the current status of SDG implementation with reference to the 2030 Agenda. Furthermore, it will examine the impact of COVID–19 on the progress of SDGs on a global scale, focusing mainly on the statistics from the *Sustainable Development Report 2021*. The purpose of the study is also to describe the results of the analysis that examines the major effects of the COVID–19 pandemic on European countries, including Central and Eastern European Countries (CEECs), in terms of the implementation of SDGs. The study is limited to the context of Goal 1 (No poverty), Goal 2 (Zero hunger) and Goal 3 (Good health and well-being). Another purpose, recognized as the added value of the research, is to identify the main challenges related to sustainable development while implementing the SDGs in the CEECs. Finally, the author investigates the post-COVID priorities and pandemic strategic response plans.

The research methods include an analysis of available documentary and literary sources on the topics in question, based on the development of relevant statistical surveys, and the deductive approach, to draw conclusions from the reports of international organizations. The research was



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based on the global indicator framework, which includes 231 unique indicators that monitored the stage and progress of the SDGs' implementation. Global SDG Indicators Data Platform (SDG Indicators Database) was the source of data.

Keywords: sustainable development, sustainable development goals, Agenda 2030, poverty, food security, social inclusion

JEL: A1, A12, B55, F18, O13, O18, Q01, Q13, Q17, Q18, Q56

# Introduction

All 193 Member States of the United Nations (UN) adopted 17 goals for sustainable development in 2015. Fulfilling 'Sustainable Development Goals' (SDGs) was connected with maintaining economic growth in connection with reducing poverty. Further issues raised by the SDGs within the Agenda 2030 were a response to social needs, including quality education, good health and wellbeing, gender equality, and decent job opportunities (Meschede 2020). The third type of SDG refers to environment protection, mitigating climate change, the life on land and below the water, and the care of green areas (forests). Even before the COVID–19 pandemic, a study on the progress towards SDGs in 2019 (Sachs et al. 2019) revealed that 'No country is on track for achieving all 17 goals with major performance gaps even in the top countries on SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water) and SDG 15 (Life on Land). Income and wealth inequalities, as well as gaps in health and education outcomes by population groups also remain important policy challenges in developing and developed countries alike.'

The major issues of concern were actions on climate (SDG 13) and maintaining biodiversity (SDGs 14 and 15). Food production and quality, as well as land use, were at risk of not meeting consumers' expectations. There are areas where some progress has been recorded (human development indicators, including poverty), but the path of progress was insufficient to reach the 2030 targets. According to the Human Development Report 2019 (United Nations Development Programme 2019, p. 3), 'A new generation of severe inequalities in human development is emerging, even if many of the unresolved inequalities of the 20$^{th}$ century are declining. Under the shadow of the climate crisis and sweeping technological change, inequalities in human development are taking new forms in the 21$^{st}$ century'. Witnessing the lack of progress on the main goals, the disregard for matters such as world peace, a healthy and vibrant society, technological development, and acceptance of cultural diversity also came into question in the difficult times of the pandemic.

Nowadays, the global effectiveness of implementing SDGs is at a critical moment in history as it has been disturbed by intense efforts to reduce the consequences of the pandemic and prevent more fatalities. The pandemic threatens the progress made in alleviating

poverty and socio-economic development over the last two decades, and it casts a shadow over the 2030 Agenda for Sustainable Development – in particular, the commitment 'not to leave anyone behind' (Abidoye et al. 2021). According to the "Progress towards the Sustainable Development Goals" (United Nations 2021a) report by the UN Secretary General, in 2020, over 100 million people were pushed back into poverty and hunger, an equivalent of 255 million full-time jobs were lost, and an additional 101 million children and youth fell below the minimum reading proficiency level. Global unemployment is rising sharply, and with the withdrawal of subsidies and guarantees of social assistance, the number of people who are unemployed will continue to grow. The UN predicts that as a result of the COVID–19 crisis, global human development, expressed as the Human Development Index (HDI), a measure of the level of education, health, and life in individual countries, will drop for the first time since measurements began, i.e., from 1990 (United Nations Development Programme 2020). The almost two years of the global pandemic brought millions of deaths. All the recovery efforts were insufficient and misdirected towards achieving sustainable development. The crisis we are facing now squanders all the achievements of human development, extending the transition to a greener, fair and inclusive economy, and throwing progress on the SDGs even further off track (United Nations 2021b).

The article aims to ascertain the main SDG principles within the 2030 Agenda. The second section of the article is dedicated to understanding and defining the background of the concept of sustainable development. It will cover the evolution of SDGs with the addition to the Millennium Development Goals and the 2030 Agenda. It will also identify the impact of the COVID–19 pandemic on the implementation of SDGs and explain the key provisions of the actions taken by international organizations over the period examined. Furthermore, it will present statics from the Sustainable Development Index 2021, focusing on the progress toward SDGs 1–3 (No poverty, Zero hunger, Good health and well-being). Finally, the article indicates the remedial measures and actions needed to overcome the situation caused by the COVID–19 pandemic, especially mitigating poverty and hunger. The article presents considerations on society's good health and wellbeing at a time when all efforts towards achieving global health security have been disturbed.

# The background of the concept of Sustainable Development regarding Sustainable Development Goals and implementing the 2030 Agenda. Main SDG targets (SDG 1, SDG 2, SDG 3)

## The concept of Sustainable Development

Sustainable development as a concept should be perceived in a very broad context, including various spheres of human activity (economy, social issues, environment). Currently, sustainable development, as one of the main subjects of economic and ecological research, is undertaken mainly by ecological economics, energy analysis, environmental economics, and other related disciplines (Jeżowski 2000, p. 57). Due to its extensive nature, there are numerous definitions of the term 'sustainable development'.

Referring to the most common definition from the Brundtland Report "Our Common Future" from 1987, sustainable development is defined as the 'Path of human progress that fulfills the needs and aspirations of the present generation without compromising the ability of future generations to meet their own needs." It is a generalized concept and essentially means meeting the needs and aspirations of today's generation in a way that does not limit the ability to meet the needs of future generations (Estes 1993). This definition clearly indicates that the economic and civilization development of the current generation should not take place at the expense of depleting non-renewable resources and environmental degradation for the benefit of the next generations, and thus the right to further development (Murphy 2012, pp. 15–29).

The principle of sustainable development calls for a declaration of actions undertaken by national governments to save the natural environment for future generations. That statement refers to one of the cardinal principles of the "Treaty on the Functioning of the European Union" (Art. 11 Treaty on the Functioning of the European Union, p. 53) – the principle of integrating the objectives and requirements of environmental protection into policies, strategies and activities in other areas of state activity. It underlines the need to identify and assess potential environmental effects in advance, within the framework specified by the applicable legal regulations, consulting these issues with interested communities, organizations and individuals, and adopting appropriate measures and solutions to eliminate environmental risks or reduce them to an acceptable minimum.

Sustainable development has been one of the main goals of EU policy for many years. In 2001, leaders of the European Union (EU) adopted the document "A Sustainable Europe for a better world: A Sustainable Development Strategy for the European Union", updated in 2006 under the name "The EU's Renewed Sustainable Development Strategy – SDS". The document included new challenges and set a long-term vision of the De-

velopment Policy, in which elements such as economic development, social cohesion and environmental protection go hand in hand and complement each other. Under the slogan "Our Will to Accomplish Sustainable Development," the concept has been defined as follows:

> Sustainable development means that the needs of the present generation should be met without compromising the ability of future generations to meet their own needs. It is an overarching objective of the European Union set out in the Treaty, governing all the Union's policies and activities. It is about safeguarding the earth's capacity to support life in all its diversity and is based on the principles of democracy, gender equality, solidarity, the rule of law and respect for fundamental rights, including freedom and equal opportunities for all. It aims at the continuous improvement of the quality of life and well-being on Earth for present and future generations. To that end it promotes a dynamic economy with full employment and a high level of education, health protection, social and territorial cohesion and environmental protection in a peaceful and secure world, respecting cultural diversity (Council of the European Union 2006, p. 2).

In 2010, the European Union approved the document "EUROPE 2020 – Strategy for smart, sustainable and inclusive growth ", replacing The Lisbon Strategy of 2000. The strategy identified the following interrelated priorities for the future development of Europe (European Commission 2010):

- smart growth – developing an economy based on knowledge and innovation,
- sustainable development – supporting an economy that uses resources more efficiently and is more environmentally friendly and more competitive,
- inclusive growth – fostering a high-tech economy,
- an employment level that ensures social and territorial cohesion.

## The 2030 Agenda and the Sustainable Development Goals

Moving on with the considerations on the implementation of sustainable development, in 2015, the UN adopted 17 SDGs within Agenda 2030, thus making an effort to alleviate poverty, protect Earth, and ensure prosperity for all (United Nations 2021c). The document 'Transforming our world: the 2030 Agenda for Sustainable Development' adopted by the UN is an action program of unprecedented scope and importance, defining a model of sustainable development at the global level. Its framework goes far beyond the previously pursued Millennium Development Goals, adopted in 2000. In line with the 2030 Agenda, the contemporary modernization effort should focus on erad-

icating poverty in all its manifestations while pursuing a number of economic, social and environmental goals (Ministerstwo Rozwoju i Technologii 2021).

The process of setting new development goals (SDGs) was initiated during the UN Conference on Sustainable Development, which took place in June 2012 in Rio de Janeiro, to complete the implementation of the Millennium Development Goals and to formulate an agenda for further global development after 2015 (post–2015 Development Agenda). The new SDGs were agreed upon in nearly three years of multilateral negotiations with governments, the private sector, academia, and civil society. An Open Working Group – a platform established for this task – defined 17 SDGs and 169 related tasks that reflect the three dimensions of sustainable development: economic, social, and environmental. The assumption is that efforts to achieve the goals require activity and maintaining progress simultaneously at these three levels and in an integrated manner (Bettelli 2021). The first six SDGs strengthen and expand specific targets from the Millennium Development Goals. In addition, goals 7–10 broaden the scope of the Millennium Development Goals Agenda and identify the root causes of poverty and inequality, as well as the interconnections between the economic, social, and environmental pillars of sustainable development. Goals 11–15 aim to measure human impact on the environment and how this affects social and economic development. The last two goals create a conducive environment to achieve sustainable development.

| SDG | Title |
|---|---|
| 1 | No poverty |
| 2 | Zero hunger |
| 3 | Good health and well-being |
| 4 | Quality education |
| 5 | Gender equality |
| 6 | Clean water and sanitation |
| 7 | Affordable and clean energy |
| 8 | Decent work and economic growth |
| 9 | Industry, innovation and infrastructure |
| 10 | Reduced inequalities |
| 11 | Sustainable cities and communities |
| 12 | Responsible consumption and production |
| 13 | Climate action |
| 14 | Life below water |
| 15 | Life on land |
| 16 | Peace, justice and strong institutions |
| 17 | Partnerships for the goals |

Picture 1. United Nations' Sustainable Development Goals

Source: United Nations Development Programme (2015).

The 2030 Agenda was finally adopted by 193 UN member states at the UN General Assembly in New York in September 2015. The Agenda also includes the UN's Addis Ababa Action Agenda (outcome document of the Third International Conference on Financing for Development: *Addis Ababa Action Agenda*), adopted at the 3rd International Development Financing Conference in July 2015. It sets out the financial resources needed to implement the 2030 Agenda, including national resources, private funding sources and official development assistance (ODA). The *Addis Ababa Action Agenda* and the 2030 Agenda jointly established a "Technology Facilitation Mechanism" (TFM) to support SDG implementation through multi-stakeholder collaboration and partnerships, sharing of experiences, best practices, policy advice, and all the necessary information (United Nations Division For Sustainable Development Goals 2015).


Picture 2. Logo of United Nations' Sustainable Development Goals

Source: United Nations in China (2015).

Another integral part of the 2030 Agenda is the Paris Agreement, which underlines the impact of climate change on human and environmental health. SDG 13 (climate change) is in the eye of actions supervised by the UN Conference on Climate Change (UNFCCC). The principal goal of the Paris Agreement is to limit global warming to well below 2 degrees Celsius compared to pre-industrial levels. The Paris Agreement works on a 5-year cycle of increasingly ambitious climate actions carried out by countries. Nevertheless, without the necessary actions to reduce greenhouse emissions, the world is unlikely to achieve the 2030 Agenda (United Nations Climate Change 2015).

## Main targets of Sustainable Development Goals (Goal 1, Goal 2 and Goal 3)

According to the UN policy, the 17 goals represent the promotion of sustainable development in all its manifestations, i.e., environmental, economic, and social dimensions (Halvorsen 2017, pp. 13–36). In contrast to the approach of concentrating only on development in developing economies, the 2030 Agenda addresses the need for action in all countries. Each goal is supplemented with concrete targets and priorities. As mentioned before, the targets are in line with the measurable indicators, which total 169 targets and more than 200 indicators. The article focuses on the first three SDGs (SDG 1, SDG2, SDG 3). To understand the idea of these goals, it is vital to outline their major targets. The reason for selecting such SDGs is mainly due to the obvious linkages between environmental quality, human health, and wellbeing. Another factor when choosing the first three SDGs is that the COVID–19 pandemic has dramatically influenced the implementation of those goals, which will be demonstrated by presenting relevant statistics.

## Goals of selected SDGs, according to the UN's 2030 Agenda (United Nations Development Programme 2015)

### Sustainable Development Goal 1 (No poverty)

- By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.
- Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.
- By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.
- By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.
- Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programs and policies to end poverty in all its dimensions.
- Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions.

### Sustainable Development Goal 2 (Zero hunger)
### (UN Sustainable Development Goals Knowledge Platform 2021)

- By 2030, end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.
- By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
- By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.
- By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.
- Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.
- Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round.
- Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

### Sustainable Development Goal 3 (Good health and well-being) (UN Sustainable Development Goals Knowledge Platform 2021)

- By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.
- By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under–5 mortality to at least as low as 25 per 1,000 live births.
- By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.
- By 2030, reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and wellbeing.
- Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.
- By 2020, halve the number of global deaths and injuries from road traffic accidents.
- By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs.
- Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.
- By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
- Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate.
- Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.
- Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing states.
- Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

# Comparative analysis of the COVID–19 pandemic's Impact on the implementation of selected Sustainable Development Goals (SDG 1, SDG 2, SDG 3)

## Main findings of the Sustainable Development Report 2021

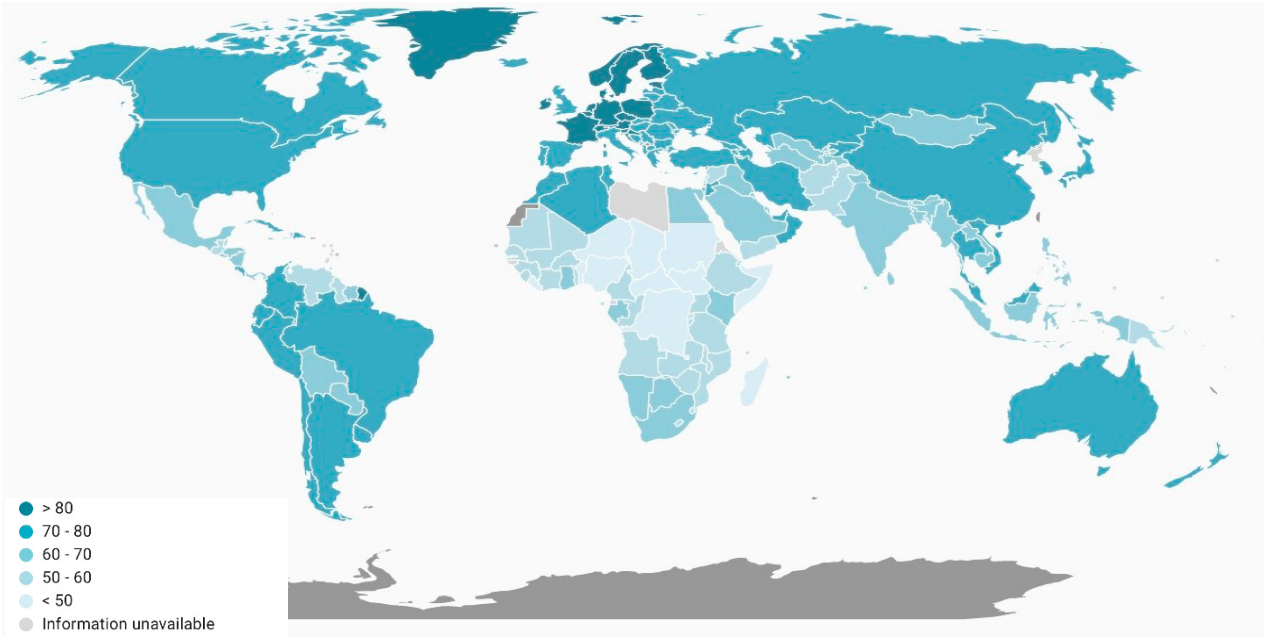
The ministerial declaration of the 2020 United Nations High-level Political Forum on Sustainable Development recognized that "the poorest people and those living under difficult conditions are ignored in the implementation of the 2030 Agenda". It was also pointed out that "these are the people most affected by the COVID–19 crisis" (United Nations Economic and Social Council 2020). Furthermore, it was confirmed that the "programme 2030 Agenda should be our joint action plan, aimed at better responsiveness and reconstruction".

Across the EU, the COVID–19 pandemic has revealed and exacerbated existing inequalities. Thus it has a major impact on achieving the EU's Sustainable Development No. 10 (SDG 10) target, the premise of which is to reduce inequalities, as well as many other initiatives related to the SDG. While the virus has affected the lifestyle of all people, all societies and their underlying economies, it has also aggravated inequalities in terms of opportunities, income, health care, and social security around the world. The poorer strata of our society have experienced many deficiencies and inequalities. These people have unequal access to high-quality healthcare and other essential services, are exposed to disease, poor housing and overcrowding, inadequate working conditions, a high level of air pollution, insufficient sanitation and water supply, and a lack of access to high-quality education (Bubola, Fisher 2020). Dr. David Nabarro, Special Representative UN Secretary General for COVID, concluded: 'Whether we like it or not, COVID is a disease of poverty, powerlessness, inequities and injustice – a disease of the disadvantaged – and gets entrenched in the poorest communities. We can only get rid of COVID if we respond together' (Global Call to Action Against Poverty 2021).

As the considerations of the article are limited to a comparative analysis of the effects of the COVID–19 pandemic on the implementation of the first three SDGs, it is vital to outline the latest findings and statistics regarding selected areas, i.e., No poverty, Zero hunger, and Good health and well-being.

One of the best sources of information on SDG implementation is the Sustainable Development Report and the SDG Index. The Sustainable Development Report (formerly the SDG Index & Dashboards) is a global assessment of countries' progress towards achieving the SDGs. Countries are ranked by their overall score, which measures their total progress towards achieving all 17 SDGs. The score can be interpreted as a percentage of SDG achievement, with a score of 100 indicating that all SDGs have been

achieved. The latest findings of the 2021 Sustainable Development Report revealed that the COVID–19 pandemic is an obstacle to sustainable development worldwide. For the first time since the adoption of the SDGs in 2015, the average global SDG Index in 2020 decreased compared to the previous year: the decline is largely due to the rise in poverty and unemployment rates following the outbreak of the COVID–19 pandemic. The pandemic affected all three dimensions of sustainable development: economic, social and environmental. Suppressing the pandemic through non-pharmaceutical interventions and global access to vaccines must remain the top priority of any government. As long as the pandemic is raging, there can be no sustainable development or economic recovery.




Picture 3. Sustainable Development Report-Overall Score, 2021 (SDR 2021)

Source: Sachs et al. (2021).

Picture 3 shows that low-income countries tend to have lower SDG Index scores. This is partly due to the nature of SDGs, which are largely focused on eradicating extreme poverty and ensuring access to basic services and infrastructure for all (SDGs 1–9). In addition, poorer countries lack adequate infrastructure and mechanisms to manage key environmental challenges addressed by SDGs 12–15. East and South Asia have made more progress on the SDG than any other region, both since 2010 and since the adoption of the goals in 2015. However, the three individual countries that made the most progress on the SDG Index are Bangladesh, Côte d'Ivoire, and Afghanistan. Meanwhile, Venezuela, Tuvalu, and Brazil recorded the greatest declines. At the top of the SDG 2021 Index, the best performers were three Nordic countries: Finland, Sweden and Denmark. All the top 20 countries except for Croatia are OECD countries. However, even OECD countries face major challenges in meeting several of the SDGs.

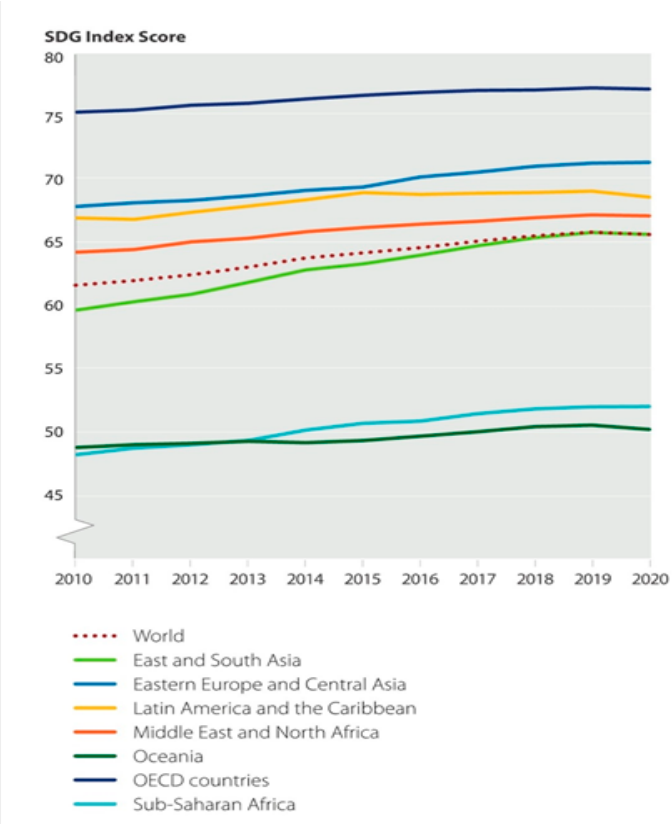



Figure 1. Progress on the SDG Index by region (2010–2020)

Source: Sachs et al. (2021).

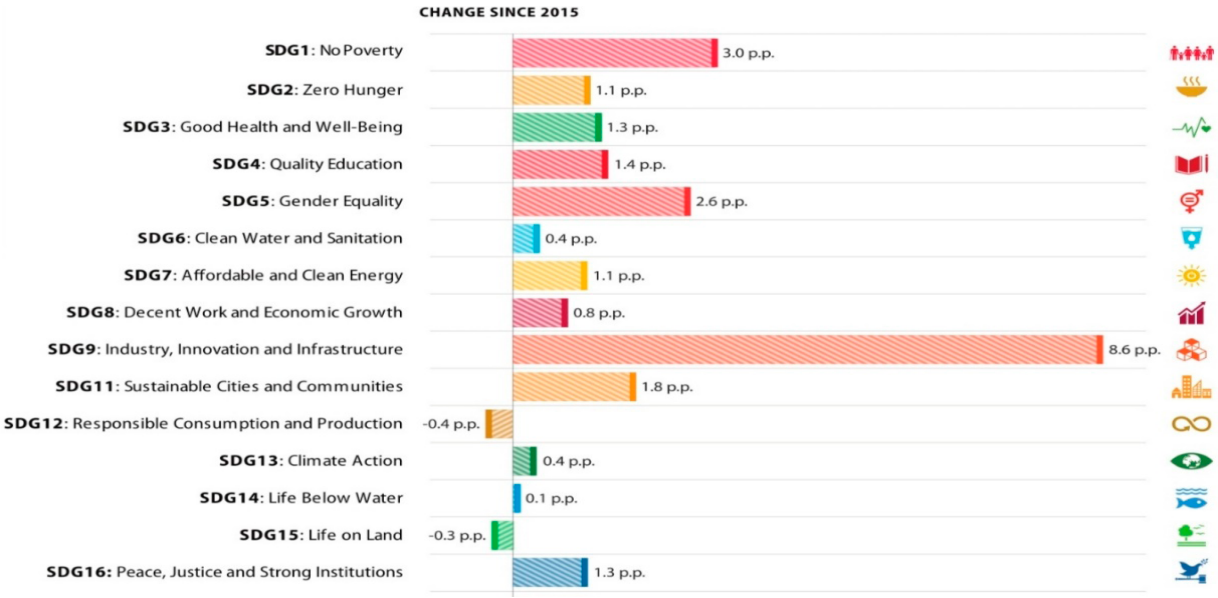



Figure 2. Progress in the world for each SDG since 2015 in percentage points

Source: Sachs et al. (2021).

## Progress by the selected SDGs

### Sustainable Development Goal 1 (No poverty)

The Sustainable Development Goals Report 2021 (United Nations 2021b) revealed that the effects of the COVID–19 pandemic reversed much of the progress in poverty reduction, with extreme global poverty rising in 2020 for the first time since the Asian financial crisis in the late 1990s. Even before COVID–19, the world was not on track to meet the goal of ending poverty by 2030, and it will remain out of reach without immediate and meaningful action. The crisis has demonstrated more clearly than ever the importance of disaster readiness and sound social protection systems. While the number of countries adopting disaster risk reduction strategies has increased significantly, and many temporary social protection measures have been introduced in response to the pandemic, much greater efforts are needed on both fronts to protect the most vulnerable. Overall, by 2018, the proportion of people living in extreme poverty worldwide had decreased by 1.4 percentage points since the 2015 SDGs were adopted, from 10% to 8.6% (United Nations Development Programme 2019). However, the rate of reduction had slowed to less than half a percentage point annually between 2015 and 2017, compared with one percentage point annually between 1990 and 2015. Based on historical trends, extreme poverty is projected to decline to 6% by 2030. But COVID–19 triggered a reversal in progress on SDG 1.

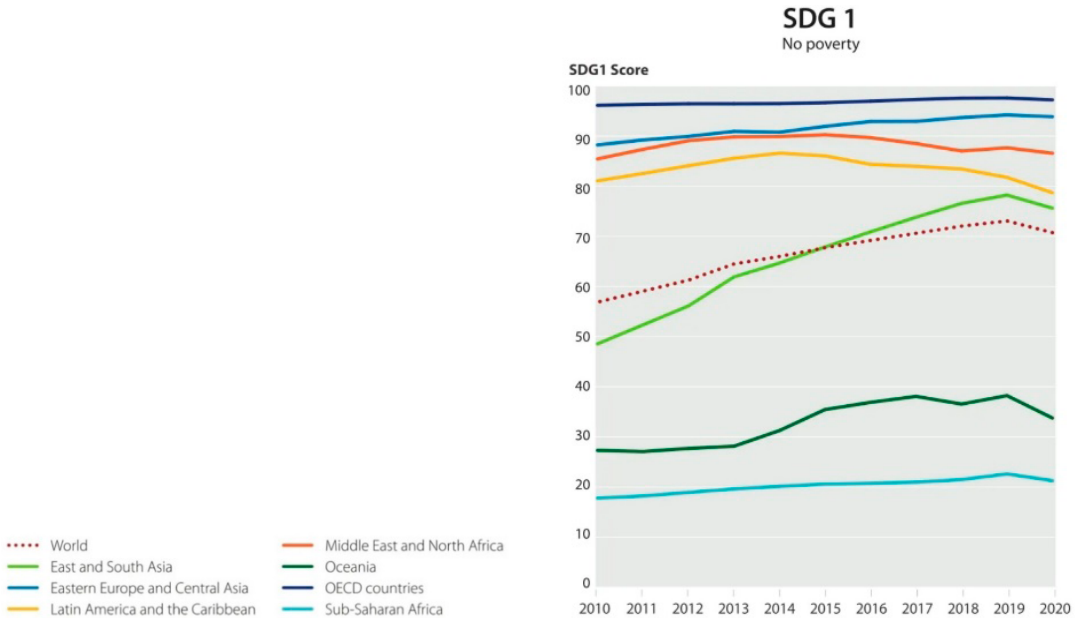



Figure 3. Progress by SDGs and regions (SDG1)

Source: Sachs et al. (2021).

The pandemic has intensified the threats to progress posed by conflict and climate change. Estimates suggest that in 2020, the number of the world's poor increased by

119–124 million, 60% of whom live in South Asia. The news shows the first increase in the extreme poverty rate since 1998, from 8.4% in 2019 to 9.5% in 2020, undermining the progress made since 2016. The effects of the pandemic will not be short-lived. Based on current projections, the global poverty rate is expected to reach around 600 million people in 2030, without achieving the poverty eradication target.

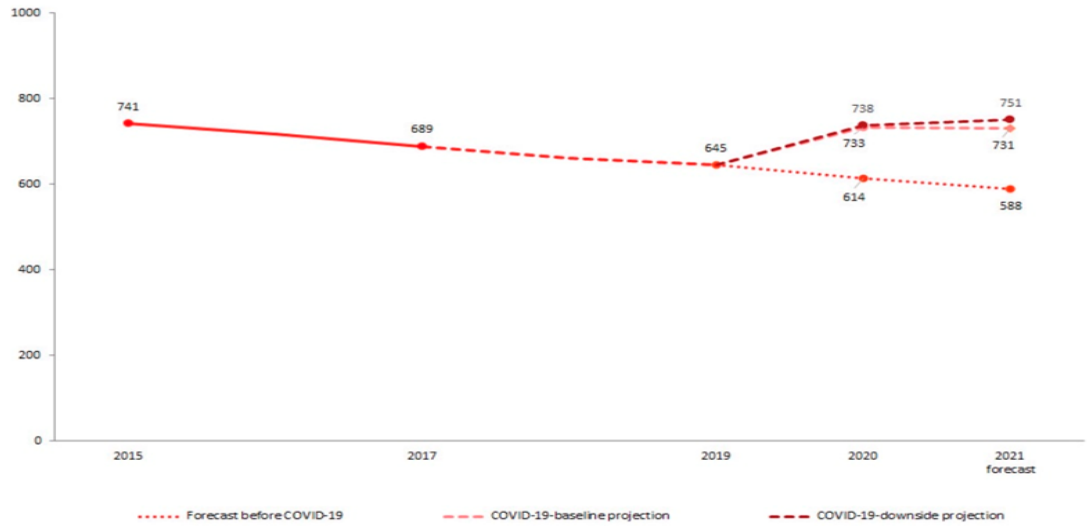



Figure 4. Number of people living below $1.90 a day, 2015–2017, 2018–2020 nowcast, and forecast before and after COVID–19 (millions)

Source: United Nations (2021b).

The share of the world's workers living in extreme poverty more than halved between 2010 and 2019 – from 14% to 6.6%. However, the lockdowns and related public health measures due to COVID–19 severely affected the informal economy, where the vast majority of the working poor are employed. The related loss of income threatens to halt global progress in reducing in-work poverty. Poverty at work affects women and young people the most, and the pandemic is likely to aggravate these disparities (United Nations 2021b).

### Sustainable Development Goal 2 (Zero hunger)

Prior to the COVID 19 pandemic, in many parts of the world, progress towards SDG2 and SDG12-SDG15 was too slow. The lack of progress on SDG 2 (Zero hunger) was compounded by the increasing number of people suffering from malnutrition and the increasing share of overweight or obese people. Before the outbreak of the pandemic, 650 million people were hit by hunger, and around 2 billion people suffered from food insecurity – a number that has been rising since 2014 (Food and Agriculture Organization of United Nations 2021). The crisis has brought additional threats to global food and nutrition security. Disruptions to food supply chains and economic downturns have affected food systems

around the world and have threatened people's access to food, making the goal of eradicating hunger even more distant.

COVID–19 is expected to exacerbate all forms of malnutrition, especially in children, due to loss of household income, lack of available and inexpensive nutritious food, decreased physical activity, and disruption of basic nutritional services. Even putting aside the effects of COVID–19, an estimated 230 million children suffer from malnutrition. Urgent, short-term action is needed to prevent increasing hunger, and the transformation of food systems is necessary to achieve a healthy and sustainable food future for all (World Health Organization 2021a). According to the World Food Programme report (World Food Programme 2021), more than half of all undernourished people (418 million) live in Asia; over a third (282 million) in Africa; a smaller percentage (60 million) in Latin America and the Caribbean (*Global Hunger Index…* 2021). However, the greatest increase in hunger occurred in Africa, where the estimated prevalence of malnutrition – at 21% of the population – is more than double that of any other region.

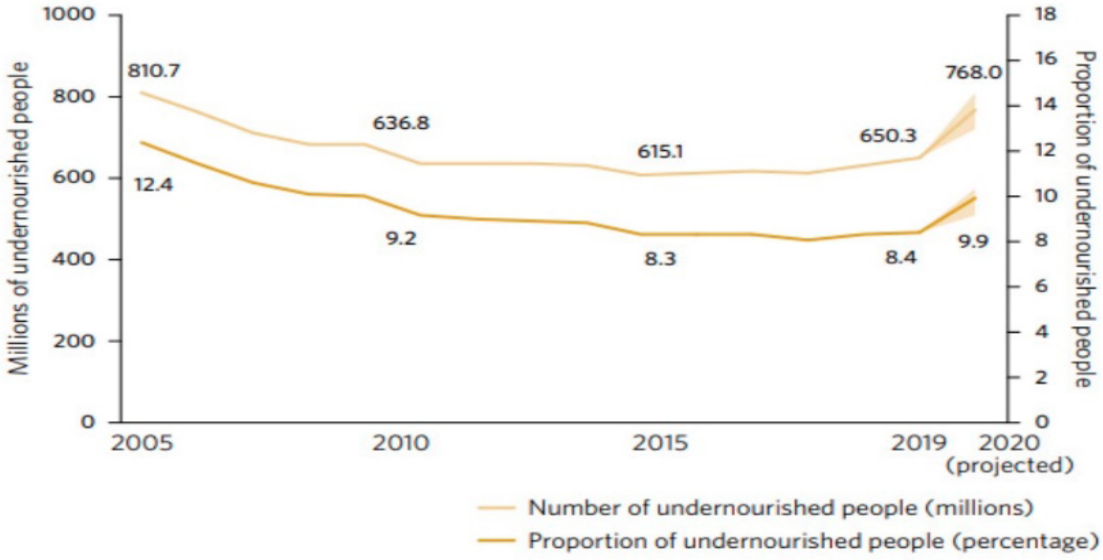



Figure 5. Number and proportion of undernourished people in the world, 2005–2019 (millions and percentage)

Source: United Nations (2021b).

COVID–19 has had a tremendous impact on hunger and food security, caused by food supply chain disruptions, loss of income, increasing social inequalities, changes in the food environment, and price rises. Between 720 and 811 million people worldwide suffered from hunger in 2020, an increase of 161 million from 2019. The incidence of malnutrition increased from 8.4% in 2019 to 9.9% in 2020. Hunger affects 21.0% of the population in Africa, compared with 9.0% in Asia and 9.1% in Latin America and the Caribbean. Reaching a state of food security goes beyond eliminating hunger.

Almost one in three people in the world (2.37 billion) was affected by moderate to severe food insecurity in 2020, an increase of almost 320 million compared to 2019. Such levels outline that people are unable to have a healthy, regular, and balanced diet or that they run out of food and, in the worst-case scenario, do not eat for a day or days. The highest level of food insecurity was found in sub-Saharan Africa (66.2%), while the prevalence grew fastest in Latin America and the Caribbean, from 24.9% in 2014 to 40.9% in 2020. A 10% higher prevalence of moderate to severe food insecurity occurs among women than men in 2020 compared with 6% in 2019.

### Sustainable Development Goal 3 (Good health and well-being)

Many health indicators were heading in the right direction before the COVID–19 threat emerged. Maternal and infant health had improved, immunization coverage had increased, and infectious diseases had declined, though not fast enough to meet the 2030 targets. The pandemic halted or reversed health progress and poses a serious threat beyond the disease itself. About 90% of countries still report one or more disruptions to basic health services, and available data from several countries show that the pandemic has shortened life expectancy. No wonder the virus disproportionately affects disadvantaged groups (World Health Organization 2021a). The pandemic has underlined the importance of universal health insurance and multi-sectoral coordination for health preparedness. In addition, to design effective pandemic policy interventions, governments are tasked with improving and strengthening the collection of basic demographic and epidemiological data. COVID–19 has impacted health outcomes and mortality worldwide, and has led to shorter life expectancies, even in many developed countries (World Health Organization 2021b). As of June 2021, the total number of reported deaths from COVID–19 had reached 3.7 million globally . Europe and North America recorded the largest loss, close to 1.7 million, followed by Latin America and the Caribbean, with around 1.2 million, and Central and South Asia with just under half a million (Sachs et al. 2021). COVID–19 can have long-term health effects, including disability due to scarring of the lungs and damage to the heart, as well as mental health problems that can affect people for long periods (Centers for Disease Control and Prevention 2021). The indiscriminate use of antibiotics during the pandemic could further increase antimicrobial resistance. While it is too early for existing data to reflect this impact, the COVID–19 pandemic threatens to reverse years of progress towards better health worldwide, no matter the place on the map or the state of development.

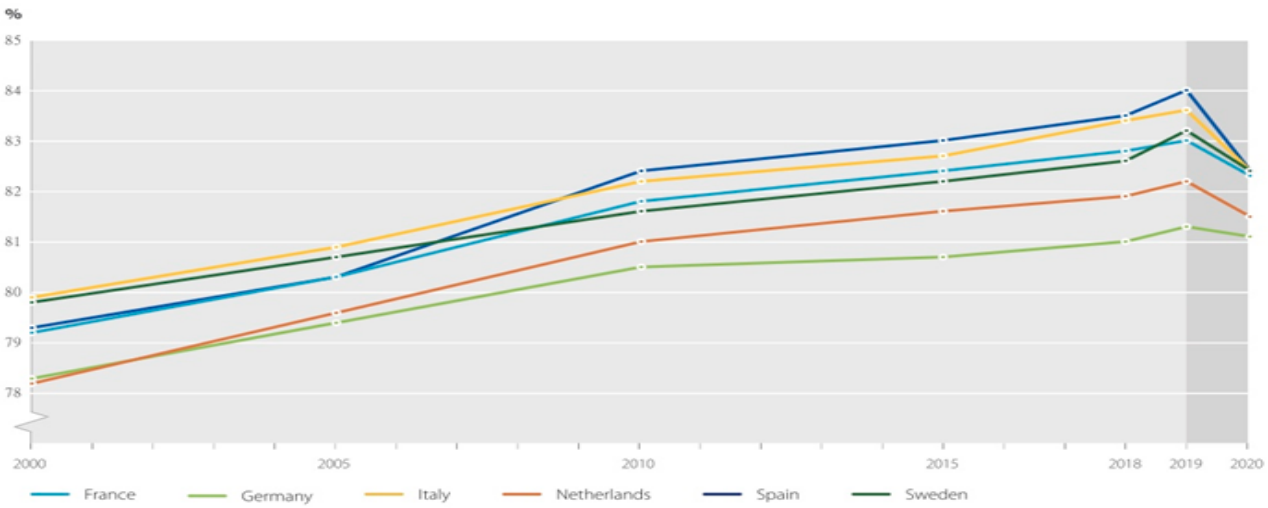



Figure 6. Life expectancy at birth in selected European countries (2000–2020)

Source: Sachs et al. (2021).

## The results of European countries' implementation of the Sustainable Development Goals (including Central and Eastern European countries)

At the European Union level, the latest European Commission Annual Sustainable Growth Strategy (ASGS) notes: 'the Recovery and Resilience Facility must guide and build a more sustainable, resilient and fairer Europe for the next generation in line with the United Nations Sustainable Development Goals' (European Commission 2020).

The COVID–19 pandemic is an obstacle to sustainable development in Europe and around the world. The global average SDG Index score fell in 2020 for the first time since 2015, when the SDGs were adopted (Sachs et al. 2021). It was mainly due to the rising poverty and unemployment rates, and the average EU27 SDG Index score also slightly decreased compared to 2019. However, this decline in the performance of the EU–27 SDGs was less than that observed in the rest of the world, possibly due to, inter alia, the effectiveness of the automatic stabilizers and strategic economic and social policies.

The fall of the SDG Index score observed in 2020 follows years of progress on SDGs in the EU27 and the rest of Europe. The average EU27 Index score increased by 8.5 percentage points, from 62.9% to 71.4%, between 2000 and 2019. Additionally, the average annual growth rate of the SDG Index score from the adoption of the Global Goals in 2015 to 2019 (0.9%) was higher than the average annual growth rate observed in 2010–2015 (0.6%).

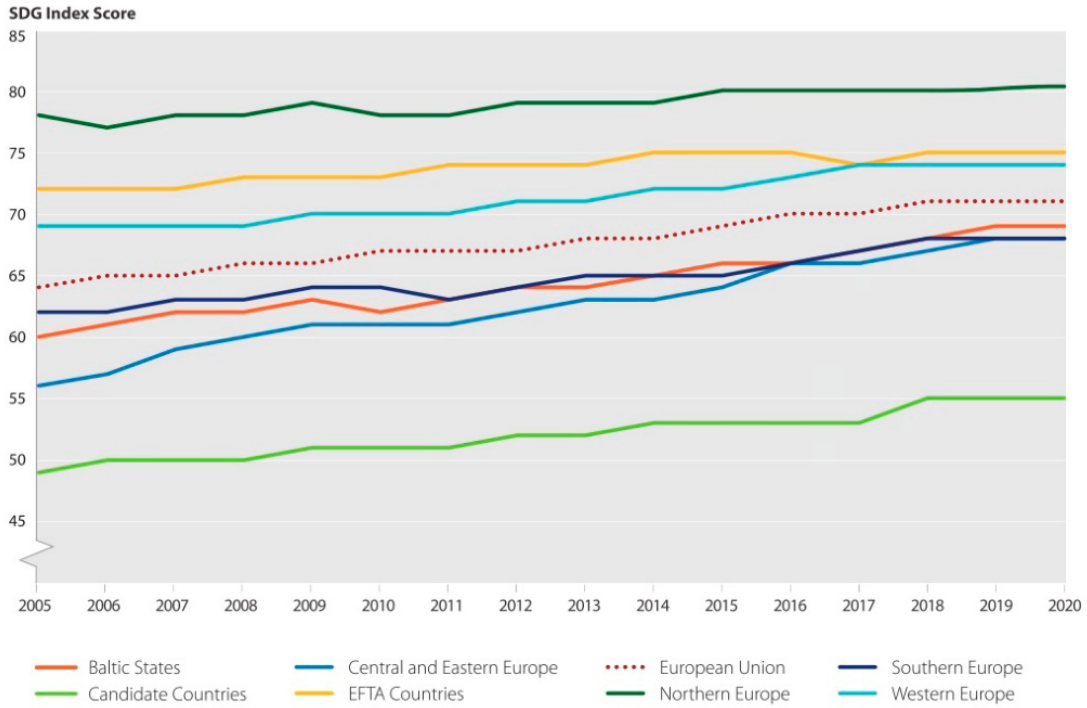



Figure 7. SDG Index Scores, EU27 and European regions, 2005–2020

Source: *Europe Sustainable Development Report 2021* (2021).

There are certain gaps in achieving the SDGs in different European regions and countries. Northern European countries should be recognized as the best performers, with an average SDG Index score of 81% in 2020. Candidate countries are underperforming, with an average score in 2020 of just above 55%, driven in particular by poor achievements on socio-economic goals (SDG 1 and SDGs 3–9) and SDG 16 (Justice, peace and strong institutions). The report reveals that European regions and countries that started out with lower SDG Index scores are progressing faster than those with higher scores; however, the pace of convergence remains slow. The major concern is that at the current rate of growth, candidate countries will not be capable of achieving the results currently held by Northern Europe for another 52 years. Southern Europe will reach this level in 18 years, while it will take 17 years for CEECs to catch up with the rest.

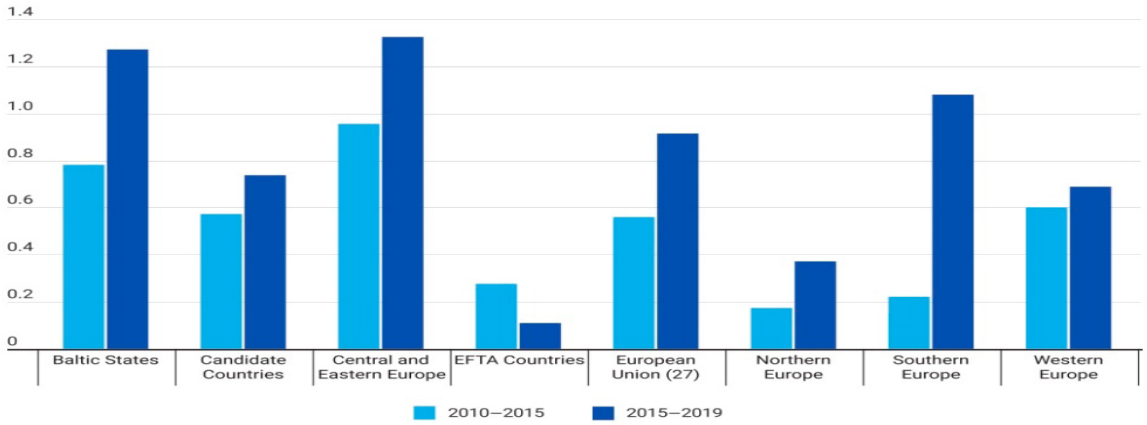



Figure 8. Average annual growth rate of the SDG Index from 2010 to 2015 versus 2015 to 2019 (%)

Source: *Europe Sustainable Development Report 2021* (2021).

## Remedial measures and the UN's system response to COVID–19

It has become obvious that the pandemic was more than a health crisis. It is a socio-economic crisis, a humanitarian crisis, a security crisis, and a human rights crisis. It has affected us as individuals, families, communities, and societies. It has had an impact on every generation, including those not yet born. The crisis has highlighted fragilities within and among nations, as well as in systems for a coordinated global response to shared threats.

The UN's response to COVID–19 and its impact consists of three main components:

1. A large-scale, coordinated and comprehensive response to health, supervised by the World Health Organization (WHO) and its Strategic Preparedness and Response Plan to mobilize all sectors and communities to respond to all threats, control and suppress virus transmission, reduce mortality by providing care to those affected, and develop safe and effective vaccines and drugs that can be delivered on a large scale and available as needed. Part of that response is a new global collaboration – the Access to COVID–19 Tools (ACT) Accelerator – which aims to accelerate the development, production, and fair access to COVID–19 testing, therapies, and vaccines (World Health Organization 2021c).
2. Extensive action to protect lives and livelihoods by addressing the destructive short-term aspects of the socio-economic, humanitarian, and human rights crisis, focusing on those most affected. The main target is to save lives, maintaining access to critical services, corporate solvency, supply chains, strong institutions, pub-

lic service delivery, and human rights in the foreground. This is achieved through immediate humanitarian aid to the most affected population in the most vulnerable 63 countries with life-saving aid under the Global Humanitarian Response Plan (GHRP), as well as support for over 120 countries for an immediate socio-economic response guided by the framework of the UN development system (United Nations Office for the Coordination of Humanitarian Affairs 2021).

3. A transformation process that leads to a better post-COVID–19 future by addressing fundamental weaknesses and identifying opportunities for a transformation towards fairer, equal and resilient societies and economies. Overcoming this crisis should be seen as an opportunity to mitigate the climate crisis, inequalities, exclusion, gaps in social protection systems, and many other injustices that have been revealed and aggravated (United Nations 2020).

## Conclusion

The 17 SDGs and their associated 169 targets, at the heart of the UN's 2030 Agenda for Sustainable Development, provide a policy framework around the world to eradicate all forms of poverty, combat inequalities, and fight climate change, while ensuring that no one is left behind. The ongoing pandemic and its expected economic, social, and environmental impacts show a clear urgent need to support the 'placement' of the SDGs in order to achieve reconstruction more equitably and avoid future health crises. The SDGs should help economies rebuild and carry out their digital and environmental transformation.

With reference to the comparative analysis of the COVID–19 pandemic's impact on the implementation of selected SDGs (SDG 1, SDG 2, SDG 3), it was revealed that problems of poverty, hunger and good health have been significantly exacerbated by the outbreak of the pandemic. This is the basis for the inference that the effects of a pandemic primarily relate to exposing the deep inequalities in societies and economies with attendant gaps in social protection systems. The ministerial declaration of the high-level segment of the 2020 session of the Economic and Social Council and the 2020 high-level political forum on sustainable development (United Nations Economic and Social Council 2020) reaffirmed that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development, and noted with anxiety that the trend of poverty reduction is being reversed for the first time in decades. To meet this challenge, critical activities oriented towards the linkages between the environment and health are the key. The transition from a reactive to a proactive policy is an answer to mitigate health emergencies, limiting and even preventing crises, which can paralyze economic, political, and physical infrastructure in the near-

est future. The efforts of the UN's System Response to COVID–19 and the remedial measures posed by international collaboration on the transformative change represent a proactive policy aimed at eradicating the effects of the COVID–19 pandemic.

In terms of identifying the main challenges related to sustainable development within the implementation of the SDGs in European countries, including CEECs, the critical issues are:

- Stronger and more comprehensive efforts to reach the environmental goals covered under SDG 2 (Zero hunger and sustainable agriculture) and SDGs 12–15 (Sustainable consumption and production, and climate and biodiversity goals);
- Reducing inequalities within countries means closing the gaps in access to services and development opportunities across different population groups in EU member states and candidate countries, which is covered under SDG 3 (Good health and well-being), SDG 4 (Quality education), and SDG 5 (Gender equality);
- Strategic and target-oriented actions to mitigate the negative effects of international spillovers reflected by disruptions in trade and financial flows, which undermines many EU countries' ability to achieve the SDGs;
- Minimizing persisting differences in SDG performance across Europe, which requires stronger convergence in Europe and better EU leadership (Southern Europe, the Baltic States, and Central and Eastern European countries all still perform below the average of the EU27 SDG Index score).

## References

Abidoye, B., Felix, J., Kapto, S., Patterson, L. (2021), *Leaving No One Behind: Impact of COVID–19 on the Sustainable Development Goals (SDGs)*, United Nations Development Programme and Frederick S. Pardee Center for International Futures, New York–Denver.

Art. 11 Treaty on the Functioning of the European Union, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12012E%2FTXT (accessed: 5.10.2021).

Bettelli, P. (2021), *What the World Learned Setting Development Goals. Still Only One Earth: Lessons from 50 years of UN sustainable development policy*, International Institute for Sustainable Development, https://www.iisd.org/articles/what-world-learned-setting-development-goals (accessed: 16.10.2021).

Bubola, E., Fisher, M. (2020), *As Coronavirus Deepens Inequality, Inequality Worsens Its Spread*, "New York Times", 15.03.2020, https://www.nytimes.com/2020/03/15/world/europe/coronavirus-inequality.html (accessed: 16.10.2021).

Centers for Disease Control and Prevention (2021), *Post-COVID Conditions*, https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html (accessed: 18.10.2021).

Council of the European Union (2006), *Review of the EU Sustainable Development Strategy (EU SDS) – Renewed Strategy, 10917/06*, Brussels, https://data.consilium.europa.eu/doc/document/ST-10917-2006-INIT/en/pdf (accessed: 7.10.2021).

Estes, R. (1993), *Toward sustainable development: from theory to praxis*, "Social Development Issues", 15 (3), pp. 1–29.

*Europe Sustainable Development Report 2021* (2021), https://eu-dashboards.sdgindex.org/chapters/part-1-performance-of-european-countries-against-the-sdgs#1-2-the-impact-of-covid-19-on-the-sd-gs (accessed: 14.05.2022).

European Commission (2010), *Europe 2020. A European strategy for smart, sustainable and inclusive growth*, COM(2010) 2020, Brussels, https://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf (accessed: 7.10.2021).

European Commission (2020), *Press release: Next Generation EU: Commission presents next steps for €672.5 billion Recovery and Resilience Facility in 2021 Annual Sustainable Growth Strategy*, Brussels, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1658 (accessed: 14.05.2022).

Food and Agriculture Organization of United Nations (2021), *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*, Rome, https://www.fao.org/documents/card/en/c/cb4474en (accessed: 10.10.2021).

Global Call to Action Against Poverty (2021), *Leave No Woman Behind Report*, https://gcap.global/news/leave-no-woman-behind-6-part-mini-series-of-publications/ (accessed: 16.10.2021).

*Global Hunger Index. Hunger and Food Systems in Conflict Settings* (2021), Bonn–Dublin, https://www.globalhungerindex.org/pdf/en/2021.pdf (accessed: 15.10.2021).

Halvorsen, T. (2017), *The sustainable development goals, knowledge production and the global struggle over values*, [in:] T. Halvorsen (ed.), *Knowledge for Justice: Critical Perspectives from Southern African-Nordic Research Partnerships*, African Minds Publishers, Somerset West, pp. 13–36.

Jeżowski, P. (red.) (2000), *Ekonomia środowiska a ekonomia ekologiczna*, [in:] P. Jeżowski (ed.), *Ochrona środowiska i ekorozwój*, Oficyna Wydawnicza SGH, Warszawa, pp. 99–124.

Meschede, Ch. (2020), *The Sustainable Development Goals in Scientific Literature: A Bibliometric Overview at the Meta-Level*, "Sustainability", 12 (11), 4461, https://www.mdpi.com/2071-1050/12/11/4461/htm (accessed: 5.10.2021).

Ministerstwo Rozwoju i Technologii (2021), *Agenda 2030*, https://www.gov.pl/web/rozwoj-technologia/agenda-2030 (accessed: 4.10.2021).

Murphy, K. (2012), *The social pillar of sustainable development: a literature review and framework for policy analysis*, "Sustainability: Science, Practice and Policy", 8 (1), pp. 15–29, https://doi.org/10.1080/15487733.2012.11908081

Sachs, J.D., Kroll, Ch., Lafortune, G., Fuller, G., Woelm, F. (2021), *Sustainable Development Report 2021, The Decade of Action for the Sustainable Development Goals*, Cambridge Uni-

versity Press, Cambridge, https://s3.amazonaws.com/sustainabledevelopment.report/2021/2021-sustainable-development-report.pdf (accessed: 16.10.2021).

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. (2019), *Sustainable Development Report 2019*, Bertelsmann Stiftung and Sustainable Development Solutions Network, New York.

UN Sustainable Development Goals Knowledge Platform (2021), *Sustainable Development Goals*, https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals (accessed: 11.10.2021).

United Nations (2020), *United Nations Comprehensive Response to COVID–19 Saving Lives, Protecting Societies, Recovering Better*, https://www.unwto.org/sites/default/files/news/pdf/Comprehensive-COVID-report-mock-up-v4.pdf (accessed: 18.10.2021).

United Nations (2021a), *Progress towards the Sustainable Development Goals. Report of the Secretary-General*, United Nations, Economic and Social Council, https://sustainabledevelopment.un.org/content/documents/28467E_2021_58_EN.pdf (accessed: 10.10.2021).

United Nations (2021b), *The Sustainable Development Goals Report 2021*, https://unstats.un.org/sdgs/report/2021/ (accessed: 5.10.2021).

United Nations (2021c), *Sustainable Development Goals*, http://www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed: 8.10.2021).

United Nations Climate Change (2015), *The Paris Agreement*, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (accessed: 6.10.2021).

United Nations Development Programme (2015), *The SDGs in Action*, https://www.undp.org/sustainable-development-goals?utm_source=EN&utm_medium=GSR&utm_content=US_UNDP_PaidSearch_Brand_English&utm_campaign=CENTRAL&c_src=CENTRAL&c_src2=GSR&gclid=CjwKCAjwwsmLBhACEiwANq-tXCfLZjFKgovntNvwE7IQpfDr7x7gUehn-Xn_sPcpDAUhL8zaSlgOjxoCNN8QAvD_BwE (accessed: 11.10.2021).

United Nations Development Programme (2019), *Human Development Report 2019. Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century*, https://hdr.undp.org/content/human-development-report-2019 (accessed: 8.10.2021).

United Nations Development Programme (2020), *COVID–19 and Human Development: Assessing the Crisis, Envisioning the Recovery*, 2020 Human Development Perspectives, United Nations, http://hdr.undp.org/en/hdp-covid (accessed: 12.10.2021).

United Nations Division For Sustainable Development Goals (2015), *Financing sustainable development and developing sustainable finance. A DESA Briefing Note On The Addis Ababa Action Agenda*, https://www.un.org/esa/ffd/ffd3/wp-content/uploads/sites/2/2015/07/DESA-Briefing-Note-Addis-Action-Agenda.pdf (accessed: 6.10.2021).

United Nations Economic and Social Council (2020), *Ministerial declaration of the high-level segment of the 2020 session of the Economic and Social Council and the 2020 high-level political forum on sustainable development, convened under the auspices of the Council, on the theme "Accelerated action and transformative pathways: realizing the decade of action and delivery for sustainable development"*, E/2020/L.20–E/HLPF/2020/L.1, Economic

and Social Council, https://sustainabledevelopment.un.org/content/documents/26780MD_2020_HLPF_HLS.pdf (accessed: 15.10.2021).

United Nations in China (2015), *Sustainable Development Goals Officially Adopted by 193 Countries*, https://www.un.org/sustainabledevelopment/blog/2015/09/historic-new-sustainable-development-agenda-unanimously-adopted-by-193-un-members/ (accessed: 11.10.2021).

United Nations Office for the Coordination of Humanitarian Affairs (2021), *Global Humanitarian Response Plan Covid–19*, https://www.unocha.org/sites/unocha/files/Global-Humanitarian-Response-Plan-COVID-19.pdf (accessed: 20.10.2021).

World Food Programme (2021), *The 2021 Global Report on Food Crises, Joint Analysis for Better Decisions*, https://docs.wfp.org/api/documents/WFP-0000127413/download/?_ga=2.45977889.427497621.1635017638-1148221790.1634028188 (accessed: 11.10.2021).

World Health Organization (2021a), *UN report: Pandemic year marked by spike in world hunger*, https://www.who.int/news/item/12-07-2021-un-report-pandemic-year-marked-by-spike-in-world-hunger (accessed: 16.10.2021).

World Health Organization (2021b), *Support to countries' equitable and resilient recovery from the pandemic towards the health SDGs: The 2021 SDG3 GAP progress report*, https://www.who.int/news/item/20-05-2021-support-to-countries-equitable-and-resilient-recovery-from-the-pandemic-towards-the-health-sdgs-the-2021-sdg3-gap-progress-report (accessed: 15.10.2021).

World Health Organization (2021c), *WHO's response to COVID–19 – 2021 Annual Report*, https://www.who.int/publications/m/item/who-s-response-to-covid-19-2021-annual-report (accessed: 18.10.2021).

## Realizacja celów zrównoważonego rozwoju w dobie pandemii Covid–19. Przyszłe wyzwania dla Agendy 2030

Pandemia COVID–19 poważnie zmieniła światową gospodarkę i zagroziła realizacji Celów Zrównoważonego Rozwoju (SDGs) na dużą skalę. Postęp w realizacji celów Agendy 2030 został znacznie zakłócony i zahamowany, niwecząc wcześniejsze wysiłki rządów i narodów. Według raportu Sekretarza Generalnego ONZ „Progress towards the Sustainable Development Goals" w 2020 r. ponad 100 milionów ludzi ponownie doznało ubóstwa i głodu; zlikwidowano 255 milionów pełnoetatowych miejsc pracy; a dodatkowe 101 milionów dzieci i młodzieży spadło poniżej minimalnego poziomu biegłości w czytaniu. Ponadto należy podkreślić, że spowolnienie gospodarcze światowej gospodarki spowodowane pandemią COVID–19 nie poprawiło sytuacji w odniesieniu do zmian klimatycznych. Skutki uboczne pandemii są poważne w każdej sferze życia, zwłaszcza w pogłębianiu się istniejących nierówności społecznych, co z kolei zagraża osiągnięciu SDGs. Celem niniejszego artykułu jest odpowiedź, jakie są obecnie postępy w realizacji Celów Zrównoważonego Rozwoju w odniesieniu do Agendy 2030. Ponadto jest próbą zbadania wpływu COVID–19 na wdrażanie Celów Zrównoważonego Rozwoju w skali globalnej, koncentrując się głównie na statystykach z Sustainable Development Report 2021. Ponadto celem opracowania jest zaprezentowanie wyników analizy mającej na celu zidentyfikowanie najważniejszych skutków pandemii COVID–19 dla krajów europejskich, w tym krajów Europy Środkowo-Wschodniej. Badanie ogranicza się do kontekstu celu 1 (brak ubóstwa), Cel 2 (zero głodu) i cel 3 (dobre

zdrowie i dobre samopoczucie). Kolejnym celem, uznanym za wartość dodaną prowadzonych badań, jest identyfikacja głównych wyzwań związanych ze zrównoważonym rozwojem w ramach realizacji Celów Zrównoważonego Rozwoju w krajach Europy Środkowo-Wschodniej. Na koniec autorka odniesie się do strategicznego planu reakcji na pandemię. Metody badawcze zastosowane w artykule obejmują analizę dostępnych źródeł dokumentalnych i literackich odnoszących się do omawianych zagadnień, opracowanie odpowiednich badań statystycznych oraz zastosowanie podejścia dedukcyjnego w wyciąganiu wniosków z raportów organizacji międzynarodowych. Badanie zostało oparte o globalną ramę wskaźników, która obejmuje 231 unikalnych wskaźników monitorujących etap i postęp realizacji Celów Zrównoważonego Rozwoju (SDGs). Źródłem danych była Globalna Platforma Danych Wskaźników SDG.

Słowa kluczowe: zrównoważony rozwój, cele zrównoważonego rozwoju, Agenda 2030, ubóstwo, bezpieczeństwo żywnościowe, włączenie społeczne

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# The Impact of COVID–19 on EU-China Trade Flows

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## Abstract

COVID–19 is expected to have contributed towards changing the geographical structure of world trade, including trade between individual EU countries and China. This article presents the results of an analysis of the impact of the COVID–19 pandemic on Sino-EU trade flows. The research aims to ascertain whether European Union countries noted a strengthening of their competitive advantage in trade with China in any of the 21 HS sections by increasing the value of the normalized revealed comparative advantage index (NRCA). To identify and select the most significant NRCA observations, Chebyshev's inequality was used. The analysis was carried out for 2015 to 2020, with a particular emphasis on 2020, when the first effects of the COVID–19 pandemic were recorded.

EU-China trade relations have been the subject of numerous studies, but their nature has not yet been fully elucidated. This article tries to fill that gap. The analysis of mutual trade, especially at such an important moment from the socio-economic perspective, can bring significant results. The analysis revealed that the pandemic did not result in any decline in EU-China trade. In fact, global trade rose in 2020, with most of the 27 EU countries recording increases in both imports and exports. There were also no significant changes in the structure of the distribution of comparative advantage. However, in contrast to the previously analyzed years (2015–2019), in 2020, the NRCA index shows a flatter distribution, suggesting that most EU countries with the highest comparative advantages actually observed reductions in them.

Keywords: COVID–19, international trade, import, export, normalized revealed comparative advantage

JEL: F10, F140



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## Introduction

Since the Second World War, China has grown stronger in military, political, and economic spheres, and in the last decade, its growth could be considered unprecedented in relation to the world's leading economies. Importantly, China has been attempting to limit its excessive dependence on the USA through consistent efforts to diversify its sources of imports, as well as its export destination markets.

In this regard, the European Union (EU) has become an important alternative for China. Therefore, China's cooperation – both economically and politically – with the Community is very important for both sides. Cooperation with China is also an opportunity for the EU to stimulate economic activity. Despite the many burdens in mutual relations, cooperation has gradually strengthened, especially since China joined the WTO (2001), and more than a decade later, when negotiations on *The Comprehensive Agreement on Investment* (CAI) began. The importance of these mutual relations is confirmed by the fact that the EU is currently China's largest trading partner, and the EU market is the second main destination for Chinese exports and the main source of imports. China, on the other hand, is the second-largest market for EU exports and the main source of imports (European Commission 2021a).

More recently, however, the EU-China relationship has been seriously tested by the COVID–19 pandemic. It led to a significant decline in world trade, and reductions in industrial production, services, and foreign investment flows. It was anticipated that the pandemic would result in significant changes in the geographical structure of world trade, including trade between the individual countries of the EU and China.

This article, therefore, presents the results of an analysis of the impact of the COVID–19 pandemic on Sino-EU trade flows. To this end, the main direction and advantages of bilateral trade between particular members of the EU and China have been identified. The aim of the research was to ascertain whether the EU countries recorded an increase in the competitive advantage in exports to China and how it changed over time. The index that was used to analyze the change in comparative advantage was the normalized index of revealed comparative advantage (NRCA). Statistical trade data from the Trade Map $3021 database was applied to conduct the analysis. The method used in this research made it possible to determine the relative competitiveness – and the changes caused by the COVID–19 pandemic – of the EU countries in the Chinese market. Identifying the comparative advantages of individual EU countries made it possible to determine which of them coped best with competition in the Chinese market, especially in such difficult conditions caused by the COVID–19 pandemic and its effects.

The research was also the basis for assessing the current competitive position of a given EU country – compared to other EU countries – and how it changed over time. This is particularly important as the EU has had a negative trade balance with China for over

two decades, perpetuating negative trade patterns. Thus, the results of the analysis presented in this work will help to explore the nature of mutual EU-China trade relations and thereby constitute a basis for building a long-term trade strategy that will enable progressive steps to be taken to overcome such negative trends.

The statistical analysis contained in the article focuses on the period between 2015 and 2020 and is used to measure and compare trends in trade before the COVID–19 pandemic and in the year when both sides felt the first effects of the pandemic.

Part one of this work focuses first on the introduction of those issues that are analyzed. This lays a foundation for part two, where the research methodology is presented. In this part, the author also provides a literature review. Part three focuses more specifically on Chinese-EU trade relations. More specific and detailed attention is paid to the actual trade turnover during the COVID–19 pandemic. Part four concentrates on the empirical analysis, and there is a closer examination of the factors that shape the revealed comparative advantages (RCAs) in EU exports to China. The final part draws on the most important conclusions from the analysis.

## Methodology

The doctrine of comparative advantage is derived from classical economics and is attributed to the Ricardian concept of trade (Ricardo 1817). A comparative advantage results from differences in technology between countries. The second major trade theory of comparative advantage stems from the work carried out by Heckscher and Ohlin (Heckscher 1919; Ohlin 1933). They stated that there are similarities in technologies in different countries, and a comparative advantage is based on differences in factor prices, which enable goods and services to be produced and supplied at a lower opportunity cost. Both Ricardo and Heckscher and Ohlin support the idea that a comparative advantage is the main determinant in shaping a country's trade structure, leading to specialization based on supply and demand.

The measurement of comparative advantage was first introduced by Liesner (1958, pp. 302–316). However, the most frequently used model was that developed by Balassa (1965, pp. 99–123; 1989), which measures RCA. This index shows a country's relative position in the export of specific goods in comparison to a reference group of countries. The Balassa index is written as follows:

$$RCA = \frac{EX_{ij}}{\sum_{i=1}^{n} EX_{ij}} : \frac{EX_{iw}}{\sum_{i=1}^{n} EX_{iw}},$$

where:

*RCA* – Revealed comparative advantage index;
$EX_{ij}$ – Value of exports from product/section *i* by country *j* to the market *m*;
$EX_{iw}$ – Value of exports from product/section *i* from a group of countries to market *m*;
*n* – Number of products/sections.

RCA measurement has its critics, however. For example, Yeats (1985, pp. 61–73), Vollrath (1991, pp. 263–279) and Laursen (1998) point to the disadvantages of RCA, such as its staticity, or the problem of asymmetric distribution and the lack of a finite upper limit. Hoen and Oosterhaven (2006, pp. 677–691) also highlighted that using logarithmic transformation methods to interpret comparative advantage provides better results. Other authors mention the importance of simultaneous consideration on the import side (Lafay 1990, pp. 27–43; Vollrath 1991, pp. 263–279), especially when country size is important (Greenaway and Milner 1993, pp. 181–208). An RCA statistical error may also be the result of a state's protectionist policy. Customs duties, import restrictions, or import quotas, as well as export subsidies, can significantly modify export/import streams, leading to a distortion of trade patterns. Due to these limitations, the formula proposed by Balassa was modified several times by authors such as Vollrath (1991, pp. 263–279), Greenaway and Milner (1993), Dalum, Laursen, and Villumsen (1998, pp. 423–443), Laursen (1998; 2015, pp. 99–115), Proudman and Reding (1998), Hinloopen and van Marrewijk (2006), Hoen and Oosterhaven (2006, pp. 677–691), Yu, Cai, and Leung (2009, pp. 267–282), Yu et al. (2009, pp. 473–485), Latruffe (2010) and Wijnands and Verhoog (2016). While these methods contribute to developing some aspects of RCA, none of them can generally be used to compare space (regions/countries) with time (Fakhrudin, Fithra, and Banu 2019, pp. 105–145). The usefulness of the measure of comparative advantage has not yet been questioned in research.

This study examines the comparative advantage of EU–27 members using the NRCA index (Yu, Cai, and Leung 2009, pp. 267–282; Yu et al. 2009, pp. 473–485), which is a revised version of the RCA index. This index makes it possible to overcome some of the above-mentioned limitations of the original Balassa index. An important advantage of the NRCA index is that it allows for the changes in comparative advantage in section, time, and space to be measured. The formula of the NRCA index is given as follows (Fakhrudin and Hastiadi 2016, p. 6):

$$NRCA_k^i = \frac{\Delta X_{ik}}{X} = \frac{X_{ik}}{X} - \frac{X_k X_i}{XX},$$

where:

$NRCA_k^i$ – the difference in the comparative advantage of country *i* for product *k* in a specific market;
$X_{ik}$ – Commodity exports *k* from country *i* to China;
$X_i$ – Total exports from country *i* to China;
$X_k$ – EU commodity exports *k* to China;
$X$ – EU exports to China.

The range of NRCA values fluctuates around zero (neutral value) ranging from $-0.25 < NRCA < 0$ and $0 < NRCA < 0.25$. With a symmetrical measure of trade specialization, it is possible to explore the advantages and disadvantages on consistent terms; values above 0 reflect a comparative advantage, while values below 0 reflect a comparative disadvantage. It is assumed that when one country strengthens its comparative advantage – through an increased NRCA index – another country records a decrease. Importantly, this corresponds to the assumption that the state may have a comparative advantage in selected groups of goods only, which means that it cannot be competitive in terms of all goods. The analysis carried out in this work used 21 commodity sections (consisting of over 5,000 groups of goods) exported from the EU–27 to China.

Due to the fact that the NRCA analysis showed a large number of observations in which the NRCA values for exports oscillate close to zero (the neutral sphere), Chebyshev's inequality was used in the research. It makes it possible to select the most outstanding observations for NRCAs that exceed +/–2 standard deviations from the mean. For +/–2 standard deviations of the mean, 75% of the observations are within limits. For this analysis, only those observations were used whose values exceed the upper limit of the sum of the mean and twice the standard deviation (maximum 12.5% of the sample), i.e., only data that demonstrate a high comparative advantage of the selected EU countries (*Schwesernotes…* 2015).

The purpose of the analysis is to identify the comparative advantage of individual EU–27 countries in trade with China. The analysis was carried out for 2015 to 2020, with particular emphasis on 2020, when the first effects of the COVID–19 pandemic were recorded. Export data has been grouped into 21 sections according to the Harmonized Commodity Description and Coding System (HS) (World Customs Organization n.d.).

## EU-China trade relations and COVID–19

China is the EU's largest source of imports and its second-largest export market. The main goods imported into the EU from China are industrial and consumer goods, machinery and equipment, and footwear and clothing. The main export goods to China are machinery and equipment, motor vehicles, planes, and chemicals. Services also have a large share in mutual trade, accounting for over 10% of total trade in goods, while exports of services account for 19% of total EU exports of goods (European Commission 2021a).

For this research, 2020 is particularly important given that most of the world, including the EU and China, were facing the effects of COVID–19. As a result, global supply chains were disrupted in many economies due to COVID–19 lockdown restrictions. It also affected the EU countries, where, according to estimates, the value of Chinese goods and services used in production amounted to USD 73.5 billion (for EU–14 – the countries of the old EU without the United Kingdom, data for 2015), which was respectively 10.8% of the value of Chinese input consumed in the world (Ambroziak et al. 2021, p. 19). Therefore, many companies are changing their strategy, realizing that locating their supplier base in only one country or region can be risky. For this reason, the "China + 1" concept is gaining popularity among countries dealing with strategic design and optimization of supply chains (Baroowa 2021). The concept is based on the idea of creating regional supplier bases as a viable alternative to China, and, due to its proximity to local supply and demand centers, the company is less dependent on intercontinental freight availability and prices. One of the expected trends in the future is the regionalization of supply chains, which potentially creates an opportunity for Eastern Europe countries, including Poland, to attract new foreign investments in production. China's position as the main supplier of goods may be threatened in this case.

As a result of the pandemic, the EU experienced a decline in industrial production, especially in the first quarter of 2020. The collapse mainly affected the automotive and clothing industries. After the first wave of the pandemic, however, there was a slight rebound, especially in Portugal, Italy, Hungary, and Slovakia. Ultimately, however, only one EU country recorded a positive GDP rate in 2020 – Ireland (Eurostat 2021a). In the EU, the reduction in economic activity resulted in a reduction in global trade turnover. China, on the other hand, is the only global economy that, despite a collapse during the first quarter, recorded economic growth in 2020 (2.3 percent of GDP) (International Monetary Fund 2021). Production in China was positively influenced by, among other things, pandemic-induced drops in natural resource prices.

Despite the pandemic, both China and the EU experienced an increase in exports to each other's markets. Despite the aforementioned declines in EU production in the automo-

tive industry, China's demand for EU cars grew. EU luxury goods were also popular in China. This was due to the changing patterns of consumption in the Chinese market. Chinese consumers' preferences moved towards more premium, greener, and healthier products (*2021 China…* 2021). It was also driven by Chinese government policy to activate internal demand, as well as the spread of Western consumption patterns, which also affect the demand for foreign products, including those from the EU.

On the other hand, Chinese exports benefited from rising European demand for medical, electronic, and entertainment goods. This was related to the widespread lockdown and the growing need for health care and home entertainment. Importantly, to combat the effects of the COVID–19 epidemic, the EU made it possible to exempt imports of necessary goods from import duties and VAT (European Commission 2021b).

A further important factor concerned the appreciation of the Chinese Yuan, whose reference rate increased by approximately 6%. It influenced trade conditions, particularly in terms of its impact on the growth of Chinese imports. Total imports and exports between China and the EU reached $709 billion in 2020 (trade between the EU and the US reached $671 billion) (*China overtakes US…* 2021). For trade between the EU and China, increases in tariffs in trade between the EU and the US (steel, aluminum, French cognac, and American motorcycles) were also important, which could have redirected global trade flows. Mutual relations between Brussels and Beijing were also supposed to be strengthened by the long-negotiated investment agreement (CAI). Negotiations ended in December 2020, and were to facilitate, among others, mutual access to markets.

When analyzing the global trade turnover between the EU and China, it should be emphasized that 2020 was another year in which the Community recorded a trade deficit. This deficit has been the hallmark of EU-China trade for more than two decades. From 2015–2019, this deficit accounted for between 28.7% and as much as 34% of total EU trade with China (31.7% on average). This means that the share of the deficit in the total trade turnover in 2020 – which amounted to 30.8% – is within this range (Eurostat 2021b).

As shown in Figure 1 above, the largest increase in EU-China turnover in 2020 compared to the previous year was recorded in section XVI (machinery/electrical), both in terms of imports and exports, where the increase in imports exceeded exports by a factor of nine. Imports from China also increased in sections such as XI (textiles), VI (chemicals and allied industries), XVIII (optic, photographic, medical or surgical instruments and apparatus), and XVII (transportation). The largest drops in EU exports were recorded in section XVII, despite an increase in Chinese demand for European cars. This was a result of a significant reduction in industrial production in the EU market. On the other hand, sections VI (chemicals and allied industries) and I (animals and animal products) experienced a significant increase in exports.

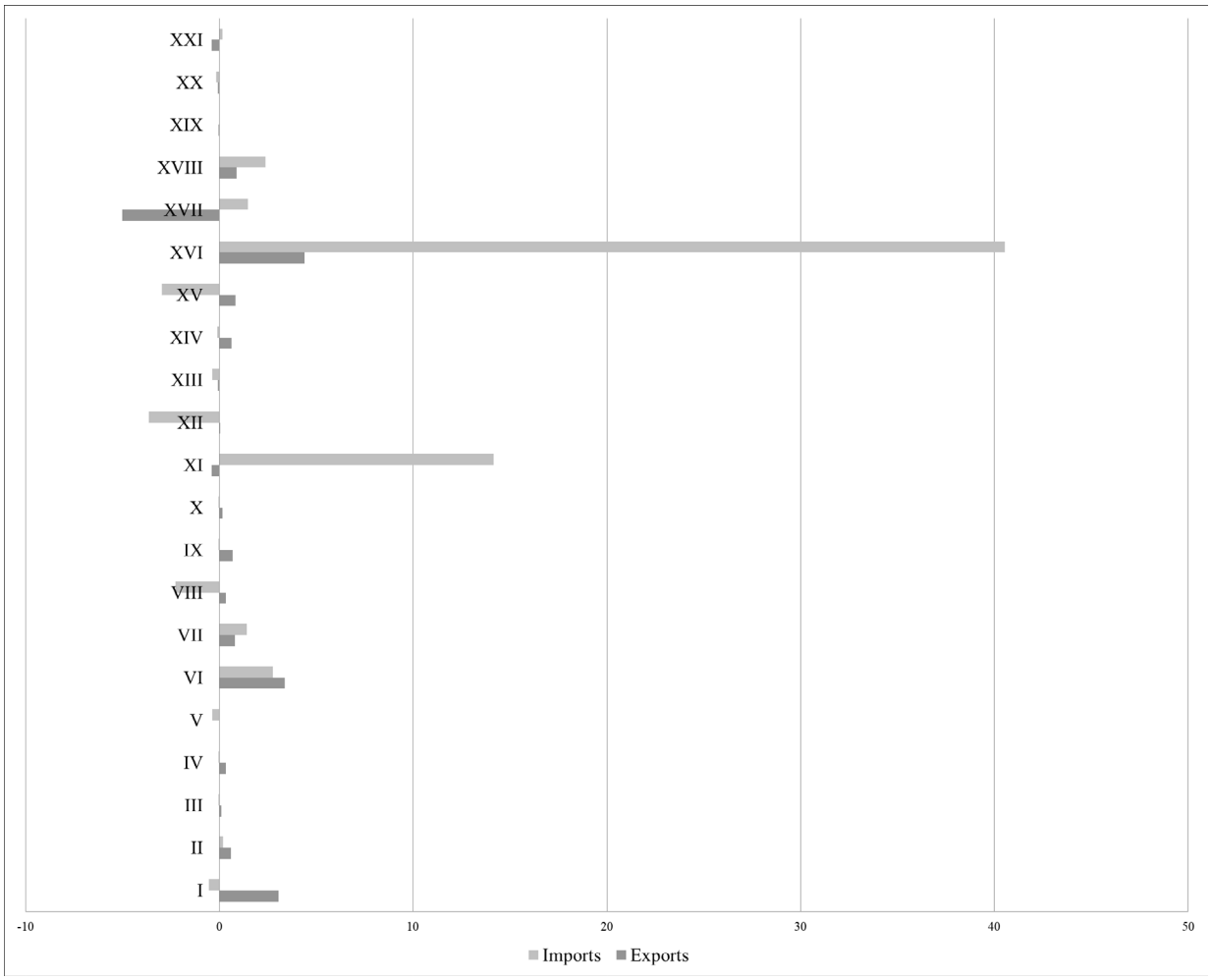


Figure 1. EU-Chinese trade by section (change between 2019 and 2020, USD bln)

Source: own calculation based on Trade Map (n.d.).

Although trade has been limited in many sections, there has been an increase in trade globally. As a result, China has become the EU's largest trading partner. In 2020, EU imports from China increased by 5.6%, while the corresponding exports increased by 2.2%, which is a worse result compared to 2019, when the corresponding data were, respectively, 5.9% and 5.4% (Eurostat 2021b). The growth of Chinese exports was facilitated, among others, by an improvement in consumer sentiment in the EU market. It was also caused by growing capital expenditure in China itself, the aim of which was to improve the economic situation after the COVID–19 crisis.

When analyzing individual EU countries' changes in trade with China in 2020 compared to 2019 (Figure 2), most experienced increases in both import and export categories, despite the pandemic. This was the case for 13 EU economies: Cyprus (149%; 10%), Slovenia (74%; 5%), Belgium (23%; 11%), the Netherlands (22%; 116%), Lithuania (16%, 29%), Bulgaria (15%; 5%), Malta (15%; 36%) Denmark (15%; 4%), Sweden (12%; 12%), Hungary (4%; 41%), Latvia (2%; 28%), Germany (2%; 8%) and Italy (2%; 3%). Seven

countries significantly improved their trade balance with China, including two countries increasing exports, with imports at a constant level: Estonia (49%; 0%) and Luxembourg (2%; 0%). The remaining five increased exports, which limited purchases on the Chinese market. This concerned Poland, where the highest increase in exports within this group was recorded (26%; –12%), Slovakia (24%; –45%), Spain (23%; –12%), Ireland (21%; –24%) and the Czech Republic (5%; –32%). Three EU countries experienced a decline in exports, which, compensated for a significant decline in imports: Finland (–13%; –48%), Austria (–8%; –40%) and Greece (–2%; –6%). Four countries observed a deterioration in their trade balance with China: Croatia (–18%; 55%), Romania (–13%; 13%), France (–14%; 10%), and Portugal (–3%; 6%).

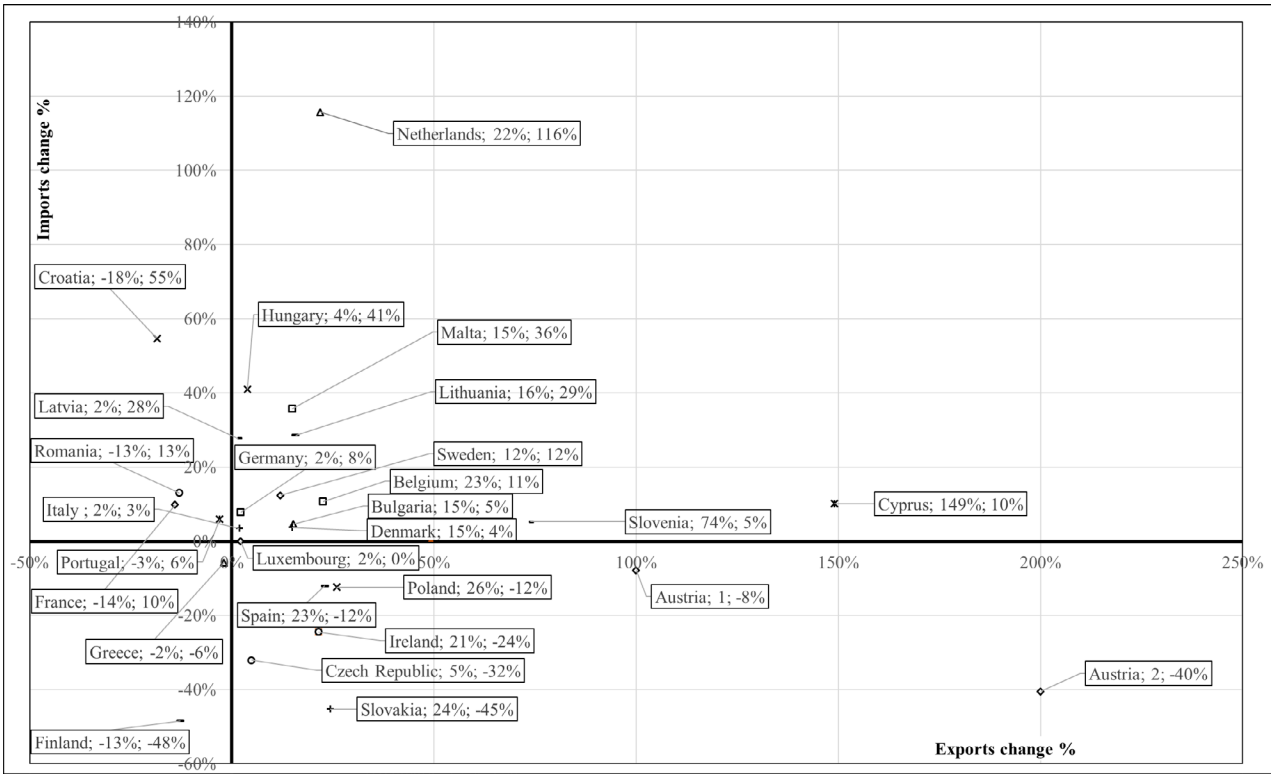


Figure 2. EU's trade with China in 2020 (change between 2019 and 2020, in %)

Source: own calculation based on Trade Map (n.d.).

Later in this work, the results of the analysis of the RCA of the 27 EU countries' trade with China are presented. This allows for an assessment of change across countries and which industries were least affected by the COVID–19 pandemic.

## Empirical results

Before the results of the analysis are presented, it is first necessary to calculate the shares of each product group in total EU exports with China with the use of the NRCA index (as of 2020).

Figure 3 below presents the changes in these shares between 2015 and 2020. The individual sections are presented by share of a given section in EU exports to China (as of 2020). The largest share in EU exports to China was held by goods from section XVI (machinery/electric), where a systematic increase in this share could be observed, from 31.3% (2016) to 33.8% (2020). Second place was taken by goods from section XVII (transport). Its share in exports to China ranged from 21% to 23.2%; in 2020, there was a significant decrease in this share by more than 3 percentage points (up to 17.9%). Goods from the chemical section (VI) took third place. There was a systematic increase in the share of exports to China, from almost 10% in 2015 to 12.6% in 2020 (despite COVID–19, this upward trend was maintained).

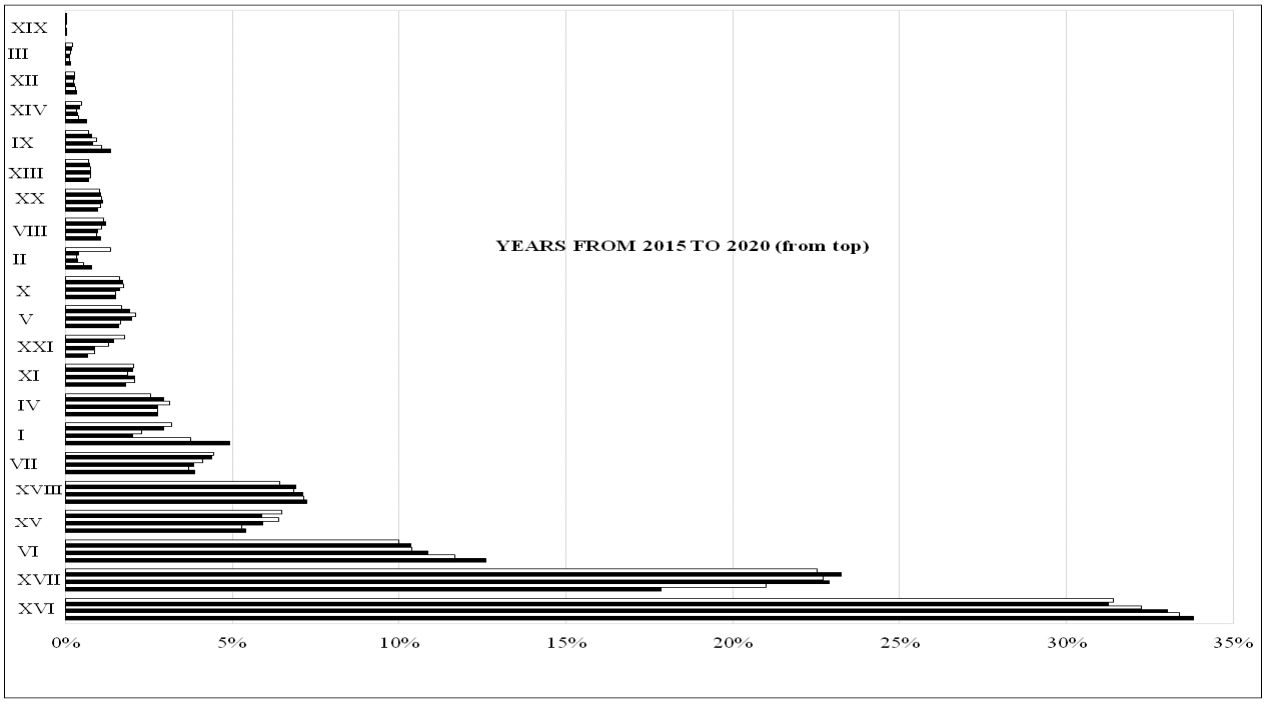


Figure 3. Share of individual sections in EU exports to China, 2015–2020 (in %)

Source: own calculation based on Trade Map (n.d.).

The next item was base metals (XV), whose share varied from 5.3% to 6.5%. Data for 2020 revealed a marginal increase of 0.1% percentage points, raising outflows to 5.4%. In 2020, products from the optical industry (XVIII) were in fifth place in EU exports to China. The share of these products in outflows also grew, from 6.4% in 2015 to 7.2% in 2020. The next position was plastic (VII), which in 2020 also recorded a slight in-

crease to almost 3.9%, while between 2015 and 2019, its share in exports ranged from 3.7% to 4.5%. Seventh place went to products from section I, i.e., live animals and animal products, which in 2020 increased to almost 5%. Before 2020, exports ranged from 2% to 3.7%. The last section (IV) was food, which exceeded the 2% share of EU exports to China in 2020. Data for 2020 (2.8%) were within the range of fluctuations observed between 2015 and 2019 (from 2.6% to 3.1%).

Other commodity groups (thirteen sections, including XI, XXI, V, X, II, VIII, XX, XIII, IX, XIV, XII, III, and XIX) did not exceed a 2% share in EU exports to China in 2020. Only five were outside the ranges observed from 2015 to 2019, three of which were lower than the previously set limits (a difference from 0.2 to 1.1 percentage points), and two exceeded these fluctuations (the difference from 0.3 to 0.6 percentage points). Based on the above data, it cannot be concluded that the pandemic significantly affected the structure of EU exports to China.

Table 1 below presents data on the value of the RCA for 21 product sections for the EU–27 for 2015–2020. The analysis took into account changes in the NRCA over time, which allowed for an assessment of COVID–19 in EU trade patterns with China.

Table 1. NRCA index for the EU–27 in trade with China, 2015–2020

| Sections | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| XVI | GER (0.02839) | GER (0.01562) | GER (0.02198) | GER (0.02308) | IRL (0.01547)<br>GER (.01824) | IRL (0.00178)<br>GER (0.00179) |
| XVII | GER (0.03705) | GER (0.04686) | GER (0.0356) | GER (0.03788) | GER (0.04528) | GER (0.00546) |
| VI | BE (0.00924) | BE (0.00772) | BE (0.00956) | BE (0.00745) | BE (0.00779) | BE (0.01027) |
| XV | POL (0.00356) | POL (0.00225) | BG (0.00258)<br>POL (0.00287) | BG (0.00281) | BG (0.0012)<br>POL (0.00284) | – |
| XVIII | GER (0.00727) | GER (0.00638) | GER (0.0078) | GER (0.00725) | GER (0.00727) | GER (0.00087) |
| VII | BE (0.00238)<br>NL (0.00261) | BE (0.0024)<br>NL (0.00205) | BE (0.00207) | BE (0.00223) | BE (0.00255) | BE (0.00233) |
| I | DK (0.0128) | DK (0.00394)<br>ES (0.004) | – | DK (0.00303) | ES (0.00725) | ES (0.00148) |
| IV | FRA (0.00471) | – | FRA (0.00667) | NL (0.00616) | NL (0.00641) | NL (0.00074) |
| XI | ITA (0.00504) | ITA (0.00495) | ITA (0.00474) | ITA (0.00578) | ITA (0.0057) | ITA (0.00052) |
| XXI | BE (0.00341)<br>GER (0.00408) | BE (0.0026)<br>GER (0.00335) | BE (0.00179)<br>GER (0.00539) | GER (0.00632) | GER (0.0037) | GER (0.00026) |
| V | NL (0.00478) | NL (0.00409) | NL (0.0052) | ES (0.00644) | ES (0.00462) | ES (0.00032) |
| X | FIN (0.00362) | FIN (0.00373) | FIN (0.00402) | FIN (0.00517) | FIN (0.00094) | FIN (0.0004) |
| II | DK (0.00457)<br>FRA (0.00406) | NL (0.0009) | NL (0.00089) | NL (0.00082) | FRA (0.00145) | FRA (0.00039) |

| Sections | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| VIII | ITA (0.00346) | ITA (0.00285) | ITA (0.003) | ITA (0.00314) | ITA (0.00041) | FRA (0.00033)<br>ITA (0.00026) |
| XX | ITA (0.00172) | ITA (0.00196) | ITA (0.00243) | ITA (0.00241) | ITA (0.0231) | ITA (0.0002) |
| XIII | ITA (0.00037)<br>AT (0.00032) | ITA (0.00039)<br>AT (0.00033) | ITA (0.00039)<br>AT (0.00032) | ITA (0.00039)<br>AT (0.00033) | ITA (0.00049) | ITA (0.00003) |
| IX | – | FIN (0.00135) | FIN (0.00176) | – | – | BE (0.00199) |
| XIV | BE (0.0025) | BE (0.00228) | BE (0.00132) | BE (0.00139) | BE (0.00089) | BE (0.0002) |
| XII | ITA (0.00151) | ITA (0.00144) | ITA (0.00129) | ITA (0.00145) | ITA (0.00149) | ITA (0.00015) |
| III | ES (0.00085) | ES (0.00089) | ES (0.00083) | ES (0.00062) | ES (0.00062) | ES (0.000005) |
| XIX | ITA (0.000001) | ITA (0.000002) | ITA (0.000001) | GER (0.000001) | ITA (0.000002) | AT (0.0000005)<br>ITA (0.0000004) |

Source: author's own calculations based on the Trade Map (n.d.).

Table 1 above contains NRCA values selected for individual sections – in accordance with Chebyshev's inequality. The use of Chebyshev's inequality allowed the capture of outliers of the NRCA index that are above the second standard deviation around the mean (lying above the upper limit) for all twenty-seven countries for each of the twenty-one sections. Importantly, Chebyshev's inequality can be applied to any distribution. Its use allows changes in the NRCA value for individual sections to be analyzed. It also makes it possible to identify within particular sections those countries that are outside 75% of all observations around the average. If the analyzed distribution is flat (within two standard deviations of the mean), there are no outlier results, which means that it is not possible to select a country that has a significant comparative advantage over the remaining twenty-seven.

The main emphasis was placed on analyzing changes in NRCA indicators in 2020 compared to previous years (2015–2019). This allowed for a preliminary determination of whether the COVID–19 pandemic had a significant impact on the EU's trade flows with China. In the table, individual sections are presented according to the order of the share of a given section in EU exports to China (as of 2020).

In the three sections that accounted for the highest share of EU exports to China (64%), no significant change was observed in the structure of the countries that obtained the highest NRCA share, i.e., they recorded a comparative advantage in trade in goods classified under these sections. For section XVI (machinery/electronics), Germany showed a comparative advantage over the entire analyzed period. In 2020, a decrease in this indicator can be observed in relation to those values obtained in previous years. In 2020, relatively high NRCA values in section XVI were also recorded in Ireland, but this fact should not be associated with the COVID–19 pandemic, as Ireland stood out a year earlier in terms of NRCA among the other twenty-seven countries, just behind Germany.

In the case of exports in section XVII (transport), Germany also had a dominant position, which did not change in 2020. However, as with products from section XVI, in 2020, there was a decrease in the value of the NRCA index against the background of the entire period under review. In the case of chemical products (VI), relatively high NRCA rates were recorded for Belgium throughout the entire period. By analyzing the development of the NRCA index for Belgium in 2020, the country strengthened its comparative advantage compared to previous years.

For section XV (base metals), high NRCA values characterized Poland between 2015 and 2017 and in 2019. Bulgaria also managed to gain a comparative advantage in 2017, 2018, and 2019. Importantly, both countries recorded a significant deterioration in the NRCA index in 2020, losing their advantage. Analyzing the development of the NRCA index for section XVIII (which includes optical, photographic, cinematographic, measurin3.g, control, precision, medical or surgical instruments and devices), Germany achieved the highest values in the entire period. However, in 2020, the value of the indicator decreased compared to previous years.

In the case of section VII (plastic, rubber and articles made of them), Belgium had a comparative advantage in the entire period, and in 2020, no significant changes were recorded compared to the previous year. In 2015 and 2016, the Netherlands also recorded high NRCA values for these products. However, in the following years, this indicator decreased significantly, and the country lost its comparative advantage, which it had not regained by 2020.

In the case of section I (live animals and animal products), Denmark achieved the highest NRCA values for most of the analyzed years (2015, 2016, and 2018). In 2016, the next country to show a comparative advantage in this product category was Spain. After a break in 2017 and 2018, it again recorded a high index in 2019. Importantly, it maintained this index in 2020.

In the last section to exceed 2% of total EU exports to China, sector IV (food products), France had an advantage in 2015 and 2017, although it lost it to the Netherlands in 2018. The Netherlands maintained high NRCA rates until 2020.

For the remaining thirteen sections, which had a share of less than 2% in EU exports to China, there were no significant changes in the development of the NRCA index, especially in 2020 compared to 2019. In 2020, all countries maintained their advantage, 12 of which achieved lower values compared to the previous year. In 2020, for the first time, positive NRCA outliers were recorded for three countries: Belgium (IX – wood and articles made of wood), France (VIII – leather and articles made from it), and Austria (XIX – weapons and ammunition). Each of these countries gained a comparative advantage in exports to China for the first time in the years analyzed.

An analysis of the above data cannot lead to the conclusion that the COVID–19 pandemic had any significant impact on changes in the distribution of benefits from trade with China in 2020. The countries that obtained the highest NRCA values in 2019 slightly weakened their comparative advantage in 2020. This observation includes 19 of the 24 countries. However, this does not apply to Belgium, which strengthened its advantage in 2020 in the chemical products section, or the three previously mentioned countries (Belgium, France and Austria), which gained a comparative advantage for the first time in 2020.

## Conclusion

The study is an attempt to ascertain how the pandemic helped shape trade between the EU and China, especially in terms of EU exports to China. The research showed that the pandemic led to reduced EU-China trade in many sections. On the contrary, it revealed that global bilateral trade increased in 2020, and a sizeable number of the 27 EU countries recorded increases in both imports and exports. However, there were no significant changes in the structure of the distribution of comparative advantages, neither in relation to 2019 nor in the previous analyzed years (2015–2018). Importantly, 20 of the 22 countries with a strong comparative advantage in 2019 maintained it in 2020. However, most of the economies with the highest NRCA values in 2019 revealed slightly weakened comparative advantages in absolute terms in 2020. It means that the comparative advantage spread over the remaining countries from the reference group. This demonstrates that compared to the previous analyzed years, in 2020, the NRCA index shows a flatter distribution. As might be expected, this was the cause of the slowdown in most EU economies due to the COVID–19 pandemic. This trend was particularly evident in the case of the German economy, which was heavily affected by the pandemic, and which gained a comparative advantage in trade with China in the main EU export sections (XVI and XVII, which account for around 50% of EU exports to China). Declines in outflows were mainly felt in the transport section, which saw a significant drop in the share of EU exports to China.

It can therefore be concluded that despite the COVID–19 pandemic, EU-China trade turnovers increased, which was due not only to the increase in EU exports, but, above all, imports. Chinese exporters are making a rapid recovery from the pandemic and fulfilling overseas orders. Chinese exports accelerated because, among other things, EU countries have started lifting restrictions on the coronavirus. In 2020, the EU also introduced some commodity trade facilities to counter the effects of COVID–19. These activities, as well as the growing needs in this area, contributed to an increase in the sale of medical equipment and articles related to health protection. The strong

trade performance indicated that a jump in imports shows that domestic investment spending remains strong. The growth in Chinese exports is most likely caused by the recent strength of retail sales in export markets, such as the EU.

One of the expected trends in the future is the regionalization of supply chains, which is expected to create opportunities for the Eastern European countries, including Poland, to attract new foreign investments. While there is currently no apparent impact of the COVID–19 pandemic on EU-China trade patterns, it may have far-reaching consequences in the future, especially for China as a "global factory."

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## References

*2021 China Outlook* (2021), "The Deloitte Research Monthly Outlook and Perspectives", issue 61, https://www2.deloitte.com/cn/en/pages/about-deloitte/articles/deloitte-research-issue-61.html (accessed: 10.05.2021).

Ambroziak, Ł., Chojna, J., Gniadek, J., Kępka, H., Strzelecki, J. (2021), *Szlaki handlowe po Pandemii Covid–19*, PISM, Warszawa.

Balassa, B. (1965), *Trade liberalization and revealed comparative advantage*, "The Manchester School of Economic and Social Studies", 33 (2), pp. 99–123, https://doi.org/10.1111/j.1467-9957.1965.tb00050.x

Balassa B., (1989), *Comparative Advantage, Trade Policy and Economic Development*, Harvester Wheatsheaf, New York.

Baroowa, S. (2021), *Adopting a China+1 Strategy in ASEAN. Diversifying Supply Chain to Minimize Risks*, https://www.dezshira.com/multimedia/view/adopting-china-1-strategy-asean-diversifying-supply-chains-minimize-risks.html (accessed: 15.03.2021).

*China overtakes US as EU's biggest trading partner* (2021), BBC, https://www.bbc.com/news/business-56093378 (accessed: 8.04.2021).

Dalum, B., Laursen, K., Villumsen, G. (1998), *Structural change in OECD export specialization patterns: de-specialization and stickiness*, "International Review of Applied Economics", 12, pp. 423–443, https://doi.org/10.1080/02692179800000017

European Commission (2021a), *China*, https://ec.europa.eu/trade/policy/countries-and-regions/countries/china/ (accessed: 10.04.2021).

European Commission (2021b), *COVID–19: Waiving VAT and customs duties on vital medical equipment*, https://ec.europa.eu/taxation_customs/covid-19-taxud-response/covid-19-waiving-vat-and-customs-duties-vital-medical-equipment_en (accessed: 11.05.2021).

Eurostat (2021a), *Real GDP growth rate – volume*, https://ec.europa.eu/eurostat/databrowser/view/tec00115/default/table?lang=en (accessed: 22.05.2021).

Eurostat (2021b), *China-EU – international trade in goods statistics*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=China-EU_-_international_trade_in_goods_statistics (accessed: 5.06.2021).

Fakhrudin, U., Hastiadi, F.F. (2016), *Impact Analysis of Normalized Revealed Comparative Advantageon ASEAN's Non-Oil and Gas Export Pattern Using Gravity-Model Approach*, "Working Paper in Economics and Business", vol. V, No. 3.

Fakhrudin, U., Hastiadi, F.F., Haidir, B.M. (2019), *Impact Analysis of Normalized Revealed Comparative Advantage on ASEAN's Non-Oil and Gas Export Pattern Using a Gravity Model Approach*, [in:] F. Hastiadi (ed.), *Globalization, Productivity and Production Networks in ASEAN*, Palgrave Macmillan, Cham, pp. 105–145, https://doi.org/10.1007/978-3-030-16510-9_5

Greenaway, D., Milner, C. (1993) *Trade and Industrial Policy in Developing Countries: A Manual of Policy Analysis*, The Macmillan Press, London, https://doi.org/10.3998/mpub.14118

Heckscher, E. (1949), *The Effects of Foreign Trade on the Distribution of Income*, [in:] H.S. Ellis, L.M. Metzler (eds.), *Readings in the Theory of International Trade*, Blakiston, Philadelphia, pp. 272–300.

Hinloopen, J., Marrewijk, C. van (2006), *Comparative Advantage, the Rank-size Rule and Zipf's Law*, Tinbergen Institute Discussion Paper No. 06–1001/1, Amsterdam, https://doi.org/10.2139/ssrn.943370

Hoen, A.R., Oosterhaven, J. (2006), *On the measurement of comparative advantage*, "Annals of Regional Sciences", 40, pp. 677–691, https://doi.org/10.1007/s00168-006-0076-4

International Monetary Fund (2021), *People's Republic of China*, https://www.imf.org/en/Countries/CHN (accessed: 7.05.2021).

Lafay, G. (1990), *La Measure des avantages comparatifs reveles*, "Economie Prospective Internationale", 41, pp. 27–42.

Latruffe, L. (2010), *Competitiveness, Productivity and Efficiency in the Agricultural and Agri-Food Sectors*, "OECD Food, Agriculture and Fisheries Working Papers", No. 30, https://doi.org/10.1787/5km91nkdt6d6-en

Laursen, K. (1998), *Revealed Comparative Advantage and the Alternatives as Measures of International Specialisation*, "DRUID Working Papers", 98–30, DRUID, Copenhagen Business School, Department of Industrial Economics and Strategy/Aalborg University, Department of Business Studies.

Laursen, K. (2015), *Revealed comparative advantage and the alternatives as measures of international specialization*, "Eurasian Business Review", 5, pp. 99–115, https://doi.org/10.1007/s40821-015-0017-1

Liesner, H.H. (1958), *The European Common Market and British Industry*, "Economic Journal", 68 (270), pp. 302–316, https://doi.org/10.2307/2227597

Ohlin, B. (1933), *Interregional and International Trade*, Harvard University Press, Cambridge.

Proudman, J., Redding, S. dan, (1998), *Openness and Growth*, The Bank of England, United Kingdom.

Ricardo, D. (1817), *On the Principles of Political Economy and Taxation*, John Murray, London.

*Schwesernotes 2016 Level I CFA Book 1: Ethical and Professional Standards and Quantitative Methods* (2015), Kaplan, Inc., USA.

Trade Map (n.d.), https://www.trademap.org/Index.aspx (accessed: 25.05.2021)

Vollrath, T.L. (1991), *A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage*, "Weltwirtschaftliches Archiv", 127, pp. 265–280, https://doi.org/10.1007/BF02707986

Wijnands, J.H.M., Verhoog, D. (2016), *Competitiveness of the EU food industry. Ex-post assessment of trade performance embedded in international economic theory*, LEI Wageningen UR, Wageningen, https://doi.org/10.18174/369980

World Customs Organization (n.d.), *What is the Harmonized System (HS)?*, http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx (accessed: 5.02.2021).

Yeats, A.J. (1985), *On the appropriate interpretation of the revealed comparative advantage index: implications of a methodology based on industry sector analysts*, "Weltwirtschaftilches Archiv", 121, pp. 61–73, https://doi.org/10.1007/BF02705840

Yu, R., Cai, J., Leung, P.S. (2009), *The normalized revealed comparative advantage index*, "The Annals of Regional Sciences", 43 (1), pp. 267–282, https://doi.org/10.1007/s00168-008-0213-3

Yu, R., Cai, J., Loke, M.K., Leung, P.S. (2009), *Assessing the comparative advantage of Hawaii's agricultural exports to the US mainland market*, "Annals of Regional Sciences", 45 (2), pp. 473–485, https://doi.org/10.1007/s00168-009-0312-9

## Wpływ pandemii COVID–19 na wzorce handlu UE-Chiny

Można oczekiwać, że trwająca obecnie pandemia COVID–19 przyczyni się do zmiany struktury geograficznej handlu światowego, w tym wymiany między poszczególnymi krajami UE a Chinami. W niniejszym artykule przedstawiono więc wyniki analizy wpływu pandemii COVID–19 na chińsko-unijne przepływy handlowe. Celem badania było uzyskanie odpowiedź na pytanie, czy kraje Unii Europejskiej odnotowały wzmocnienie przewagi konkurencyjnej w handlu z ChRL w którymkolwiek z 21 sektorów HS poprzez zwiększenie wartości znormalizowanego wskaźnika ujawnionej przewagi komparatywnej (NRCA). Ze względu na dużą liczbę obserwacji, których wartości NRCA dla eksportu oscylują w pobliżu zera (sfery neutralnej), w badaniach wykorzystano nierówność Czebyszewa, co pozwoliło na wyodrębnienie tych najbardziej odstających obserwacji. Analiza prowadzona była dla lat 2015–2020, ze szczególnym uwzględnieniem roku 2020, w którym odnotowano pierwsze skutki pandemii COVID–19.

Stosunki handlowe UE-Chiny były przedmiotem licznych badań, ale ich charakter nie został jeszcze w pełni wyjaśniony, o czym świadczy utrzymujący się przez ponad dwie dekady znaczący deficyt handlowy Wspólnoty. Ten artykuł próbuje wypełnić istniejącą lukę. Analiza handlu UE-ChRL, zwłaszcza w tak kluczowym, z perspektywy historii społeczno-gospodarczej okresie, może

przynieść istotne rezultaty. Niniejsza analiza wykazała, że pandemia nie spowodowała spadku wymiany handlowej UE-Chiny. W rzeczywistości światowy handel wzrósł w 2020 r., a większość z 27 krajów UE odnotowała wzrost zarówno w imporcie, jak i eksporcie. Nie nastąpiły również istotne zmiany w strukturze rozkładu przewag komparatywnych. Jednak w przeciwieństwie do wcześniej analizowanych lat (2015–2019), w 2020 r. indeks NRCA wykazuje bardziej płaski rozkład. Sugeruje to, że większość krajów UE o najwyższych przewagach komparatywnych faktycznie odnotowała ich redukcję.

Słowa kluczowe: COVID–19, handel międzynarodowy, import, eksport, znormalizowana ujawniona przewaga komparatywna

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# Global Income Inequality – A Case Study of OECD Countries and Kazakhstan

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## Abstract

This article presents the results of a study into the features of the formation of economic inequality in Kazakhstan in the context of global trends in the country's development. The methodological basis of the study was a comparative analysis of the former Soviet Union (FSU) and OECD countries in terms of economic development and inequality in the context of global changes and trends, implemented with the help of econometric and economic-statistical methods. The study revealed a direct statistically significant ($p < 0.05$) correlation between the level of income concentration of the 10% group and the economic growth of Iceland ($r = 0.67$) and the Republic of Belarus ($r = 0.65$). In the case of the Republic of Kazakhstan, no such correlation was



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found. However, in Kazakhstan, the link between the 10% group's income concentration and gross domestic product per capita has been established. The dynamics of GDP growth and the values of Kazakhstan's population's real money incomes have a stable inverse relationship. The correlation coefficient between them is r = –0.46, and the determination coefficient is R = 0.215, based on data from 2008 to 2020. This suggests that economic growth is still the most important factor that influences the population's real income. The results of the study will be put into practice by familiarizing government officials with the developed proposals for enhancing the state's policy of overcoming economic inequality and setting the stage for sustainable economic growth. In addition, the results of this study will be of interest to academic science, actualizing new directions for further research.

Keywords: development, distribution, institutions, transition economy, wealth

JEL: O10, O57, P16

## Introduction

Global income inequality has remained stubbornly high for decades, a reflection of the world's existing highly hierarchical economic system. At the same time, the share of income received by 10% of the world's population fluctuates between 50–60% of total income, while the share of the remaining 50% in the lower part is typically 5–10%. The global share of the world's richest 1% is nearly three to four times that of the remaining 50%, which is roughly on the same order of magnitude as the 0.1% share (Chancel and Piketty 2021).

In today's world, the COVID–19 pandemic and its accompanying economic crisis are the two most powerful contributors to global poverty and persistent inequality. As a result of the pandemic, between 88 and 115 million people were trapped in extreme poverty in 2020, bringing global poverty rates back to levels seen in 2017. The figure is expected to rise to 150 million by 2021 (World Bank 2020).

Global inequality remains widespread in 2021, despite three decades of trade and financial globalization. Inequality is now nearly as bad as when Western countries were at their pinnacle of power. Additionally, the COVID–19 pandemic has contributed to the escalation of global inequality. Since the mid–1990s, roughly 1% of the wealthiest people have amassed 38% of all additional wealth. Notably, since 2020, these processes have moved at a much faster pace (World Inequality Lab 2021a).

Because of this, income distribution is of significant scientific and practical importance. Recent years have seen many new economic theories arise that try to ascertain why there is so much inequality in income distribution and how that can upset economic growth. This research will investigate the theories that explain inequality. Again, the study of income inequality in the FSU countries is particularly important because this issue has received insufficient attention.

## New perspectives on income inequality

While it is widely acknowledged that income inequality is inherently undesirable, there is considerable debate about its impact on economic growth. The level of equality of opportunity is responsible for the relationship between income inequality and economic growth. Income inequality has a greater impact on future growth in societies where opportunities are unequally distributed, i.e., where parents' material circumstances constrain their children's opportunities (Mijs 2021). By contrast, in societies where there are more opportunities for everyone, income inequality can be more easily ignored and should not limit investment opportunities or slow down growth. In this case, opportunity equality can be equated with intergenerational mobility, or the degree of correlation between parents' achievements (income and education) and children's achievements (Aiyar and Ebeke 2020).

The dynamics of income inequality in the post-communist countries of Central and Eastern Europe have long been thought to be linked to the impact of institutional change. The group analysis results indicate two types of institutional changes: endogenous in the first transition period, associated with a deterioration in income distribution, and exogenous in the second transition period, associated with income distribution stabilization. The persistence of high income inequality during the second transition period can be explained by post-transitional tolerance for inequality, which reflects economic evolution but also suggests a possible shift in values in Central and Eastern European countries (Josifidis, Supic, and Glavaski 2018).

## Main hypothesis

Inequality has a detrimental effect on economic growth for a number of reasons. To begin with, inequality can result in underinvestment in education, health care, and physical capital, all of which contribute to slower economic growth. On the other hand, underinvestment can be associated with a lack of resources, i.e., poverty, rather than inequality as an economic phenomenon. This favors considering poverty as another factor that can stifle economic growth (Breunig and Majeed 2020).

Inequality in FSU countries may be linked to the fact that, as a result of rapid development and urbanization, there is a high concentration of population in these countries' capitals, owing to higher personal incomes. This always favors increased mobility and long-term migration from small and medium-sized cities to large cities, as well as rural depopulation (with the exception of Kazakhstan, which has the highest degree of spatial polarization). The high degree of personal income inequality in capitals compared to provinces primarily determines labor migrants' choices: the capital or outside the country (Zubarevich 2018).

Another aspect of the problem is that the relationship between remittances and inequality is reversed in most countries. Remittances, on the other hand, deepen economic inequality when they account for more than 20% of GDP. This situation calls into question the assertion that remittances should only be viewed as a redistribution mechanism that benefits the poor because additional migrant remittances can actually increase income inequality in some cases (Tokhirov 2021).

The issues captured here are viewed through the lens of the following hypothesis, which will either be confirmed or refuted: A high level of income inequality in FSU countries and Kazakhstan can, among other things, affect the dynamics of economic growth and its sustainability. Furthermore, there is a link between the indicator of gross internal income per capita and the percentage of people living on less than the poverty line.

## Literature review

Today's world is marked by widespread economic inequality. Rapid economic growth in some developing countries has helped to reduce inter-country inequality to some extent, but intra-country inequality remains high and, in some cases, is increasing (Haller and Eder 2016).

According to the UN Sustainable Development Outlook Report, high levels of inequality limit human development's economic and social mobility and, as a result, impede economic growth (United Nations 2019). Inequality is also a major impediment to achieving the Sustainable Development Goals. Societies with high levels of income inequality develop more slowly than societies with low levels, and they are less successful at sustaining long-term economic growth. They are also ineffective at alleviating poverty (Department of Economic and Social Affairs of the United Nations Secretariat 2020).

The world of global flows of goods, services, and capital has changed dramatically over the last twenty-five years. This has influenced global economic and financial power relations (Čaušević 2017).

The financial capitalism era, characterized by increased globalization and banking, has altered the relationship between labor and capital, with labor frequently being the weaker party. On the one hand, trade unions lost power as a result of the labor-capital conflict, and labor market institutions such as worker protection from layoffs, unemployment benefits, unemployment subsidy replacement rates, and so on were weakened. Moreover, workforce flexibility, atypical labor contracts, and temporary jobs led to precarious employment and, thus, precarious consumption. In this context, income inequality has grown because labor, the most important source of income, is viewed from a supply-side perspective as a cost to be reduced rather than a fundamental component of aggregate demand to expand production (Fadda and Tridico 2016).

Thus, in recent decades, the shift away from classical industrial capitalism toward financial capitalism has accelerated the growth of inequality. In this regard, economic inequality is common in many countries around the world. This socio-economic phenomenon is still one of the most perplexing scientific mysteries of the past and present. The FSU countries only recently faced the problem of inequality, about 30 years ago, after abandoning the planned economy and transitioning to a market economy. Therefore, this phenomenon has received insufficient attention.

There has recently been much interest in studying certain aspects of the development of inequality in the FSU countries. The reason for this is that there is a significant difference between countries in terms of inequality, with Kazakhstan standing out. The purpose of this study is to examine the characteristics of economic inequality in Kazakhstan in light of global trends affecting its growth. This assumes that the research objectives will be met. To begin, it is necessary to examine the issue of economic inequality at the global level, specifically between individual countries in terms of GDP per capita, as well as between different segments of the population in terms of income, using an established assessment criterion based on the Gini coefficient and other relevant indicators. The next step is to delve deeper into the study of the inequality problem by comparing Kazakhstan to other countries. Finally, the study intends to characterize similar approaches and differences in viewpoints on the major global trends and factors in the formation of inequality in various countries worldwide.

## Methods and materials

### Research methodology

For this comparative analysis, 12 FSU countries and 38 OECD member countries as of 2021 were chosen for their distinctive patterns of socio-economic development. Appropriate indicators were chosen based on a study of the main theoretical and methodological concepts and approaches to the study of the problem of inequality. The use of these indicators in the comparative analysis would reveal differences and trends in the dynamics of income inequality in Kazakhstan and developed countries, as well as their impact on economic growth. The results allow us to assess the impact of changing income inequality trends on Kazakhstan's economic growth rate and, ultimately, the country's real chances of joining the world's thirty most developed countries.

The indicators representing the distribution of households according to the amount of average per capita cash income and total cash income of the population by 10% groups were used during the study of income inequality in Kazakhstan and some

developed countries. They enable the calculation of decile differentiation indicators and the assessment of income concentration, cash income and expenditure structure of the population, the Gini coefficient, the poverty rate, etc. Inequality was measured using data from the National Bureau of Statistics of the Republic of Kazakhstan, OECD. Stat, the World Bank Open Data, World Inequality Database (WID.world), the Eurasian Union's statistical database, and other sources.

The P90/P10 ratio, i.e., the ratio of the upper bound value of the ninth decile or the 10% of people with the highest income to that of the first, was also used here.

The Gini coefficient has significant advantages over other indicators, but it also has a number of limitations. It has a clear graphical representation, and as with any generalizing measure, it allows general conclusions about inequality trends to be drawn. It does not, however, determine whether the increase or decrease in inequality is the result of changes at the bottom, middle, or top of the distribution. The Gini coefficient is more sensitive to changes in the middle of the distribution than other indices and less sensitive to changes at the very bottom and very top of the distribution (Department of Economic and Social Affairs of the United Nations Secretariat 2020).

Correlation analysis was carried out using Microsoft Excel. All calculations were performed according to Meissner (2013).

## Results

In the modern world, economic inequality exists at the global level between individual countries. It is typically measured in terms of GDP per capita, as well as income inequality between different strata of the population. Let us take a closer look at these two situations.

When the dynamics of the FSU countries and the OECD countries in terms of GDP per capita (current US$) are compared, there is a significant difference between them (Table 1).

Table 1. The FSU countries' achieved Level of GDP per capita (current US$) in relation to the OECD countries' average indicator (as a percentage)

| Country | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 137.5 | 127.5 | 148.8 | 167.1 | 183.0 | 182.2 | 164.7 | 159.5 | 138.6 | 144.5 | 145.8 | 139.4 | 136.0 |
| Austria | 143.3 | 143.0 | 134.0 | 137.3 | 130.7 | 135.6 | 136.3 | 124.1 | 125.6 | 126.6 | 130.8 | 126.9 | 126.9 |
| Belgium | 133.3 | 132.9 | 126.3 | 126.5 | 120.2 | 124.9 | 125.7 | 115.2 | 116.5 | 118.0 | 120.9 | 117.5 | 117.1 |

| Country | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Canada | 129.5 | 121.9 | 136.0 | 139.6 | 141.7 | 140.7 | 134.3 | 122.5 | 117.4 | 120.7 | 118.1 | 117.3 | 113.6 |
| Switzerland | 206.7 | 214.9 | 220.6 | 243.9 | 232.9 | 235.5 | 236.4 | 238.2 | 230.4 | 223.0 | 219.6 | 216.0 | 228.6 |
| Chile | 29.8 | 30.4 | 36.6 | 39.1 | 41.3 | 42.3 | 38.7 | 38.1 | 38.2 | 40.1 | 40.4 | 37.3 | 34.7 |
| Colombia | 15.2 | 15.5 | 18.1 | 19.6 | 21.7 | 22.0 | 21.4 | 17.4 | 16.3 | 17.1 | 17.1 | 16.3 | 14.0 |
| Costa Rica | 19.1 | 20.3 | 23.5 | 24.7 | 27.1 | 28.7 | 28.6 | 32.7 | 33.3 | 32.7 | 31.7 | 32.1 | 31.7 |
| Czech Republic | 63.2 | 59.2 | 57.1 | 58.5 | 53.5 | 53.8 | 52.4 | 50.1 | 51.5 | 55.2 | 59.5 | 59.9 | 60.2 |
| Germany | 125.9 | 123.7 | 118.8 | 124.7 | 118.0 | 123.7 | 126.4 | 115.4 | 116.8 | 119.2 | 121.9 | 118.4 | 121.3 |
| Denmark | 178.3 | 173.4 | 166.0 | 165.0 | 157.4 | 163.6 | 164.8 | 149.6 | 151.6 | 154.1 | 156.6 | 151.3 | 160.3 |
| Spain | 98.0 | 95.5 | 87.2 | 84.6 | 76.2 | 77.7 | 77.6 | 72.3 | 73.5 | 75.2 | 77.1 | 74.8 | 71.0 |
| Estonia | 50.5 | 43.9 | 41.9 | 46.7 | 46.8 | 50.9 | 53.3 | 48.9 | 50.7 | 54.5 | 58.6 | 59.2 | 60.4 |
| Finland | 148.4 | 141.0 | 132.9 | 136.5 | 128.4 | 133.3 | 132.5 | 120.2 | 121.5 | 123.9 | 127.0 | 123.2 | 128.0 |
| France | 125.6 | 124.0 | 116.2 | 117.0 | 110.0 | 113.8 | 113.4 | 102.9 | 102.7 | 103.5 | 105.7 | 102.7 | 102.5 |
| United Kingdom | 131.0 | 115.5 | 113.1 | 112.4 | 114.2 | 116.0 | 125.1 | 126.5 | 113.9 | 107.8 | 109.3 | 107.2 | 105.8 |
| Greece | 88.7 | 88.6 | 76.3 | 68.0 | 59.0 | 58.1 | 56.9 | 50.7 | 49.6 | 49.7 | 50.2 | 48.5 | 46.4 |
| Hungary | 43.7 | 38.9 | 37.7 | 38.0 | 34.9 | 36.6 | 37.6 | 35.7 | 36.3 | 39.1 | 41.7 | 42.4 | 41.7 |
| Ireland | 169.3 | 154.8 | 139.0 | 139.3 | 131.9 | 137.7 | 146.3 | 174.2 | 174.3 | 186.2 | 201.0 | 204.7 | 223.8 |
| Iceland | 157.8 | 123.1 | 123.7 | 127.5 | 123.8 | 133.1 | 143.8 | 148.8 | 172.0 | 192.6 | 189.3 | 174.5 | 155.6 |
| Israel | 82.0 | 82.6 | 87.8 | 89.8 | 87.5 | 97.1 | 99.5 | 100.6 | 103.4 | 108.3 | 106.0 | 110.3 | 114.5 |
| Italy | 113.0 | 110.6 | 103.0 | 103.2 | 94.3 | 95.0 | 93.6 | 84.9 | 85.8 | 86.5 | 88.0 | 85.0 | 83.2 |
| Japan | 110.5 | 123.2 | 128.6 | 130.3 | 132.3 | 109.3 | 101.4 | 98.2 | 109.3 | 104.0 | 101.2 | 103.2 | 103.8 |
| Korea Republic | 59.2 | 57.1 | 66.0 | 67.1 | 68.5 | 72.7 | 77.1 | 80.7 | 81.2 | 84.6 | 85.0 | 80.6 | 82.7 |
| Lithuania | 41.4 | 35.2 | 34.3 | 38.4 | 38.7 | 42.0 | 43.6 | 40.1 | 41.6 | 45.1 | 48.7 | 49.5 | 52.5 |
| Luxembourg | 316.7 | 307.7 | 300.2 | 309.4 | 287.3 | 303.7 | 313.2 | 284.8 | 289.3 | 287.2 | 296.4 | 290.3 | 304.2 |
| Latvia | 45.5 | 36.6 | 32.5 | 36.8 | 37.5 | 40.4 | 41.4 | 38.7 | 39.7 | 41.9 | 45.4 | 45.0 | 46.3 |
| Mexico | 27.8 | 23.9 | 26.5 | 27.3 | 27.6 | 28.7 | 28.8 | 27.0 | 24.3 | 24.8 | 24.6 | 25.2 | 21.9 |
| Netherlands | 159.8 | 156.6 | 145.7 | 144.8 | 134.8 | 139.5 | 139.2 | 126.9 | 127.6 | 129.9 | 134.8 | 132.8 | 137.5 |
| Norway | 268.7 | 238.4 | 250.8 | 268.9 | 273.2 | 275.1 | 255.7 | 208.9 | 195.5 | 202.0 | 209.1 | 191.9 | 176.9 |
| New Zealand | 86.6 | 84.1 | 96.3 | 102.6 | 107.6 | 114.9 | 117.5 | 108.5 | 111.2 | 115.0 | 110.1 | 108.2 | 108.9 |
| Poland | 38.8 | 34.4 | 36.1 | 37.1 | 35.2 | 36.6 | 37.6 | 35.3 | 34.5 | 37.1 | 39.3 | 39.7 | 41.1 |

| Country | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Portugal | 68.9 | 68.8 | 64.4 | 62.0 | 55.3 | 57.9 | 58.2 | 54.1 | 55.4 | 57.4 | 59.9 | 58.9 | 58.9 |
| Slovak Republic | 51.8 | 49.3 | 47.9 | 49.1 | 47.0 | 48.8 | 49.2 | 45.8 | 45.8 | 46.8 | 49.2 | 48.8 | 50.3 |
| Slovenia | 76.2 | 73.6 | 67.2 | 67.1 | 60.9 | 62.8 | 63.8 | 58.7 | 60.1 | 62.8 | 66.4 | 65.7 | 67.0 |
| Sweden | 155.6 | 140.0 | 151.2 | 162.4 | 156.2 | 163.4 | 158.2 | 144.8 | 144.1 | 143.9 | 138.8 | 131.5 | 137.2 |
| Turkey | 30.3 | 27.1 | 30.7 | 30.5 | 31.7 | 33.7 | 32.0 | 30.9 | 30.2 | 28.3 | 24.0 | 23.1 | 22.4 |
| USA | 134.1 | 140.4 | 138.6 | 133.3 | 138.9 | 141.9 | 145.1 | 159.8 | 160.9 | 160.8 | 160.3 | 165.2 | 166.8 |
| OECD members | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Armenia | 11.1 | 8.9 | 9.2 | 9.4 | 9.9 | 10.3 | 10.5 | 10.1 | 10.0 | 10.5 | 10.7 | 11.7 | 11.2 |
| Azerbaijan | 15.4 | 14.8 | 16.7 | 19.2 | 20.2 | 21.1 | 20.8 | 15.5 | 10.8 | 11.1 | 12.0 | 12.2 | 11.1 |
| Belarus | 17.7 | 16.0 | 17.2 | 17.4 | 18.7 | 21.3 | 21.9 | 16.7 | 13.9 | 15.4 | 16.1 | 17.3 | 16.8 |
| Georgia | 9.2 | 8.4 | 9.2 | 10.7 | 11.9 | 12.4 | 12.5 | 11.3 | 11.3 | 11.7 | 12.0 | 11.9 | 11.2 |
| Kazakhstan | 23.4 | 21.4 | 25.9 | 31.1 | 33.3 | 37.1 | 33.8 | 29.5 | 21.4 | 24.7 | 24.9 | 24.8 | 23.8 |
| Kyrgyz Republic | 2.7 | 2.6 | 2.5 | 3.0 | 3.2 | 3.4 | 3.4 | 3.1 | 3.1 | 3.3 | 3.3 | 3.5 | 3.1 |
| Moldova | 5.9 | 5.7 | 7.0 | 7.9 | 8.2 | 8.9 | 8.8 | 7.7 | 8.0 | 9.4 | 10.8 | 11.4 | 11.9 |
| Russian Federation | 32.2 | 25.5 | 30.5 | 38.2 | 41.5 | 42.7 | 37.1 | 26.2 | 24.1 | 28.7 | 28.7 | 29.1 | 26.6 |
| Tajikistan | 2.0 | 2.0 | 2.1 | 2.3 | 2.6 | 2.8 | 2.9 | 2.7 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 |
| Turkmenistan | 10.8 | 12.0 | 12.7 | 15.1 | 18.0 | 19.5 | 21.0 | 18.1 | 17.7 | 17.6 | 17.7 | 19.3 | – |
| Ukraine | 10.8 | 7.6 | 8.5 | 9.5 | 10.4 | 10.8 | 8.2 | 6.0 | 6.1 | 7.1 | 7.9 | 9.3 | 9.8 |
| Uzbekistan | 3.0 | 3.6 | 4.7 | 5.1 | 5.8 | 6.1 | 6.6 | 7.3 | 7.1 | 4.9 | 3.9 | 4.4 | 4.4 |

Source: compiled by the author using data from the World Bank Group (2021).

Only the Russian Federation, Kazakhstan, and Belarus had the highest GDP per capita (in current US$) among the CIS countries from 2008 to 2020. Nonetheless, it was nearly 4–5 times lower than the OECD average. This disparity is 40 or more times greater in other FSU countries. Kazakhstan's GDP per capita (current US$) in 2020 was only 23.8% of the OECD average, a value that had not seen marked changes since 2008. Furthermore, the smallest lag of this indicator from OECD countries in Kazakhstan was only 37.1% in 2013. The economic inequality that exists in the FSU countries can be explained from both the standpoint of institutional theory and the raw material model of economic development. When the causes of differentiation and inequality in the FSU

countries in terms of GDP per capita (current US$) are considered, the underdevelopment of market economic institutions, as well as the high proportion of resource industries in the structure of these countries' national economies, stand out. In many ways, this is linked to another aspect of economic inequality, which is the difference in income between different groups of people.

## Comparative analysis of income inequality

The ratio of incomes of the richest and poorest strata of the population allows for the most realistic assessment of the scale of social inequality in various countries worldwide. This indicator not only reveals the main trends in income distribution over specific periods, but it also reveals the extent to which inequality varies between different countries in the world.

Table 2 compares countries with varying market economies. They are roughly divided into two groups: those with neoliberal market economies (the United States, the United Kingdom, and Canada) and those with socially oriented market economies (Denmark, Finland, France, Germany, the Netherlands, Norway, and Sweden), as well as Kazakhstan.

Table 2. Interdecile P90/P10 ratio in several OECD countries and Kazakhstan

| Country | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|
| Canada | 4.3 | 4.4 | 4.2 | 4.4 | 4.1 | 4.1 | 4.0 | 4.0 |
| United Kingdom | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.3 | 4.5 | 4.5 |
| USA | ... | 6.4 | 6.4 | 6.1 | 6.3 | 6.2 | ... | ... |
| Denmark | 2.8 | 2.9 | 2.9 | 2.9 | 2.9 | 3.0 | ... | ... |
| Finland | 3.1 | 3.2 | 3.1 | 3.1 | 3.0 | 3.1 | 3.1 | ... |
| France | 3.6 | 3.5 | 3.4 | 3.5 | 3.4 | 3.4 | 3.5 | ... |
| Germany | 3.5 | 3.6 | 3.7 | 3.7 | 3.8 | 3.7 | ... | ... |
| Netherlands | 3.2 | 3.3 | 3.3 | 3.3 | 3.4 | ... | ... | ... |
| Norway | 3.0 | 3.0 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | ... |
| Sweden | ... | 3.2 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 |
| Kazakhstan | 5.8 | 5.6 | 5.7 | 5.6 | 5.6 | 5.9 | 6.0 | ... |

Source: OECD (2021).

A comparison of the Interdecile P90/P10 ratio of income inequality between the two groups of countries and Kazakhstan allows for a fairly clear distinction between them based on the level of income inequality that has been achieved in each of these countries.

This indicator in a multiple ratio between the incomes of the richest and poorest strata of the population was 4 or more times in the United States, Great Britain, and Canada, while it ranged from 2.9 (Denmark) to 3.7 times in the other group of countries during the period under review (Germany). In this regard, Kazakhstan is comparable to and even outperforms the United States, the United Kingdom, and Canada.

The Gini coefficient, which compares the total share of the population with the total share of income that they receive, is another globally recognized indicator of income distribution among certain groups of the population. This indicator ranges from 0 for perfect equality to 1 for perfect inequality (Table 3).

Table 3. Gini coefficient in several OECD countries and Kazakhstan

| Country | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|
| Canada | 0.317 | 0.32 | 0.313 | 0.318 | 0.307 | 0.31 | 0.303 | 0.301 |
| United Kingdom | 0.351 | 0.358 | 0.356 | 0.36 | 0.351 | 0.357 | 0.366 | 0.366 |
| USA | ... | 0.396 | 0.394 | 0.39 | 0.391 | 0.39 | ... | ... |
| Denmark | 0.249 | 0.254 | 0.256 | 0.263 | 0.261 | 0.264 | ... | ... |
| Finland | 0.26 | 0.262 | 0.257 | 0.26 | 0.259 | 0.266 | 0.269 | ... |
| France | 0.305 | 0.291 | 0.293 | 0.295 | 0.291 | 0.292 | 0.301 | ... |
| Germany | 0.289 | 0.292 | 0.289 | 0.293 | 0.294 | 0.289 | ... | ... |
| Netherlands | 0.288 | 0.287 | 0.303 | 0.288 | 0.285 | ... | ... | ... |
| Norway | 0.253 | 0.252 | 0.257 | 0.272 | 0.262 | 0.262 | 0.262 | ... |
| Sweden | ... | 0.268 | 0.274 | 0.278 | 0.282 | 0.282 | 0.275 | 0.280 |
| Kazakhstan | 0.284 | 0.276 | 0.278 | 0.278 | 0.278 | 0.287 | 0.289 | ... |

Source: OECD (2021).

Throughout the studied period, the value of the Gini coefficient in the United States remained virtually constant, while in the United Kingdom it fluctuated between 0.351 and 0.366. Meanwhile, in Canada, it was noticeably lower and showed a downward trend compared to previous countries.

Following a comparative analysis of Gini coefficients, it can be concluded that, in contrast to countries with a neoliberal economic model of market relations, countries with a socially oriented market economy experience greater equality in the distribution of income. Kazakhstan belongs to the second group, according to this indicator. Norway, like Kazakhstan, is an oil-producing country, and the Gini coefficient shows that it has a higher level of equality. In general, it can be argued that Kazakhstan's Gini coefficient has reached average values for OECD countries that follow the model of a socially oriented market economy.

In terms of relative poverty, Kazakhstan falls somewhere between the indicators of a neoliberal market economy and a socially oriented economy (Table 4). A closer examination reveals, however, that, with the exception of Canada, Finland, and France, the majority of the countries studied show an increasing trend toward relative poverty.

Table 4. Total poverty in several OECD countries and Kazakhstan, 2012–2018

| Country | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|
| Canada | 0.133 | 0.133 | 0.126 | 0.142 | 0.124 | 0.120 | 0.118 | 0.116 |
| United Kingdom | 0.105 | 0.104 | 0.105 | 0.109 | 0.111 | 0.119 | 0.117 | 0.124 |
| USA | ... | 0.172 | 0.175 | 0.168 | 0.178 | 0.178 | ... | ... |
| Denmark | 0.054 | 0.054 | 0.055 | 0.055 | 0.058 | 0.061 | ... | ... |
| Finland | 0.065 | 0.071 | 0.068 | 0.063 | 0.058 | 0.063 | 0.065 | ... |
| France | 0.085 | 0.079 | 0.081 | 0.081 | 0.083 | 0.081 | 0.085 | ... |
| Germany | 0.084 | 0.091 | 0.095 | 0.101 | 0.104 | 0.104 | ... | ... |
| Netherlands | 0.069 | 0.079 | 0.078 | 0.078 | 0.083 | ... | ... | ... |
| Norway | 0.081 | 0.078 | 0.081 | 0.081 | 0.082 | 0.084 | 0.084 | ... |
| Sweden | ... | 0.086 | 0.090 | 0.092 | 0.091 | 0.093 | 0.089 | 0.093 |
| Kazakhstan* | 0.103 | 0.099 | 0.097 | 0.100 | 0.095 | 0.101 | 0.100 | ... |

* Share of population with incomes below 60% of the median income level.
Source: OECD (2021).

Several notable factors can be identified as contributing to rising inequality and poverty in these countries. This is mostly because of the current demographic crisis in urban civilization and socio-economic reasons associated with the shrinking middle class.

The OECD countries' annual population growth rate is decreasing year by year. Accordingly, the share of working-age people in the total population is also steadily decreasing. These demographic trends are driving an increase in social insurance spending and healthcare costs, resulting in budget deficits, economic stagnation, and rising income inequality.

The analysis of the growth of the Gini coefficient in OECD countries and Kazakhstan in recent years reveals the influence of demographic and social factors. It should be noted, however, that explaining this solely by one demographic factor of population aging would be insufficient. There are additional reasons. In recent years, the share of underemployed workers in the total number of workers has increased in OECD countries, owing to high adoption rates of new technologies and growth in labor productivity. Part-time employment in the OECD countries averaged 16.7% of the total number of employed people in 2019, with the Netherlands accounting for 36.96%, the United King-

dom accounting for 23.06%, Germany accounting for 22.04%, and Norway accounting for 20.14%.

The share of workers who are employed temporarily, which averaged 11.77% across OECD countries in 2019, is also noteworthy. Furthermore, the population's self-employment rate in 2019 was 6.1% in the United States, 15.57% in the United Kingdom, 16.62% in the Netherlands, 9.6% in Germany, and 12.1% in France. These three groups of employed people are paid less, which results in a decrease in the average income of the population as a whole and an increase in social inequality.

According to official statistics, the share of fixed-term contracts in Kazakhstan in 2019 was only 3.5% (calculated as the share of those employed under a definite term contract at the age of 25 and older in the total number of employed at the corresponding age). The share of self-employed workers is 24.0%, with the average income per self-employed person accounting for 37% of the average monthly salary of employees. Part-time workers (30 hours or less per week) accounted for 6.63% of all employed, according to the calculations here. Clearly, out of the three types of employment, self-employment has the greatest impact on income inequality indicators in Kazakhstan.

A high level of inequality, particularly its continued growth as a result of these and other factors, strains tax and social security systems, reduces investment in human capital development, and makes it more difficult for the middle class to get by. According to the OECD report, the middle class is shrinking in most developed countries (OECD 2019). According to OECD methodology, the size of Kazakhstan's middle class is approximately 56.2%, based on the calculations here. According to a survey conducted by the country's National Bureau of Statistics in 2018 to obtain data on respondents' subjective assessments, 57.2% of respondents rate their level of material security as average and place themselves in the middle class. Both numbers confirm Kazakhstan's significant lag behind the OECD countries, where nearly two-thirds of the population is classified as middle class, which includes households earning 75–200% of the country's median income.

As a result, it can be argued that rising income inequality reduces the share of the middle class, resulting in a drop in consumer demand. This has a detrimental effect on the country's economic growth. However, how true is this for countries with varying levels of economic development and inequality? To figure out how close this relationship is, one can use the following indicators:

- share of pre-tax national income going to top 10% (Top 10% Pre-Tax National Income Share) (Appendix 1–2),
- GDP growth (annual %),
- GDP per capita (current US$).

According to the correlation analysis, this relationship is not statistically significant for most FSU countries and OECD countries between 2008 and 2020 (Table 5).

Table 5. Correlation analysis of the effects of income inequality on economic growth and gross domestic product per capita in FSU and OECD countries, 2008–2020

| | Correlation coefficients between top 10% pre-tax national income share and the following indicators: | |
|---|---|---|
| | GDP growth (annual %) | GDP per capita (current US$) |
| Australia | –0.41 | 0.17 |
| Austria | 0.01 | 0.07 |
| Belgium | –0.22 | 0.08 |
| Canada | 0.27 | 0.27 |
| Chile | 0.28 | 0.43 |
| Colombia | 0.09 | –0.69* |
| Costa Rica | –0.17 | –0.5 |
| Czech Republic | 0.47 | –0.56 |
| Denmark | 0.31 | 0.08 |
| Estonia | 0.36 | 0.28 |
| European Union | 0.04 | –0.05 |
| Finland | 0.04 | 0.09 |
| France | –0.03 | –0.38 |
| Germany | 0.08 | –0.43 |
| Greece | 0.2 | –0.39 |
| Hungary | –0.3 | –0.04 |
| Iceland | 0.67* | –0.49 |
| Ireland | 0.33 | 0.41 |
| Israel | –0.63 | –0.75* |
| Italy | 0.31 | 0.89* |
| Japan | 0.29 | 0.41 |
| Korea | 0.5 | –0.41 |
| Latvia | 0.01 | 0.59 |
| Lithuania | –0.21 | 0.24 |
| Luxembourg | 0.13 | –0.32 |
| Mexico | 0.02 | –0.1 |
| Netherlands | –0.18 | 0.61 |
| New Zealand | 0.55 | 0.46 |

| | Correlation coefficients between top 10% pre-tax national income share and the following indicators: | |
|---|---|---|
| | GDP growth (annual %) | GDP per capita (current US$) |
| Norway | 0.54 | 0.6 |
| Poland | 0.34 | –0.01 |
| Portugal | 0.17 | 0.48 |
| Slovakia | 0.06 | –0.32 |
| Slovenia | 0.05 | 0.08 |
| Spain | 0.06 | –0.15 |
| Sweden | 0.23 | –0.1 |
| Switzerland | –0.01 | –0.48 |
| Turkey | 0.01 | –0.4 |
| United Kingdom | –0.36 | 0.22 |
| USA | 0.49 | 0.74* |
| Armenia | 0.31 | 0.42 |
| Azerbaijan | 0.54 | 0.67* |
| Belarus | 0.65* | 0.01 |
| Georgia | 0.12 | 0.67* |
| Kazakhstan | –0.06 | –0.60* |
| Moldova | 0.15 | –0.79* |
| Russian Federation | –0.004 | –0.03 |
| Tajikistan | 0.08 | –0.12 |
| Turkmenistan | –0.31 | –0.15 |
| Ukraine | 0.07 | –0.29 |
| Uzbekistan | –0.18 | –0.45 |

* $p < 0.05$.
Source: calculated by the authors using data from the World Bank Group (2021) and the World Inequality Lab (2021b).

Concurrently, there is a direct statistically significant ($p < 0.05$) relationship between the level of income concentration in the 10% group and economic growth in Iceland ($r = 0.67$) and Belarus ($r = 0.65$). Kazakhstan did not show this correlation, although there is a correlation between the income concentration of the top 10% of earners and gross domestic product per capita.

According to the data presented above, there is a stable inverse relationship between the dynamics of GDP growth and the values of Kazakhstan's population's real money incomes. The correlation coefficient between them is $r = –0.46$, and the coefficient

of determination is R = 0.215, based on data from 2008 to 2020 (Figure 1). This suggests that economic growth is still the most important factor influencing the population's real income.

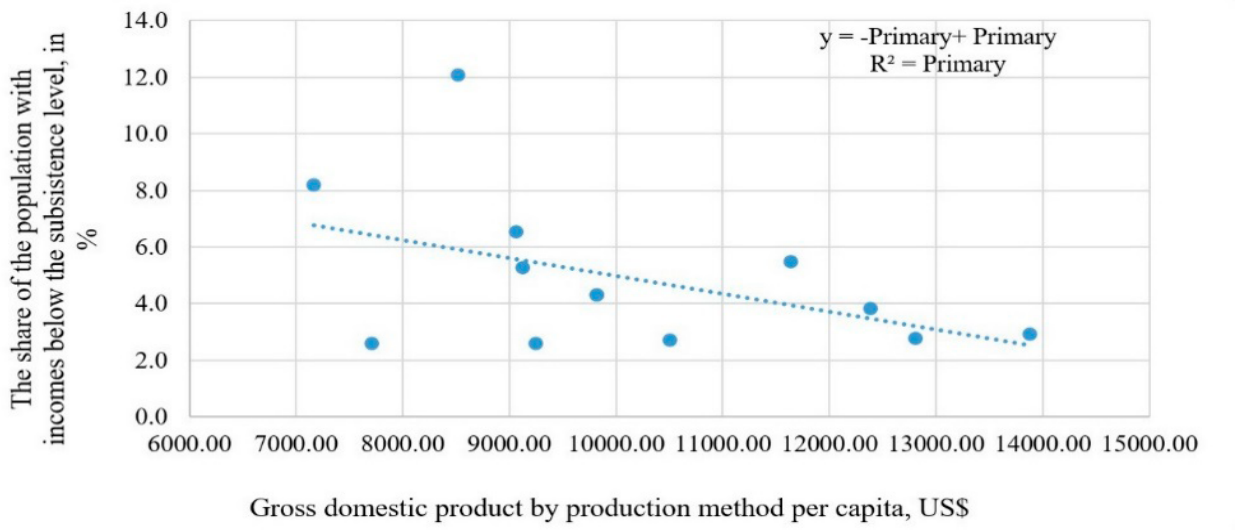


Figure 1. Relationship between Gross Domestic Product per capita and share of population living below the poverty line, 2008–2020

Source. calculated by the authors based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (2021)

The dynamics of income inequality and living standards are also affected by how diverse the population's sources of monetary income and expenditures are. It is thought that the higher the level and more complex the structure of income and expenditure, the more the household sector can influence the process of making market-relevant decisions. According to the data in Table 6, the share of receipts from social payments has been increasing recently: it was 16.6% of the population's cash income in 2015 and 28.6% in 2020 (Table 6).

The growing contribution of social payments to family income is primarily due to two factors: the desire to provide the population with a certain level of inclusive economic growth (the average annual growth of GDP and real money income of the population during this period was 3% and 2.7%, respectively) and an increase in the number of people in the older age group. Most of Kazakhstan's elderly stop working, relying on state retirement benefits and assistance from close relatives. During the period in question, the number of pension recipients increased by 246,860, a 12.46% increase. During the same period, the population grew at a rate of 5.53%, while the employed population grew at a rate of 4.12%, implying that the rate of growth in the number of pensioners was 2.25 and 3.02 times faster, respectively. The average income of people of retirement age is significantly lower than that of working-age people: the average pension to average wage rate for this period

ranged between 29.7 and 33.7%. In these circumstances, the state attempted to slow the rise of inequality by increasing the share of social transfers.

Table 6. The structure of monetary incomes of the surveyed households in Kazakhstan, in %

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| Cash income – total | 100 | 100 | 100 | 100 | 100 | 100 |
| Including | | | | | | |
| Remuneration of employees (wages) | 69.3 | 68.0 | 65.7 | 63.3 | 61.9 | 57.9 |
| Income from entrepreneurial activity and self-employment (except agricultural) | 8.7 | 8.1 | 8.7 | 8.9 | 8.6 | 7.6 |
| Income from agricultural activities (income from the sale of agricultural products, feed, livestock, etc.) | 2.1 | 2.1 | 2.0 | 2.0 | 1.8 | 1.6 |
| Social benefits | 16.6 | 18.2 | 19.7 | 21.6 | 23.8 | 28.6 |
| Retirement benefits | 13.7 | 14.9 | 16.4 | 18.3 | 20.3 | 23.5 |
| Other income sources | 3.3 | 3.6 | 3.9 | 4.2 | 3.9 | 4.3 |

Source: Eurasian Economic Commission (2021).

Meanwhile, the focus on the close relationship between social policy and the choice of a model for the country's economic growth is more important. In particular, it is important to pay attention to how the state regulates the country's labor market. In comparison to developed countries, a distinguishing feature of Kazakhstan's current labor market model is its certain adaptation to sharp fluctuations in demand, primarily due to wage changes rather than changes in employment. The government's policy goal is to maintain high employment and low unemployment in the country at the expense of low labor productivity and low wages. Therefore, social policy should emphasize improving the quality rather than the quantity of available labor. A decisive shift toward stimulating the creation of high-quality new jobs is required, as it is a necessary condition for the development of a stable middle class.

In the long run, reducing income inequality in Kazakhstan can serve as an additional driver to sustain economic growth and increase the country's global competitiveness, gradually bringing it closer to the characteristics of developed countries.

## Discussion

Globally, wealth inequality is still severe. The Middle East and North Africa have the highest levels of inequality, with the richest 10% of the population receiving nearly 60% of the region's total income. Sub-Saharan Africa ranks second with 57%, Latin

America ranks third with 55%, and South and Southeast Asia ranks third with 53%. In the Russian Federation and Central Asia, about 10% of the richest citizens receive 48% of the total income, while in North America, it is 45%. In Europe, where the richest 10% of the population account for only 36% of total income, inequality is the least pronounced (World Inequality Lab 2021a).

Global trends undoubtedly have an effect on how opportunities and resources are distributed. Certain megatrends have the potential to help equalize opportunities, while others have the potential to exacerbate income inequality, primarily through their impact on labor markets. However, their impact is not set in stone. Inequality levels and trends vary even among countries at the same level of economic development and are affected equally by trade, technological innovation, and even the effects of climate change (Department of Economic and Social Affairs of the United Nations Secretariat 2020). Successful examples of inequality reduction highlight the importance of national policies and local institutions.

Identifying the root causes of inequality is critical to developing effective policy solutions. However, the answer to the question of whether or not it is appropriate to take action against income inequality is somewhat influenced by what is considered the source of inequality (Fadda and Tridico 2016).

Financial inclusion is a major driver of economic growth. Therefore, when developing public policy, it is critical to pay special attention to financial sector reforms to ensure long-term economic growth. To stimulate economic growth, governments and policymakers must address the barriers to financial services access (Sethi and Acharya 2018). Furthermore, understanding the links between financial inclusion, poverty, and economic growth will assist policymakers in designing and implementing programs that increase access to financial services, thereby reducing poverty and income inequality.

Inequality stems from unequal power. Those who have more assets have more power than those who do not (Yates 2016).

The difference in the average Gini coefficient between the five richest and five poorest countries increased by 37.8% in the final year of the twentieth century compared to 1990. Consequently, despite high rates of real economic growth in the fastest growing group of countries that includes a number of developing countries (notably China and Vietnam), most other developing countries lagged increasingly behind during the last decade of the last century. This, coupled with the continued impoverishment of poor and highly indebted countries and sharp economic declines in the transition economies that were once part of the former Soviet Union, resulted in marked increases in inequality worldwide (Čaušević 2017).

In the aftermath of the Soviet Union's disintegration, income inequality increased at an unprecedented level. This is, in fact, one of the reasons for many Russians' dissat-

isfaction with the country's modern economic system (Libman and Obydenkova 2019). Inequality, on the other hand, is a valid outcome. It results from processes in which the underlying causes and consequences of deficiencies in the political system lead to increased economic instability (Stiglitz 2015).

There has been no long-term and widespread economic growth in the Russian Federation since its partial market economy transition. The gains of economic growth are concentrated at the top of the income distribution, trapping large segments of the population in low-income situations. While extreme poverty has been largely eradicated, approximately 40% of the population struggles to purchase anything beyond the bare necessities. In the lowest-income decile, food accounts for nearly half of household budgets. Public social spending, which is becoming a larger proportion of total income, is characterized by a lack of progressiveness (Remington 2019). Most of it is non-cash but retains the Soviet-era categorical structure.

Income inequality and institutional reforms have a statistically significant and non-linear relationship. Reforms harmed the income distribution at the start of the transition, but after reaching a crucial point in reform progress, institutional improvements helped stabilize the income distribution. The persistence of high income inequality during the second transition period can be explained by the emergence of tolerance for inequality, which coincides with the shift from shock therapy to institutional reforms based on implementing European Union legislation. Increasing income mobility and encouraging meritocratic values are critical factors in post-transitional tolerance for inequality (Josifidis, Supic, and Glavaski 2018). Consequently, the dynamics of inequality and redistribution in Central and Eastern European countries should be considered in the context of not only economic evolution, but also the emergence of social conventions in which a high concentration of income is not justified but appears to be accepted as an unavoidable part of the national economy's integration into the European and global economies.

The concept of providing a minimum inclusive income at the European level, whether unique or not, is a formula for the true identity of the European model, an adaptive model in its evolution to global changes in economic and social needs (Jianu et al. 2021). Indeed, concern for an inclusive minimum income is both an expression of the relatively recent concern for creating a harmonious economic space developed across the European Union and another formula aimed at addressing the consequences of social injustice.

## Conclusion

The purpose of this study was to examine the characteristics of economic inequality in Kazakhstan in the light of global trends affecting its growth. To achieve the goal, a multi-country quantitative study was designed and implemented. The methodological basis of the study was a comparative analysis, which was implemented with the help of econometric and economic-statistical methods. Twelve countries of the former Soviet Union and 38 OECD member countries were chosen for testing.

The results support the hypothesis that there is a link between the indicator of gross domestic income per capita and the percentage of people living on less than the subsistence level in Kazakhstan. Simultaneously, there was no statistically significant relationship between high levels of income inequality and the dynamics of economic growth. In this way, specific suggestions about how to improve public administration's attitude toward addressing income inequality problems can be issued.

Cross-country analysis also revealed a statistically significant ($p < 0.05$) relationship between the level of income concentration in the 10% group and economic growth in Iceland ($r = 0.67$) and Belarus ($r = 0.65$). Kazakhstan did not show this correlation, although the relationship between the level of income concentration in the 10% group and the gross product per capita was confirmed.

According to the data presented above, there is a stable inverse relationship between the dynamics of GDP growth and the values of Kazakhstan's population's real money incomes. The correlation coefficient between them is $r = -0.46$, and the determination coefficient is $R = 0.215$, based on data from 2008 to 2020. This suggests that economic growth is still the most important factor that influences the population's real income.

Only the Russian Federation, Kazakhstan, and Belarus had the highest GDP per capita (current US$) among the CIS countries from 2008 to 2020, according to the study. However, it remained nearly 4–5 times lower than the average for the OECD countries. This difference is 40 or more times greater in other FSU countries. Kazakhstan's GDP per capita (current US$) in 2020 was only 23.8% of the OECD average, and the indicator had not seen marked changes since 2008. Furthermore, the smallest lag of this indicator from OECD countries in Kazakhstan was only 37.1% in 2013.

Broadly, the reasons for the FSU countries' differentiation and inequality in terms of GDP per capita (current US$) primarily relate to the underdevelopment of market economic institutions, as well as the high share of resource industries in the structure of these countries' national economies. Another aspect of economic inequality is the income disparity between different strata of the population, which is linked to this in a variety of ways.

A successful resolution of the population's income inequality is a precondition for Kazakhstan's admission to the OECD's group of economically developed countries. In the future, overcoming inequality could become a key driver of the country's economic growth. The primary directions for reducing income inequality are determined by the state's social policy, which is inextricably linked to labor market regulation and adjustment to the creation of new, highly productive jobs. A critical aspect of the problem of income inequality is finding the right balance between measures to achieve the desired level of inequality and the increasing role of social transfers.

In the future, the results of the study will be put into practice by familiarizing Kazakhstan's government experts with the developed proposals for enhancing the state's policy of overcoming economic inequality and establishing the conditions for sustainable economic growth. In addition, the results of this study are of scientific interest, primarily in terms of the formation of directions for further research, including the study of the main economic factors that influence the level of inequality and research on the effectiveness of public policies to overcome inequality.

## References

Aiyar, S., Ebeke, C. (2020), *Inequality of opportunity, inequality of income and economic growth*, "World Development", 136, https://doi.org/10.1016/j.worlddev.2020.105115

Breunig, R., Majeed, O. (2020), *Inequality, poverty and economic growth*, "International Economics", 161, pp. 83–89, https://doi.org/10.1016/j.inteco.2019.11.005

Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (2021), *Basic socio-economic indicators of the Republic of Kazakhstan*, https://stat.gov.kz/for_users/dynamic (accessed: 10.06.2021) [in Russian].

Chancel, L., Piketty, T. (2021), *Global Income Inequality, 1820–2020: The persistence and mutation of extreme inequality*, "Journal of the European Economic Association", 19 (6), pp. 3025–3062, https://doi.org/10.1093/jeea/jvab047

Čaušević, F. (2017), *A Study into Financial Globalization, Economic Growth and (In) Equality*, Palgrave Macmillan, Cham, https://doi.org/10.1007/978-3-319-51403-1

Department of Economic and Social Affairs of the United Nations Secretariat (2020), *World Social Report 2020. Inequality in a Rapidly Changing World*, https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/01/World-Social-Report-2020-FullReport.pdf (accessed: 10.06.2021).

Eurasian Economic Commission (2021), *Statistical Yearbook of the Eurasian Economic Union*, Eurasian Economic Commission, Moscow.

Fadda, S., Tridico, P. (2016), *Varieties of Economic Inequality*, Routledge, London–New York, https://doi.org/10.4324/9781315682099

Haller, M., Eder, A. (2016), *Ethnic Stratification and Economic Inequality around the World: The End of Exploitation and Exclusion*?, Ashgate Publishing, Ltd, Abingdon.

Jianu, I., Dinu, M., Huru, D., Bodislav, A. (2021), *Examining the relationship between income inequality and growth from the perspective of EU member states' stage of development*, "Sustainability", 13 (9), https://doi.org/10.3390/su13095204

Josifidis, K., Supic, N., Glavaski, O. (2018), *Institutional changes and income inequality: Some aspects of economic change and evolution of values in CEE countries*, "Eastern European Economics", 56 (4), pp. 1–19, https://doi.org/10.1080/00128775.2018.1487265

Libman, A., Obydenkova, A. (2019), *Inequality and historical legacies: Evidence from post-communist regions*, "Post-Communist Economies", 31 (6), pp. 699–724, https://doi.org/10.1080/14631377.2019.1607440

Meissner, G. (2013), *Correlation Risk Modeling and Management: An Applied Guide including the Basel III Correlation Framework-With Interactive Models in Excel/VBA*, John Wiley & Sons, Singapore.

Mijs, J.J. (2021), *The paradox of inequality: Income inequality and belief in meritocracy go hand in hand*, "Socio-Economic Review", 19 (1), pp. 7–35, https://doi.org/10.1093/ser/mwy051

OECD (2019), *OECD Under Pressure: The Squeezed Middle Class*, OECD Publishing, Paris.

OECD (2021), *Income Distribution Database*, OECD.Stat, https://stats.oecd.org/index.aspx?queryid=66670 (accessed: 10.06.2021).

Remington, T.F. (2019), *Income inequality and food insecurity in Russia*, "Russian Politics", 4 (3), https://doi.org/10.1163/2451-8921-00403002

Sethi, D., Acharya, D. (2018), *Financial inclusion and economic growth linkage: Some cross country evidence*, "Journal of Financial Economic Policy", 10 (3), pp. 369–385, https://doi.org/10.1108/JFEP-11-2016-0073

Stiglitz, D. (2015), *The price of inequality. How the stratification of society threatens our future*, Eksmo, Moscow.

Tokhirov, A. (2021), *Remittances and inequality: the post-communist region*, "Prague Economic Papers", 30 (4), pp. 426–448, https://doi.org/10.18267/j.pep.776

United Nations (2019), *Sustainable Development Outlook 2019: Gathering storms and silver linings*, https://www.un.org/development/desa/dpad/publication/sustainable-development-outlook-2019-gathering-storms-and-silver-linings/ (accessed: 10.06.2021).

World Bank (2020), *Poverty and Shared Prosperity 2020: Reversals of Fortune*, World Bank, Washington.

World Bank Group (2021), *World Development Indicators*, https://databank.worldbank.org/source/world-development-indicators (accessed: 10.06.2021).

World Inequality Lab (2021a), *The World Inequality Report 2022*, https://wid.world/news-article/world-inequality-report-2022/ (accessed: 10.06.2021).

World Inequality Lab (2021b), *World Inequality Database (WID.world)*, https://wid.world/data/ (accessed: 10.06.2021).

Yates, M.D. (2016), *The Great Inequality*, Routledge, London–New York, https://doi.org/10.4324/9781315645841

Zubarevich, N.V. (2018), *Concentration of the Population and the Economy in the Capitals of Post-Soviet Countries*, "Regional Research of Russia", 8 (2), https://doi.org/10.1134/S2079970518020107

## Globalne nierówności dochodów – studium przypadku krajów OECD i Kazachstanu

W artykule przedstawiono wyniki badania sposobu powstawania nierówności ekonomicznych w Kazachstanie w kontekście globalnych trendów w rozwoju kraju. Podstawą metodologiczną pracy była analiza porównawcza krajów byłego Związku Radzieckiego (FSU) i OECD pod kątem rozwoju gospodarczego i nierówności w kontekście globalnych zmian i trendów, realizowana za pomocą metod ekonometrycznych i ekonomiczno-statystycznych. Badanie wykazało bezpośrednią istotną statystycznie ($p < 0,05$) korelację pomiędzy poziomem koncentracji dochodów grupy 10% populacji a wzrostem gospodarczym Islandii ($r = 0,67$) i Białorusi ($r = 0,65$). W przypadku Kazachstanu nie stwierdzono takiej korelacji. Jednak w Kazachstanie ustalono związek między koncentracją dochodów grupy 10% populacji a produktem krajowym brutto na mieszkańca. Dynamika wzrostu PKB i wartości realnych dochodów pieniężnych ludności Kazachstanu wykazują stabilną odwrotną zależność. Współczynnik korelacji między nimi, obliczony na podstawie danych z lat 2008-2020, wynosi $r = -0,46$, a współczynnik determinacji wynosi $R = 0,215$. Sugeruje to, że wzrost gospodarczy jest nadal najważniejszym czynnikiem wpływającym na realne dochody ludności. Wyniki badania znajdą zastosowanie w praktyce dzięki zapoznaniu urzędników rządowych z opracowanymi propozycjami wzmocnienia polityki państwa w zakresie przezwyciężania nierówności gospodarczych i stworzenia warunków dla zrównoważonego wzrostu gospodarczego. Ponadto wyniki tych badań będą interesujące dla nauki gdyż wskazują nowe kierunki dalszych badań.

Słowa kluczowe: rozwój, dystrybucja, instytucje, gospodarka przechodząca transformację, bogactwo

## Appendix 1. Top 10% pre-tax national income share in OECD countries

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 0.2977 | 0.3119 | 0.3137 | 0.3059 | 0.3182 | 0.3293 | 0.327 | 0.3286 | 0.3251 | 0.3356 | 0.3366 | 0.336 | 0.336 |
| Austria | 0.3553 | 0.3424 | 0.3472 | 0.3386 | 0.3189 | 0.3212 | 0.3408 | 0.3331 | 0.3417 | 0.3338 | 0.3352 | 0.3388 | 0.3385 |
| Belgium | 0.3172 | 0.3093 | 0.3135 | 0.3114 | 0.3137 | 0.3163 | 0.3187 | 0.3183 | 0.3211 | 0.3183 | 0.3286 | 0.3289 | 0.3289 |
| Canada | 0.4072 | 0.3935 | 0.4022 | 0.4036 | 0.399 | 0.409 | 0.4128 | 0.4132 | 0.3941 | 0.4095 | 0.4086 | 0.407 | 0.407 |
| Chile | 0.5909 | 0.5889 | 0.6081 | 0.6274 | 0.6174 | 0.6075 | 0.6016 | 0.5957 | 0.5924 | 0.5891 | 0.5891 | 0.5891 | 0.5891 |
| Colombia | 0.5395 | 0.5368 | 0.5342 | 0.5263 | 0.5062 | 0.5123 | 0.5142 | 0.5015 | 0.502 | 0.5067 | 0.5146 | 0.5146 | 0.5146 |
| Costa Rica | 0.529 | 0.5237 | 0.4801 | 0.4977 | 0.4976 | 0.4992 | 0.4997 | 0.5064 | 0.5167 | 0.4983 | 0.5125 | 0.501 | 0.501 |
| Czech Republic | 0.3215 | 0.2984 | 0.2978 | 0.29 | 0.3033 | 0.2966 | 0.3029 | 0.3072 | 0.2979 | 0.2953 | 0.2877 | 0.2854 | 0.2857 |
| Denmark | 0.3007 | 0.29 | 0.3156 | 0.3165 | 0.3175 | 0.3276 | 0.3349 | 0.3301 | 0.333 | 0.3333 | 0.3328 | 0.3364 | 0.3386 |
| Estonia | 0.3753 | 0.3439 | 0.359 | 0.3718 | 0.3912 | 0.388 | 0.3841 | 0.3579 | 0.3621 | 0.3534 | 0.3595 | 0.3462 | 0.3474 |
| European Union | 0.3587 | 0.3588 | 0.3536 | 0.3555 | 0.3561 | 0.3603 | 0.3611 | 0.3593 | 0.3591 | 0.3588 | 0.3572 | 0.3553 | 0.3551 |
| Finland | 0.3406 | 0.3228 | 0.3264 | 0.3235 | 0.3177 | 0.3153 | 0.3205 | 0.3293 | 0.329 | 0.3386 | 0.3361 | 0.334 | 0.3399 |
| France | 0.3369 | 0.3219 | 0.3272 | 0.3336 | 0.3251 | 0.3237 | 0.3243 | 0.3247 | 0.3229 | 0.32 | 0.3201 | 0.3225 | 0.3223 |
| Germany | 0.3675 | 0.3724 | 0.3668 | 0.3678 | 0.3632 | 0.3776 | 0.3826 | 0.3818 | 0.381 | 0.3778 | 0.3729 | 0.3722 | 0.3707 |
| Greece | 0.3315 | 0.3251 | 0.3374 | 0.3142 | 0.3177 | 0.3329 | 0.3574 | 0.3538 | 0.3467 | 0.3383 | 0.3276 | 0.3253 | 0.3261 |
| Hungary | 0.3415 | 0.332 | 0.3367 | 0.328 | 0.3181 | 0.3327 | 0.3288 | 0.3295 | 0.3306 | 0.3357 | 0.3359 | 0.3395 | 0.3384 |
| Iceland | 0.2925 | 0.2768 | 0.2677 | 0.2733 | 0.2772 | 0.2968 | 0.2955 | 0.2949 | 0.2916 | 0.2908 | 0.2908 | 0.2908 | 0.2908 |
| Ireland | 0.322 | 0.3247 | 0.3234 | 0.3245 | 0.31 | 0.3227 | 0.3264 | 0.3498 | 0.3559 | 0.3488 | 0.354 | 0.3516 | 0.3518 |
| Israel | 0.5226 | 0.5254 | 0.5282 | 0.5223 | 0.5166 | 0.5066 | 0.4974 | 0.4944 | 0.4915 | 0.4915 | 0.4915 | 0.4915 | 0.4915 |
| Italy | 0.3072 | 0.3041 | 0.3089 | 0.3129 | 0.3116 | 0.3084 | 0.3087 | 0.3075 | 0.3215 | 0.3289 | 0.3285 | 0.3255 | 0.3221 |

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Japan | 0.4507 | 0.4401 | 0.4495 | 0.4473 | 0.4478 | 0.4493 | 0.449 | 0.45 | 0.4493 | 0.4489 | 0.4489 | 0.4489 | 0.4489 |
| Korea | 0.4614 | 0.457 | 0.4659 | 0.4662 | 0.4622 | 0.46 | 0.4605 | 0.464 | 0.4664 | 0.4671 | 0.4666 | 0.4645 | 0.4645 |
| Latvia | 0.3762 | 0.3802 | 0.3622 | 0.3892 | 0.3841 | 0.3824 | 0.3663 | 0.3558 | 0.3381 | 0.3595 | 0.3533 | 0.3444 | 0.3452 |
| Lithuania | 0.3725 | 0.3732 | 0.3473 | 0.348 | 0.3731 | 0.3797 | 0.4113 | 0.3719 | 0.3702 | 0.3831 | 0.3713 | 0.3652 | 0.3657 |
| Luxembourg | 0.3847 | 0.3332 | 0.3668 | 0.3541 | 0.3409 | 0.333 | 0.328 | 0.3252 | 0.3283 | 0.338 | 0.333 | 0.3353 | 0.3353 |
| Mexico | 0.5848 | 0.5819 | 0.5789 | 0.5863 | 0.5936 | 0.5907 | 0.5878 | 0.5843 | 0.5807 | 0.5771 | 0.5735 | 0.5735 | 0.5735 |
| New Zealand | 0.2963 | 0.3151 | 0.3117 | 0.326 | 0.343 | 0.3324 | 0.3338 | 0.3383 | 0.337 | 0.3445 | 0.3465 | 0.3457 | 0.3457 |
| Norway | 0.3412 | 0.3092 | 0.3252 | 0.3276 | 0.3297 | 0.324 | 0.322 | 0.3064 | 0.3052 | 0.3083 | 0.3189 | 0.3011 | 0.2959 |
| Poland | 0.3783 | 0.3644 | 0.3662 | 0.3698 | 0.3674 | 0.3658 | 0.3726 | 0.3778 | 0.3743 | 0.371 | 0.3746 | 0.3764 | 0.3775 |
| Portugal | 0.3806 | 0.3747 | 0.3794 | 0.3827 | 0.3667 | 0.3725 | 0.3731 | 0.3716 | 0.373 | 0.3764 | 0.3674 | 0.3651 | 0.3521 |
| Slovakia | 0.298 | 0.2956 | 0.3177 | 0.3024 | 0.2956 | 0.3252 | 0.2994 | 0.3152 | 0.2929 | 0.2726 | 0.274 | 0.269 | 0.265 |
| Slovenia | 0.3041 | 0.2978 | 0.2986 | 0.2926 | 0.2947 | 0.293 | 0.2996 | 0.2902 | 0.2939 | 0.2946 | 0.2958 | 0.2952 | 0.2958 |
| Spain | 0.3476 | 0.3588 | 0.3434 | 0.3406 | 0.3464 | 0.3469 | 0.3488 | 0.3507 | 0.3489 | 0.3496 | 0.346 | 0.348 | 0.3448 |
| Sweden | 0.3179 | 0.3028 | 0.3144 | 0.3092 | 0.298 | 0.2989 | 0.3014 | 0.3096 | 0.2924 | 0.3014 | 0.2945 | 0.2961 | 0.3078 |
| Switzerland | 0.3118 | 0.3168 | 0.3364 | 0.3389 | 0.3288 | 0.33 | 0.3282 | 0.3297 | 0.328 | 0.3195 | 0.3189 | 0.3256 | 0.3249 |
| Turkey | 0.5017 | 0.5187 | 0.5124 | 0.5147 | 0.5151 | 0.5086 | 0.5173 | 0.524 | 0.5397 | 0.5518 | 0.5593 | 0.5447 | 0.5447 |
| United Kingdom | 0.3689 | 0.385 | 0.3464 | 0.3554 | 0.3647 | 0.3866 | 0.3669 | 0.356 | 0.3562 | 0.3592 | 0.3593 | 0.3564 | 0.3567 |
| USA | 0.438 | 0.4259 | 0.4388 | 0.4447 | 0.4555 | 0.4506 | 0.4567 | 0.4568 | 0.4543 | 0.4535 | 0.4563 | 0.4546 | 0.4546 |

Source: data from World Inequality Lab (2021b).

## Appendix 2. Top 10% pre-tax national income share in the CIS countries

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Armenia | 0.3781 | 0.3729 | 0.4003 | 0.3811 | 0.3844 | 0.3877 | 0.3998 | 0.4144 | 0.4076 | 0.4451 | 0.4476 | 0.4062 | 0.4062 |
| Azerbaijan | 0.3988 | 0.3951 | 0.3879 | 0.3942 | 0.4013 | 0.3961 | 0.3961 | 0.3897 | 0.3801 | 0.3907 | 0.3907 | 0.3907 | 0.3907 |
| Belarus | 0.3631 | 0.3581 | 0.3514 | 0.377 | 0.3599 | 0.3326 | 0.344 | 0.3267 | 0.3316 | 0.3365 | 0.3355 | 0.3339 | 0.3339 |
| Georgia | 0.4653 | 0.4475 | 0.4551 | 0.494 | 0.4611 | 0.4945 | 0.4669 | 0.4684 | 0.4823 | 0.4886 | 0.484 | 0.4903 | 0.4903 |
| Kazakhstan | 0.4233 | 0.4327 | 0.4274 | 0.4056 | 0.4086 | 0.4095 | 0.3971 | 0.3784 | 0.418 | 0.421 | 0.4253 | 0.4253 | 0.4253 |
| Moldova | 0.3646 | 0.3675 | 0.3576 | 0.3551 | 0.3518 | 0.3485 | 0.3467 | 0.3471 | 0.3405 | 0.3419 | 0.3431 | 0.3445 | 0.3439 |
| Netherlands | 0.2855 | 0.2866 | 0.2917 | 0.2894 | 0.2926 | 0.2843 | 0.2928 | 0.2926 | 0.2923 | 0.299 | 0.296 | 0.2941 | 0.2943 |
| Russian Federation | 0.5219 | 0.4961 | 0.4556 | 0.4815 | 0.4554 | 0.4731 | 0.4537 | 0.4535 | 0.4579 | 0.4558 | 0.4646 | 0.4643 | 0.4643 |
| Tajikistan | 0.4185 | 0.4168 | 0.4178 | 0.4155 | 0.4193 | 0.4203 | 0.4163 | 0.4124 | 0.4272 | 0.4314 | 0.4321 | 0.4321 | 0.4321 |
| Turkmenistan | 0.4937 | 0.4981 | 0.497 | 0.4941 | 0.4949 | 0.4941 | 0.4905 | 0.4871 | 0.4958 | 0.4983 | 0.4988 | 0.4988 | 0.4988 |
| Ukraine | 0.3408 | 0.3203 | 0.3061 | 0.3034 | 0.3008 | 0.3003 | 0.3044 | 0.3247 | 0.3406 | 0.3357 | 0.3327 | 0.3349 | 0.3349 |
| Uzbekistan | 0.4618 | 0.4618 | 0.4618 | 0.4618 | 0.4618 | 0.4618 | 0.4618 | 0.4618 | 0.4578 | 0.4626 | 0.4626 | 0.4626 | 0.4626 |

Source: data from World Inequality Lab (2021b).