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THE WORLD ECONOMY IN THE ERA OF TURBULENCE

The article provides an overview of the key expected changes in the technological landscape of the global energy sector. On the part of the end-use energy consumption sectors, the requirements for energy systems and the organization of their operation are changing significantly. Consumers are demanding ever more versatile, environmentally friendly, cost-effective and reliable energy supplies, and energy-intensive equipment with off-grid options is increasingly in demand. Technical progress, in turn, provides access to new solutions, while changing the parameters of inter-fuel competition. Government policy also contributes, and its tools allow both to softly influence the attractiveness of the choice and to simply limit the possibilities of using certain equipment. Electrification is becoming a key trend in the supply of energy to industry, commercial and residential sectors. The transportation sector is moving from an era of oil dominance to an era of inter-fuel competition, with electric solutions also becoming a key substitute for petroleum products. In the electricity generation sector itself, preference is increasingly being given to carbon-free and renewable energy sources. In some regions of the world, renewable energy sources are already becoming competitive in terms of the cost of electricity production (before feeding into the grid) with fossil generation. It is important that with an increase in the share of renewable energy sources in the electricity balance, the share of costs for backup, storage, and network infrastructure increases, which makes it necessary to assess costs in a complex manner when making decisions. The growing share of renewable energy sources in energy systems necessarily requires the development of storage technologies; however, the current level of scientific and technological progress in this area makes such solutions extremely expensive, which leaves long-term niches for thermal generation, but significantly changes its operating modes. Technologies are also changing significantly in the field of exploration, production and transportation of fossil fuels. This makes it possible not to fear resource shortages in the coming decades, despite rising production levels and the depletion of the easiest-to-exploit reserves. But the operating environment for conventional energy will change.

INTERNATIONAL TRADE AND INVESTMENT

In this paper, we track the shifts in economic ties of the United States and China with partner countries in the context of commodity and service trade. We propose the grouping of major partner countries and regions. The dynamics of trade ties is broken down into three stages.

COUNTRY VIEW

The European Union sets rather ambitious tasks to maintain its position in the global economy, as well as to transform its geoeconomic power into geopolitical one. At least, this is how one might interpret the tasks set in the framework of the concept of open strategic autonomy of the European Union, which actually unambiguously unites different components of the Union's security (military, political, economic, etc.). This allows us to consider the EU trade and investment (foreign economic) policy (together with a number of other areas of activity) through the prism of the realist paradigm in the framework of international relations theory and to try to identify new political economy features of the EU's approach to its activities in the field of regulation of international trade and capital flows. By adjusting and transforming some key elements of external economic policy (primarily revising the parameters of preferential trade regimes, as well as approaches to bilateral and multilateral investment agreements), along with creating new coordination mechanisms and barriers to trade and capital flows (such as the Foreign Direct Investment Screening Mechanism and the Anti-Coercion Instrument), the European Union is strengthening the "protective" component of its integration model, trying to adapt the EU's integration model to the changing parameters of the global economy. The mutual intertwining of the main directions of the EU's activities is clearly visible, which also applies to relatively new aspects of the union's positioning in the external arena (geoeconomic anticrisis policy, financial and monetary policies), which can potentially lead to new contradictions and limitations in the course pursued, taking into account the specifics of the integration structure.

The work identifies three groups of countries and examines their contribution to the megaprojects being implemented in modern Egypt. Based on this analysis, it is concluded that the OECD and BRICS-5 countries participate both as investors and as contractors, while the GCC countries almost always act as investors. At the same time, the BRICS-5 and GCC countries are usually represented by state corporations and sovereign funds, while the OECD countries are more often represented by private companies. This fact emphasizes the importance of BRICS as a platform for interstate negotiations that can expand cooperation between Egypt and other member countries of this organization. However, when choosing partners, Egypt is guided more by economic rather than political considerations, wanting to maintain neutrality in world politics and not become dependent on any of the political blocs. The country's economic future is uncertain, so maintaining financial and political independence in the future is a challenge for Egypt.

REVIEWS

Changing Technological Landscape of the Global Energy Sector: Drivers and Opportunities

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Keywords: technologies in the energy sector, inter-fuel competition, renewable energy sources, LCOE, energy storage, scientific and technological progress.

Abstract

The article provides an overview of the key expected changes in the technological landscape of the global energy sector. On the part of the end-use energy consumption sectors, the requirements for energy systems and the organization of their operation are changing significantly. Consumers are demanding ever

more versatile, environmentally friendly, cost-effective and reliable energy supplies, and energy-intensive equipment with off-grid options is increasingly in demand. Technical progress, in turn, provides access to new solutions, while changing the parameters of inter-fuel competition. Government policy also contributes, and its tools allow both to softly influence the attractiveness of the choice and to simply limit the possibilities of using certain equipment.

Electrification is becoming a key trend in the supply of energy to industry, commercial and residential sectors. The transportation sector is moving from an era of oil dominance to an era of inter-fuel competition, with electric solutions also becoming a key substitute for petroleum products.

In the electricity generation sector itself, preference is increasingly being given to carbon-free and renewable energy sources. In some regions of the world, renewable energy sources are already becoming competitive in terms of the cost of electricity production (before feeding into the grid) with fossil generation. It is important that with an increase in the share of renewable energy sources in the electricity balance, the share of costs for backup, storage, and network infrastructure increases, which makes it necessary to assess costs in a complex manner when making decisions.

The growing share of renewable energy sources in energy systems necessarily requires the development of storage technologies; however, the current level of scientific and technological progress in this area makes such solutions extremely expensive, which leaves long-term niches for thermal generation, but significantly changes its operating modes.

Technologies are also changing significantly in the field of exploration, production and transportation of fossil fuels. This makes it possible not to fear resource shortages in the coming decades, despite rising production levels and the depletion of the easiest-to-exploit reserves. But the operating environment for conventional energy will change.

Introduction

The energy sector is currently undergoing a period of substantial technological transformation. This transformation is driven by a confluence of factors, including the advent of novel opportunities propelled by scientific and technological progress, the increasing complexity of the resource base, escalating requirements for the quality and options of energy supply from end consumers, and the influence of government policy.

In every sector of the energy end-use sector, novel solutions are emerging, and the field of inter-fuel competition is expanding.

The array of prospective technologies is extensive and continuously expanding. However, the race to develop these technologies will be won by those who can effectively prioritize and allocate financial and scientific resources to segments that will be in practical demand in the future. History demonstrates that even the most promising technologies, initially poised to transform the global energy industry, have

often occupied limited niches in the market or remained theoretical, encountering unforeseen challenges. A notable example is the series of accidents at nuclear power plants (NPPs), which have led to a re-evaluation of the peaceful atom, a technology that was projected to account for 80% of the world's energy production by the 2020s. Difficulties in development and high costs of gas hydrates extraction have left them at the level of experiments instead of 10% share in the world balance by 2025.

High production costs and technological challenges have hindered the realization of plans to develop Helium-3 on the Moon. Furthermore, concerns regarding food security and the concomitant environmental impact have impeded the substantial displacement of petroleum products by biofuels in engines. For a comprehensive overview of technologies that have fallen short of expectations, refer to [Kulagin 2020].

The development and testing of many technologies require decades of investment and research before a prototype is ready for market implementation. The timeframe for market penetration varies significantly depending on the specific segment. For instance, a novel battery type intended for cell phones or tablets is projected to be adopted in 50% of devices within a few years following the commencement of the commercialization process. In contrast, the large-scale implementation of a novel oil refining process is estimated to require 25–30 years, while a new nuclear reactor is anticipated to take 50–60 years. The temporal framework is defined by the rate of equipment and infrastructure upgrades within each segment [Kulagin 2020].

In the context of the power industry, characterized by protracted investment cycles and extended planning horizons, it is imperative to identify the technologies that are likely to be predominant and widely demanded by the year 2050. This underscores the necessity for comprehensive review studies that seek to elucidate the pivotal drivers of energy system transformation and to identify optimal solutions from among the available options.

1. Changing energy end-use technologies: Consumer demands and regulatory constraints

Consumer demands on energy systems, household processes, and the performance of the appliances that serve them are increasing on a continuous basis. The following are a few examples:

- Saving time, a commodity that is widely considered the most valuable resource in modern life, is of particular importance. By acquiring a robot vacuum, dishwasher, or washing machine, we gain time, allowing us to allocate our time toward more fulfilling activities.
- Cost-effectiveness and environmental impact. When buying appliances, we often strive for rational consumption, choosing between the initial cost and the costs of operation. Consequently, a refrigerator of A+ energy class, which is initially more expensive, will reduce energy consumption more than twice as much as a model of C class and will be cheaper in terms of total costs during its lifetime. Furthermore, consumers have expressed a growing interest in appliances that are

environmentally sustainable, emphasizing the materials used in their production and the methods employed during operation.

- Convenience. As prosperity increases, prices become a less significant factor in purchasing decisions. The emphasis has shifted towards the convenience of utilization, with features such as self-cleaning mechanisms (refrigerators, ovens, vacuum cleaners) and portable operation (without the need for constant repositioning of cords) being highly sought after.
- Intelligence and controllability. The demand for smart devices, including those that can be remotely controlled via the Internet, is increasing. This demand is evidenced by the proliferation of remote-control systems for indoor climate control, automated cooking, affordable video surveillance, baby monitors, and smart speakers. These devices, when first introduced to the user, can create a new demand for energy.
- The power and operating time of the devices to be charged are also critical factors. This parameter is also often a crucial factor in consumer electronics selection. Phones, laptops, tablets, and electric scooters with extended battery life are experiencing heightened demand.
- Universalization. The demand for uniformity in connector ports, sockets, and plugs is not merely a consumer trend but often a response to regulatory requirements. For instance, by the end of 2024, all mobile devices sold within the European Union (EU) must be equipped with a Type-C connector, as mandated by the EU Parliament in 2022. This trend is not exclusive to consumer electronics. In rural areas, for instance, propane stoves, wood-fired furnaces, and diesel generators are common sources of electricity, underscoring the need for constant oversight of energy resources. A significant number of individuals express a desire to transition to a unified energy source capable of powering all domestic systems.
- Sustainability of energy supply. Consumers seek a reliable energy source to avoid the potential loss of essential energy during times of crisis.
- Autonomy. Temporary departures, the development of new territories, and the energy demands of consumers residing in remote areas far from centralized infrastructure necessitate the exploration of optimal solutions for autonomous energy supply.

The demands of consumers in the commercial and residential sectors are also influencing the requirements for energy supply. The predominant trend in this regard will be the escalating demand for electrification and energy storage solutions.

The advent of technological advancements has given rise to an expanding array of alternatives and a growing field of inter-fuel competition in the domains of space and water heating systems. In most cases, the utilization of gas and coal remains the most economic option. In the case of centralized district heating and electricity supply, this option facilitates enhanced efficiency through the effective utilization of residual heat. Concurrently, the appeal of electric devices of various types is also increasing, both for additional heating and for creating more comfortable conditions in locations where centralized systems are not feasible (e.g., warm floors, entrance areas). A particular

focus should be placed on autonomous facilities that are not connected to centralized heating systems or gas networks. In this regard, a wide array of options is available. If electricity is available, it emerges as a highly advantageous solution. However, there are also options for achieving complete autonomy, including gasoline and diesel generators, gas installations using liquefied petroleum gases (LPG) and methane (in gaseous or liquefied form), coal and wood stoves, and novel technologies such as solar panels, heat pumps, and biogas. The selection of a particular energy source is contingent upon considerations such as physical accessibility, cost, and environmental impact.

When consumers purchase vehicles, they typically prioritize various indicators, with manufacturers striving to offer more attractive solutions. These indicators include the cost of operation, which encompasses the vehicle price, maintenance, and refueling costs; acceleration dynamics; mileage without refueling or recharging; comfort; quality of multimedia systems; and reliability, defined as trust in the brand and technologies used. An increasing focus on environmental sustainability by consumers and regulators is also a salient trend. The accessibility of service and refueling/charging infrastructure constitutes a pivotal criterion in the selection process. This shift is precipitated by evolving lifestyles, the aspiration to enhance daily comfort, and the advent of new technologies, such as individual small mobility solutions (electric scooters, electric bicycles, monocycles), delivery robots, and drones. In this context, electrification emerges as a pivotal trend, akin to its role in the utility sector. The inter-fuel competition field is expanding in all modes of transportation. For road transportation, the competition is between petroleum products, natural gas, biofuels, electricity, and hydrogen [Kulagin et al. 2020]. For railway transportation, the competition is between petroleum products and electricity [Grushevenko et al. 2023]. For maritime transportation, the competition is between petroleum products, ammonia, methanol, biofuels, and even nuclear facilities [Grushevenko et al. 2023].

In industry, the demands on energy supply technologies are also changing. Traditionally, the sector has followed three basic principles when selecting an energy resource: energy must be cheap (to reduce production costs), safe, and the energy carrier must be supplied sustainably (for process continuity). Now new guidelines are being added to these ones:

- Image of the energy component. Manufacturers often choose not the cheapest, but the most environmentally friendly solutions, monetizing their ESG-values in the growth of the value of their own shares [Deloitte 2023]. But in many cases, this choice has a point demonstration character, without large-scale re-equipment of all production facilities.
- Autonomous energy supply—the ability to provide energy for production remote from the grid infrastructure in new territories.
- Quality of energy source—modern equipment becomes more demanding of the energy source (class of oil products, compliance of electricity parameters with established values, etc.).
- Optimizing tax payments. Carbon taxation and carbon border barriers are forcing some producers of energy-intensive products to consider the source of their energy supply.

Against the background of the development of automation and robotization of technological processes, the demand for electricity is also increasing in the industrial sector.

In addition to consumer requirements, government policy has a significant influence on the set of energy supply options in each sector, which allows adjusting consumer demands and the attractiveness of using specific solutions. Among the most prominent examples:

- Tariff, tax and price regulation that artificially inflates the cost to the consumer of some solutions and lowers the cost of others.
- Energy efficiency standards favoring specific technological schemes for buildings, equipment, industrial plants, etc.
- Fuel class requirements
- Direct bans and restrictions—e.g., banning the use of light bulbs, sale of certain containers, banning internal combustion engine vehicles from entering city limits, etc.
- Direct and indirect subsidization of energy supply—e.g., connection to the electricity grid or to gas not at the expense of the consumer or through co-financing schemes.
- Carbon regulation.

The set of applied tools can significantly adjust the initial demand formed by consumers for the energy supply system and the consumption level itself.

In the future, inter-fuel competition will continue to expand, and demand for electric power in end-use sectors will grow faster than for any other type of energy carriers, which is well seen in the forecasts of ERI RAS [Makarov et al. 2024], the International Energy Agency [IEA 2023], OPEC [OPEC 2023], and others.

Thus, the main battlefield for fuel alternatives is becoming the electric power generation segment, and its technological landscape will largely determine the future of the global energy industry.

2. Electricity generation: Renewable or fossil?

In the domain of power generation, a pivotal concern pertains to the prospective parameters of inter-fuel competition among conventional fossil-fueled generation, nuclear power, and renewables. In 2021, renewable energy sources (RES) contributed up to 15% of the global primary energy consumption. Approximately half of this energy was utilized directly in end-use sectors. The primary end-use sectors for this energy were heating and cooking, with biomass and waste being the main sources. The remaining half was allocated to electricity generation. Of this, 40% of generation came from hydropower, 25% from bioenergy (biogas, solid biomass, waste), and the remaining approximately one-third from new RES (solar power plants (SPPs), wind power plants (WPPs), geothermal plants (GPPs), ocean energy, etc.) [IEA 2023]. Concurrently, it is the new RES that have exhibited the most substantial growth rates over the past decade, and it is with these that the primary expectations for the transition to a novel energy sector are associated. However, the viability of these prospects is contingent upon the specific characteristics of STP in each segment.

In the domain of solar energy, crystalline silicon photovoltaic plants (PVs), which directly convert sunlight into electricity through photovoltaic cells, are currently the most prevalent. Since 2010, the cost of these facilities has decreased from 0.43 $(2023)/kWh to 0.08 $(2023)/kWh. This decline has led to a situation where, in certain regions, the cost of solar energy is comparable to that of traditional energy sources in terms of the cost per kilowatt-hour produced. The reduction in costs has been achieved primarily through the expansion of production facilities and the relocation of manufacturing operations from OECD countries to developing Asian countries, where labor and critical materials utilized in panel production are substantially more affordable. While the technology's learning curve has largely been surmounted, there remains potential for further cost reductions through reductions in cell thickness, increases in lifetime, and optimization of module architecture [VDMA 2022; DNV 2023; AEGIR 2022].

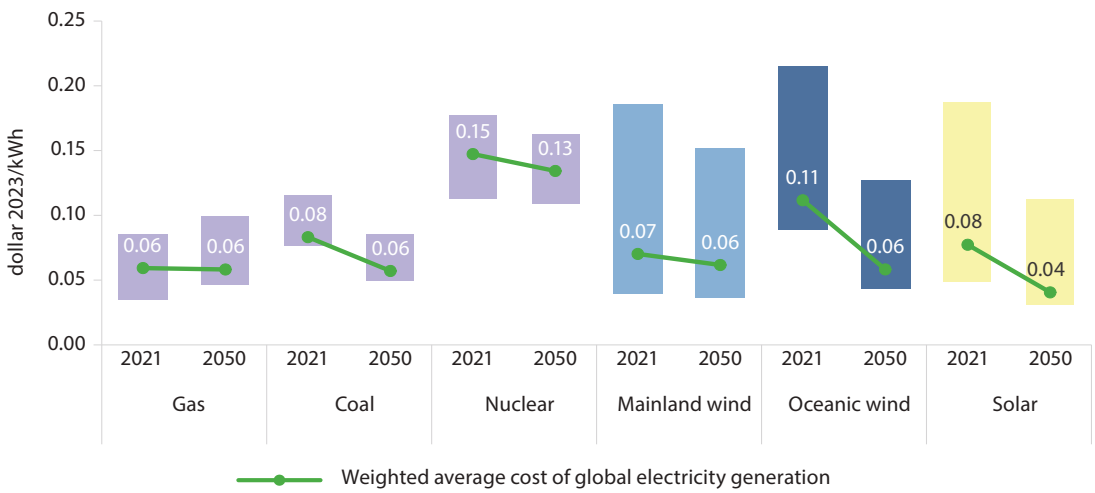
The potential for breakthroughs in photovoltaics is associated with perovskite technologies (pure perovskite/perovskite-silicon tandem), which are currently under development in Russia [Akbulatov et al. 2017]. The prototypes of these panels exhibit high efficiency, and their production is less costly than that of traditional silicon panels. However, the issue of the material's extremely high degradation rate remains unresolved, with the longest achieved lifetime being one month. In contrast, silicon panels face the challenge of uneven generation. The maximum efficiency of silicon panels is observed under specific insolation parameters, and cloudy or excessively hot weather hinders the attainment of optimal operating conditions. A persistent challenge in solar energy generation pertains to the lack of output after sunset, accompanied by a substantial decline during periods of precipitation, overcast conditions, and the winter season.

Theoretically, the issue of nighttime generation can be addressed by concentrated solar power (CSP) technologies. In such systems, the sun's rays are reflected from heliostat mirrors and heat up a tower located in the center of the station, where a coolant heated to a temperature of 600 degrees Celsius is stored. In the absence of sunlight, the tower functions as a conventional thermal power plant, converting thermal energy into electrical energy for an extended period of a few hours. However, these systems are associated with significant disadvantages (in addition to the fact that they are 2 to 3 times more expensive than conventional crystalline panels in terms of the cost of energy production [IRENA 2023a]), including the need for extensive land areas and the requirement for substantial resources such as fresh or desalinated water, which are necessary for the technological processes involved.

Wind farms represent another prevalent category of renewable energy sources. Over the period from 2010 to 2022, there was a significant decrease in the levelized cost of electricity generation (LCOE): from $0.11/kWh to $0.07/kWh for onshore wind power plants and from $0.20/kWh to $0.11/kWh for offshore wind power plants. According to the expert community, the prospects for further cheapening of mainland generation through improvements in rotor systems and blade materials are estimated to be within 10% [ETIP WIND 2021; DNV 2022]. Conversely, the potential for cost reduction in offshore wind power plants is projected to be more pronounced, with a range of 30–40%, primarily attributable to the anticipated augmentation in turbine unit capacity and the optimization of control and transmission systems [AEGIR 2022; Makarov 2020].

Already, in some regions of the world, PV and WPP generation is competitive with conventional generation in terms of cost per unit of energy (LCOE). In the future, given the projected cost reductions, the attractiveness of RES should increase (see Figure 1 on p. 13).

Figure 1. Projected change in the levelized cost of electricity generation (LCOE) by source in 2050 compared to 2021



The columns show the range of electricity generation costs by region of the world.

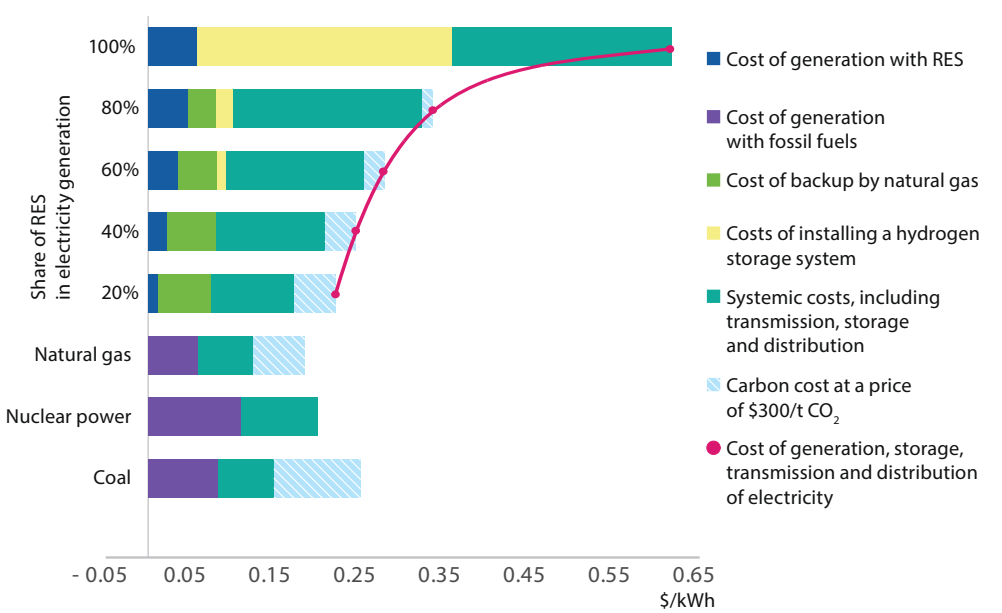
Source: ERI RAS calculations.

However, the complexity of a power system extends beyond the mere objective of generating electricity in an economical manner. As electricity travels from the generation source to the consumer, additional costs are incurred, including transmission, storage, distribution, maintenance of reserve capacity, and dispatching. In an effort to account for system effects, certain studies have proposed a shift from the LCOE to the VALCOE of the present unit cost of electricity generation [Karn et al. 2022; Moses 2023].

The primary challenges associated with renewable energy generation pertain to the disparity between electricity demand and generation peaks, as well as the substantial reliance on meteorological conditions. For instance, solar panels are unable to meet evening demand, and in cloudy or very hot weather, generation may fail during the day as well. In many regions of the world, generation experiences a significant decline during winter months. Additionally, wind generation exhibits similar challenges, with periods of high output during nighttime hours, but a complete cessation of electricity production during periods of low wind speeds or high wind speeds. Observations of wind power in the EU demonstrate that generation failures can persist for weeks. To address these challenges, the implementation of renewable energy generation systems necessitates either a robust and reliable backup system or an accumulation and subsequent return of generated electricity to the grid. Furthermore, as the share of renewable energy in the energy portfolio increases, the backup costs are expected to rise, given the rising

cost of generation at conventional plants as the installed capacity utilization factor (ICUF) decreases. Furthermore, the costs associated with electricity accumulation are subject to a multiplicative increase when considering not intraday modes (e.g., day/night charging, morning and evening peaks of output) but rather reserve capacity for extended periods of a few days, necessitating significantly larger capacities and a very low number of operation cycles during the year. In essence, as the share of new RES in generation increases, system costs escalate disproportionately, a phenomenon that holds true for all countries worldwide (see Figure 2 on p. 14). The specific level of costs is contingent on resource availability, the initial electricity generation mix, natural and climatic conditions, the ability to balance flows with neighboring countries, and numerous other parameters. In cases where the generation is exclusively from renewable sources (i.e., 100% RES), the only viable solution to address long-term generation discrepancies is to convert electricity into another form of energy for storage, particularly hydrogen. However, such approaches are characterized by substantial expense, stemming from the costs of equipment (e.g., electrolysis plants, hydrogen storage facilities, and fuel cells) and energy losses during conversion [Kulagin et al. 2023]. A comparison of hydrogen systems reveals an efficiency range of 25–45% for the cycle "production–charge–discharge–supply to the grid," while chemical batteries demonstrate an efficiency of 85–95% [Environmental and Energy Study Institute 2019]. Notably, the cost of hydrogen storage (LCOS) exceeds $300/MWh, compared with $150/MWh for chemical current sources [Lazard 2023]. In addition, the utilization of hydrogen entails specific safety imperatives.

Figure 2. Schematic ratio of the full pre-tax cost of electricity supply, taking into account generation costs, system effects, CO_2-eq. emission charges for different energy sources



Source: ERI RAS.

It is imperative to ascertain whether there exist alternative methods of generating energy from renewable sources that possess sufficient maneuverability to circumvent the disadvantages inherent in PVs and WPPs. In principle, the answer is affirmative. These include technologies that harness oceanic energy, such as bottom turbine generators driven by strong tidal currents, buoy generators that utilize constant wave energy, and plants that operate through ocean thermal energy conversion, leveraging the temperature difference between the ocean bottom and surface [Lewis et al. 2011]. To a lesser extent, tidal range dam stations can be attributed to such technologies, since they operate only at high tide. However, in terms of levelized cost of energy (LCOE), all "oceanic" solutions are significantly more expensive than WPPs and SPPs (see Table 1 on p. 15), not to mention conventional generation. Furthermore, the environmental implications of these technologies, particularly their impact on marine flora and fauna, have not been thoroughly investigated.

Table 1. Key technologies using ocean energy to generate electricity

Technology	Workout stage	LCOE 2023, $ 2023/kWh	LCOE 2050, $ 2023/kWh
Tidal range (dam stations)	Commercial stations are in operation	0.11–0.24	0.11–0.24
Tidal currents (bottom turbine generators)	Pilot projects are being developed	~ 0.9	< 0.14
Wave energy conversion (buoy generators)	Pilot projects are being developed	~ 1.024	< 0.21
Ocean thermal energy conversion (OTEC plants)	There are experimental stations	~ 0.26	~0.13

Source: IRENA 2023b, European Commission 2021, ETIP OCEAN 2020.

An alternative to oceanic solutions that has been employed by humankind for over a century is hydroelectric power plants. The procurement of electricity from substantial hydroelectric power plants (HPPs) is comparatively inexpensive, with costs starting from 0.02 $(2023)/kWh. In certain countries, these facilities are the predominant source of electricity generation, with examples including Norway, where hydropower accounts for over 90% of the total electricity production [IEA 2023]. However, globally, hydropower plants currently contribute only 15% of electricity generation and 8% of primary energy consumption [IEA 2023]. The development of hydropower is constrained by several factors, including the limited hydro potential observed in many countries, the geographical dispersion of hydropower resources and consumption centers, and the need for specific landscape conditions for installation. Criticisms of hydropower are manifold, particularly with regard to the disruption of ecosystems within the flood zone. Conversely, there is a growing interest in mini-HPPs and micro-HPPs, which, in theory, can be located even on small flowing water bodies. However, these systems frequently demonstrate unstable output and are often cost-prohibitive, with the LCOE for micro-hydropower plants starting at an average of 0.13 $(2023)/kWh on a global scale [IRENA 2023a].

Another viable option is the utilization of geothermal energy, which is already widespread in suitable locations (geysers, hot springs, etc.). New generation geothermal systems that utilize energy from great depths by drilling deep wells are also being considered. However, the cost of electricity generation using such technologies currently exceeds $0.45/kWh. The viability of these solutions is contingent on the geothermal gradient, defined as the temperature variations at varying depths from the Earth's surface. The earlier a transition to high temperatures can be achieved, the higher the probability of a plant entering the zone of economic efficiency.

The high cost of some renewable energy technologies and the inadequacies of others in terms of unpredictable output dynamics, against the backdrop of a reinvigorated low-carbon agenda, are driving renewed interest in carbon-free nuclear energy. Nuclear power generation frequently incurs a higher LCOE compared to other carbon-free alternatives. It necessitates substantial capital investment and unprecedented safety measures, surpassing those of other generation methods. However, unlike WPPs and SPPs, nuclear power plants can operate without generation dips and exhibit sufficient intraday balancing capabilities. This results in substantial savings on backup and storage systems compared to renewable energy systems. However, even in this context, the need for backup capacities or the utilization of energy storage remains paramount, necessitating a comprehensive analysis of the energy storage technologies available.

3. Energy storage technologies

Storage technologies are important not only for balancing carbon-free power generation but also for the electrification of end-use sectors: they are used in consumer electronics, off-grid power supply systems, transportation, etc. Despite the wide range of energy storage solutions available, they can all be categorized into:

- Physical systems. In these, the electricity coming from a generation source is converted into kinetic, potential, or thermal energy and then back into electrical energy. Such storage systems include: pumped storage power plants, thermal storage, compressed air systems, flywheels.
- Electrochemical systems. They store and then release electricity through a chemical reaction. These include: alkaline batteries, lead-acid batteries, lithium-ion batteries, redox vanadium batteries, etc.
- Hydrogen systems. These produce pure hydrogen through the electrolysis of water, which is subsequently fed to a fuel cell to generate electricity.
- Electrical—supercapacitors and superconductors. They store and release electricity without converting it.
- Chemical-thermal systems. In these systems, electricity is converted into fuel (synthesis gas or hydrogen), which is then burned.

Concurrently, five predominant sectors have been identified that are influencing the demand for electricity storage. Each of these sectors is expected to witness competition among various storage technologies, each with its own distinct set of parameters. It is

noteworthy that in numerous instances, cost considerations do not serve as the primary determinate. Dimensions, number of charge/discharge cycles, charge rate, and runtime may prove to be more significant factors in selection decisions. In the context of electricity storage, the specific application and the necessity of redundancy are also crucial factors. The viability of daytime operation or high-volume storage over extended periods is a key consideration.

1. The segment of large balancing power systems. This segment is particularly crucial in mitigating the discrepancies in renewable energy generation. The pivotal parameter in this context is the normalized cost of energy storage, given the commercial orientation of such projects. Another salient parameter is compactness, defined as the ratio of occupied area to storage capacity. The service life of these facilities is also a critical factor, as they are designed to be integrated into urban infrastructure over the long term. Additionally, energy losses per charge/discharge cycle must be considered.
2. The segment of consumers relying on uninterruptible/standby power supplies in emergency situations is particularly sensitive to the initial cost of the storage device. The device may only operate a limited number of times during its lifetime if the power supply is uninterrupted, thereby negating the relevance of the LCOS indicator for such systems. The operating temperature range is a critical factor, as uninterruptible power supplies may be necessary in extreme climatic conditions.
3. Energy-intensive portable electronics, including cell phones, tablets, electric toothbrushes, and other standalone appliances, are prime candidates for this technology. The storage device must be lightweight and compact, as well as provide maximum uptime at a reasonable price.
4. The storage segment for small mobility devices, including electric scooters, monocycles, drones, delivery robots, and warehouse forklifts, among others, is another area of concern. The cost of the storage device is a salient factor in this context, and it is imperative that the cost of the device does not have a significant impact on the overall cost of the equipment. The specific power output is also of significance, as the battery must provide a sufficient range of travel within a compact size.
5. The segment of storage devices for electric-powered vehicles (e.g., electric cars, electric buses, electric river streetcars) is sensitive to the cost of the storage device (expressed as the present value of the battery per charging cycle over the vehicle ownership period), as well as the compactness of the battery and the recharge rate.

The key parameters that are important in deciding which drive to choose in each segment and the prospects for changes in these parameters through 2050 are summarized in the tables (see Table 2–Table 6 on pp. 18–19).

Table 2. Key characteristics of energy storage technologies for balancing systems in the power industry

	LCOS, $ 2023/MWh		Compactness of the system, m cub./MWh	Service life in charge-discharge cycles and years	Efficiency per cycle of accumulation-release, %
	2023	2050			
Pumped-storage hydroelectricity	105	100	500–5000	30-60 years	70–85
Gravity	350	315	>100	30 years	70–80
Thermal	211	180	5–15	30 years	50–60
Flywheels	620	555	13–50	20 000-100 000 cycles (more than 50 years)	70–85
Compressed air	230	200	150–500	20-40 years	40–50
Lead-acid	881	724	10–15	500-600 cycles (1-2 years)	85–95
Li-ion	175	135	1–5	1000-8000 cycles (3-20 years)	85–95
Na-ion	230	120	3–5	~5000 cycles (15 years)	85–95
VO-flow	315	205	25–50	~20 000 cycles (up to 60 years)	70–80
H_2 fuel cell	350	250	1–2	5-30 years	25–45
Hydrogen-to-power	400	350	no data	20-40 years	25–40
SNG-to-power	450	380	no data	20-40 years	20–30
SMES (superconducting magnetic energy storage)	More than 3000	More than 2000	>100	20-30 years	over 95

Source: compiled by the authors.

Table 3. Key characteristics of energy storage technologies for consumer-side storage (in the uninterruptible / backup power supply segment)

	Unit cost of capacity, $ 2023/kWh		Service life of the system, years	Optimum operating temperature range, °C
	2023	2050		
Lead-acid	90	90	3-5	+15… +25
Li-ion	120–400	95–300	~ 10	0…+40
Na-ion	151	65	10-15	0…+40
NiCd	350	350	Up to 20	–20…+40
VO-flow	650	430	20-30	+10…+40
H_2 fuel cell	750	550	Up to 30	0…+80
Flywheels	1500	1350	Up to 30	Theoretically unlimited

Source: compiled by the authors.

Table 4. Key characteristics of energy storage technologies for energy-intensive portable electronics

	Specific energy intensity, W•h/kg (volume of energy contained in a unit of mass)		Average unit mass cost per unit of capacity, $ 2023/g (cost per unit mass)		Full charge cycle time
	2023	2050	2023	2050	
Li-ion	200–300	250–350 (potentially more than 1,000)	0,45	0,35	5-60 min.
Na-ion	80–120	100–150	0,65	0,45	20-60 min.
NiCd	40–60	40–60	7	7	4-6 hours
NiMH	140–300	140–300	2,75	2,75	4-6 hours

Source: compiled by the authors.

Table 5. Key characteristics of energy storage technologies for small mobility vehicles

	Specific cost of capacity unit, $ per unit 2023/kWh		Specific power, W/kg	
	2023	2050	2023	2050
Lead-acid	90	90	100–250	100–250
Li-ion	141	110	200–500	250–800
Na-ion	150	65	100–200	150–300
NiMH	550	550	250–1000	250–1000

Source: compiled by the authors.

Table 6. Key characteristics of electricity storage technologies for autonomous transportation

	Levelized value of the battery per cycle, $ 2023/charge-discharge cycle		Weight of standard battery*, kg	Full charge cycle time
	2023	2050		
Li-ion	28	25	150–700	5-60 min.
Na-ion	30	13	350–700	20-60 min.
NiMH	111	111	200–400	4-6 hours
Lead-acid	20	18	1100–1800	6-8 hours

* The average electric vehicle battery has a capacity of 55 kWh

Source: compiled by the authors.

In almost all segments, lithium-ion batteries are among the best solutions, which makes it safe to call lithium the new gold. However, in case of metal shortages and a significant increase in the cost of lithium-based batteries, interest in alternative solutions, such as sodium-based batteries, will also increase. That said, most storage solutions are

still quite expensive. Therefore, in the power sector, the rational solution for balancing RES in terms of energy availability is backup at the expense of conventional generation.

4. Fossil fuel production and supply technologies

The depletion of the most accessible deposits and the increasing competition among fuels in the power sector and end-use sectors are stimulating STP in the production, supply, and processing of fossil fuels. The achievements of related sciences: IT, chemistry, physics, materials science, etc., are widely used in this process.

Across all elements of the production chain, efficiency can be improved by implementing smart and digital solutions. This includes reservoir modeling, smart drilling, intelligent pipeline flow control, digital filling stations, and other segments. With the use of sensors and robotic inspection systems, it is possible to detect malfunctions in a timely manner and prevent accidents. Digital twins are increasingly in demand for working out project variants before operation, testing abnormal situations and software, and training specialists. The development of the unmanned aerial vehicle industry provides new opportunities for monitoring fields and pipeline routes (visually and with the use of diagnostic equipment), conducting geological exploration, and ensuring the delivery of cargo to remote locations. Artificial intelligence algorithms capable of processing large amounts of data are being introduced into geological exploration, production and transportation of hydrocarbons.

Software solutions, combined with the introduction of multi-cluster drilling equipment, lateral extension and optimization of proppant flow rates in hydraulic fracturing, have already revolutionized the development of low-permeability reservoirs. Technological advances continue in this area, as well as in reducing energy costs and increasing oil recovery factor (ORF) for extra-heavy oils and kerogen, where surface retorting is increasingly being replaced by in-situ production technologies.

The desire to exploit aquatic resources as other reserves are depleted is driving the development of offshore and deepwater production technologies. In addition to offshore platforms, advanced subsea robotic production systems are increasingly in demand.

Companies are paying a lot of attention to methods of enhancing oil and gas recovery – different configurations of surfactants are being used, variants with thermal effects on the reservoir and injection of different types of gases, including CO_2, are being developed.

In pipeline transportation, efficiency can be increased by improving the properties of the materials used, increasing the pressure, smooth coatings, anti-friction additives, and robotization of fault detection and repair processes.

In the processing of fossil resources, new solutions are being actively applied to increase the yield of the most valuable and expensive components and to adapt to changes in the incoming refinery feedstock. In some projects, good synergies can be achieved by processing refinery feedstock to produce higher value fuels and chemical products at the same time.

The traditional energy industry's ability to provide a self-sufficient energy supply is expanding significantly. Equipment for the sustainable supply of facilities based on various fuels is becoming available: compressed natural gas, LPG, liquefied gas, coal, diesel.

Thermal power generation is also being improved, where the main efforts are aimed at increasing the efficiency of combustion in turbines, ensuring maneuverability of operation, and introducing systems for minimizing emissions.

5. Progress in Carbon Capture, Utilization and Storage Technologies (CCUS)

The low-carbon agenda, as well as plans for greenhouse gas taxes and carbon border payments, have stimulated research on CCUS, including as an element of "greening" fossil fuels and improving their competitive position in changing market conditions.

There are already point projects at production sites to capture CO_2 and immerse it back into the reservoir to displace hydrocarbons. Oil and gas chemistry, refining, hydrogen production, metallurgy, the cement industry, and thermal generation are considered promising applications of CCUS technologies. However, so far everything is limited to the state of evaluation and experimental phase, primarily due to the high costs associated with the endeavor and the necessity for substantial enhancement of the elements of production chains, commencing from the capture stage.

The main challenges holding back the increased use of CCUS solutions are:

- large geographical distances between CO_2 emission centers and acceptable storage sites;
- risks of environmental impact of CCUS processes due to the high carbon footprint of such production chains themselves and possible CO_2 leakages after disposal;
- reduction of thermal generation efficiency when using CCUS processes due to high energy intensity of the process;
- the need to monitor and maintain CO_2 storage facilities over long time horizons at a constant cost.

The viability of CCUS is contingent on its capacity to address the identified challenges and the prevailing costs of CO_2 emissions, which directly impact the cost-effectiveness of the implemented solutions. Concurrently, advancements in technology will persist in domains external to the energy sector, where carbon dioxide emissions are an integral component of the production process. Consequently, novel solutions may experience an increase in demand within the energy sector over time.

Conclusion

The pivotal factors propelling the technological transformation of the energy sector include shifts in consumer demand, regulatory priorities, novel opportunities, and constraints arising from scientific advancements and the need to transition to more sophisticated production facilities. Concurrently, the energy sector itself is undergoing a rapid transformation, transitioning from closed fuel markets to a unified, interconnected competitive system.

Societal demands on energy systems are undergoing substantial transformation, precipitated by the emergence of novel categories of household and industrial energy-consuming equipment and vehicles. The transition towards a more electrified energy

landscape is progressing steadily across all sectors of final consumption. The generation of electricity is becoming the primary domain of inter-fuel competition in the global energy sector.

In numerous countries worldwide, the cost of solar and wind power generation has fallen to a level that is competitive with that of fossil fuels. Concurrently, the development of other carbon-free solutions is underway, with the potential to penetrate specific competitiveness zones on a local scale. However, as the share of RES in the generation mix increases, system costs (backup, storage, grid infrastructure, etc.) and consequently energy prices for end consumers rise substantially. This underscores the need for a balanced approach that prioritizes both the availability of energy and its environmental sustainability.

The challenges associated with energy storage and accumulation assume particular significance within the context of carbon-free energy systems, particularly in light of the intermittent nature of renewable energy generation. Active research and technology development in this area are ongoing. At this juncture, it can be stated with a reasonable degree of confidence that lithium-ion solutions remain optimal in comparison to other alternatives for the majority of storage segments. However, the high dependence of batteries on rare metals gives rise to concerns, thereby prompting the exploration of alternative electric energy storage solutions. The optimal solution for each battery utilization segment varies, allowing multiple technologies to coexist and thrive. In the context of long-term electric power storage, particularly in cases where the generation is lost for an extended period, the carbon-free alternatives are limited to hydrogen. However, hydrogen is currently prohibitively expensive for large-scale applications. Consequently, reliance on fossil fuels for backup purposes emerges as a prevailing economic strategy for the time being.

The strategic integration of STP within the fossil energy sector will facilitate the sustained delivery of high production levels, even in the face of the depletion of readily accessible fields. Moreover, it will enable the provision of novel and more efficient energy supply solutions to consumers. Concurrently, gas and coal markets must adapt to operate within more stochastic frameworks, attributable to variations in RES production. It is important to note that fossil fuels and renewables are becoming not only competitors but also important complementary elements of a new energy system. This system should offer consumers both affordable and more environmentally friendly energy.

The ensuing decades will witness a period of intense technological competition across all segments of energy production, supply, and consumption. Concurrently, the global energy sector is expected to see a significant rise in trade, particularly in the domains of equipment and services. In this technological race, it is imperative not only to establish clear priorities but also to devise effective mechanisms for technological innovation, from theoretical frameworks to industrial production.

The ability to integrate into a shifting technological landscape, ensuring technological readiness for adaptation, will be a key factor in the competitiveness of companies and countries in this new era.

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Shifting Trade Ties of the United States and China with Their Partner Countries: Changes Over the Five Years of Turbulence

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Abstract

In this paper, we track the shifts in economic ties of the United States and China with partner countries in the context of commodity and service trade. We propose the grouping of major partner countries and regions: China, the US, North America (excluding the US), Europe, ASEAN, Chip 4 alliance countries (South Korea, Japan, Taiwan), India, and other countries. The dynamics of trade ties is broken down into three stages: active phase of the US—China trade war (July 2018 – January 2020); post-COVID recovery of the global economy (February 2020 – January 2022); geopolitical turbulence (February 2022 – present).

Regarding commodity trade, we document the changes in trade ties of the US and China with key groups of partner countries during each stage; apart, we examine the US trade in services with partner countries. A steady decline in commodity trade between the US and China was observed only during the third stage, while the drop during the trade war had turned out to be temporary. Trade in services between the US and China started to fall a bit earlier, during the second stage. At the third stage, the US commodity trade deficit with China declines in parallel with an increase in the commodity trade deficit with ASEAN, the Chip 4 alliance, and North America (partly due to re-exported Chinese goods). In 2020, China has reached a record share in global commodity exports (about 16%) and continues to hold strong.

We propose the short list of countries and regions that may have the strong impact on growth and restructuring of world trade in the long term, in particular: China, ASEAN, North America, Russia, and India. The list relies on the following facts: retention of China's extraordinary position in world trade even under the increasing pressure from the West; active integration and exceptional trade connectivity of ASEAN countries; significant efforts by the US to reintegrate North America and reshoring high-tech production back to the continent; Russia's very high interest in developing cooperation within BRICS and decentralizing international payments; the rise of India as a major sales market.

Introduction

Notable shifts have occurred in the foreign trade relations of the world's two largest economies, namely China and the United States, since the conclusion of 2018. First and foremost, this was reflected in shifts in the geographical structure of their foreign trade in goods. This structural adjustment can be periodized into three stages.

The initial phase aligns with the active phase of the trade conflict between the United States and China (from July 2018 to January 2020[1]), was characterized by a reciprocal escalation of import tariffs, and culminated in a trade agreement. However, this did not signify the conclusion of the confrontation, but rather its transfer to alternative formats. Immediately following the adoption of the trade agreement, the second phase commenced, during which international trade was significantly impacted by the implementation of lockdown measures in response to the global spread of the coronavirus and the subsequent recovery of the world economy in the wake of the pandemic.[2] By the beginning of 2022, this momentum had effectively been exhausted. In February, the third stage of this process commenced, characterized by a heightened geopolitical tension, set against the backdrop of the eruption of the Russia—Ukraine conflict. This was followed by an

[1] The first large-scale tariffs in the trade war were imposed on July 6, 2018, and on January 15, 2020. The US and China formalized the first phase of the trade deal [Bown 2021].

[2] An important consequence of the active recovery, including the fiscal stimulus measures implemented during the pandemic, has been the rise in inflation in developed countries unprecedented for the 21st century [Chau et al. 2024].

intensification of existing contradictions in other regions of the world, including the China—Taiwan and Israel—Palestine confrontations, the latter have directly impacted navigation in the Red Sea.

The objective of this study is to provide a comprehensive overview of the evolving foreign trade relations between the United States and China and their key partner countries, with a particular focus on the driving forces behind prospective structural changes in global trade. In order to achieve this objective, the author employs a methodology based on statistical analysis, the grouping of objects by geography and industry, and the expert assessment of prospects based on trend extrapolation.

Section 1 presents and justifies the author's classification of the United States' and China's partner countries. Section 2 elucidates the stages of the dynamics of international trade of the two countries in the context of key groups of partner countries, with a focus on the features of each of the three stages (based on the analysis of national statistical data of the US and China on trade in goods and WTO data on trade in services). Section 3 presents the author's perspective on the potential future trajectory of global trade.

1. Principles of grouping partner countries of the US and China

In order to facilitate comprehension and present information in a clear and concise manner, this article employs the paired analysis approach. This entails examining trade relations with partner countries from the perspective of the two most prominent economies in the world, namely the United States and China. Concurrently, a number of partner countries are categorized in accordance with the following criteria.

Firstly, data pertaining to trade with the other largest competitor country (for the United States, China; for China, the United States) are explicitly reported. This approach enables us to identify the impact of a trade war and other external shocks on US-China direct trade, which is a key area of focus in global trade discussions.

Secondly, estimates of trade with North America (Mexico and Canada) are presented. The selection of this region allows for the monitoring of the processes of reintegration of North America within the framework of the USMCA agreement, which replaced NAFTA and entered into force in July 2020 [Brookings 2024]. In the case of China, the concentrated examination of trade relations with North America enables the documentation of indirect trade with the United States via Mexican and Canadian enterprises.

Thirdly, this approach delineates the dynamics of trade between the United States and China with European countries (the European Union, the United Kingdom, Switzerland, Norway, and Iceland[3]), representing the third party in the balance of major economies. This allows for the illustration of the evolving dependence of Europe on China, which is particularly pronounced in sectors such as electric vehicles and solar energy

[3] In the US and Chinese national foreign trade statistics, the groupings of countries by world region differ. For example, while in the US grouping Turkey belongs to Europe, in the Chinese grouping it belongs to Asia. In both groupings, Russia, Ukraine and Belarus belong to Europe, but for the purposes of this study it seems more appropriate to define Europe as a narrower community of developed countries oriented toward Western values. Thus, Russia, Ukraine, Belarus and several other countries (such as Serbia, Moldova and some others) are categorized as other countries in this study.

equipment [Mazzocco 2023] and its interconnections with the US. From the perspective of the European Union, China's robust position in international trade has emerged as a significant geopolitical concern. In response, the European Commission has allocated funding to the China Horizons research project, a collaborative endeavor involving nine research centers,[4] to examine this issue in greater depth.

Fourth, the rapidly developing Asian region is divided into three groups: ASEAN members, countries involved into the Chip 4 alliance, and India. The countries of the ASEAN[5] integration bloc are experiencing dynamic growth. For the United States, they represent a potential substitute for at least some Chinese imports. For China, they constitute a large and close integration grouping with good logistics.[6] The countries of the Chip 4 alliance, which includes South Korea, Japan, and Taiwan, have been gravitating toward Western countries in recent years. They are also involved in the United States' project to coordinate the supply of chips.[7] India is a traditional partner of the United States in Asia.[8] It also represents a counterweight to China, which views India as one of its emerging potential competitors.

Finally, all other partners, including Russia, are classified as belonging to the "other" group. It is important to note that the categorization of Russia as a distinct entity would not correspond to the purpose of this analysis. The United States does not consider Russia to be a significant supplier, except for a limited range of raw materials. Despite the intensification of cooperation between China and Russia in 2022–2023, Russia remains a relatively minor market for China, particularly in comparison to India (except for selected goods, such as automobiles).

The paper primarily relies on national US and Chinese merchandise trade statistics, CPB World Trade Monitor data to estimate the respective shares of the two largest economies in global trade, UN Comtrade data to provide a sectoral breakdown of merchandise trade, and WTO data on trade in services.

2. Stages in US—China trade dynamics

2.1. Trade in goods

In the initial phase of the US—China trade conflict, the United States, the instigator of the dispute, formally achieved a reduction in imports from China (and, consequently, a reduction in the trade deficit with China). However, the overall balance of US trade with all partner countries remained largely unaltered during this period,

[4] https://chinahorizons.eu

[5] The bloc consists of 10 countries: Indonesia, Malaysia, Singapore, Thailand, Philippines, Brunei, Vietnam, Laos, Myanmar, and Cambodia.

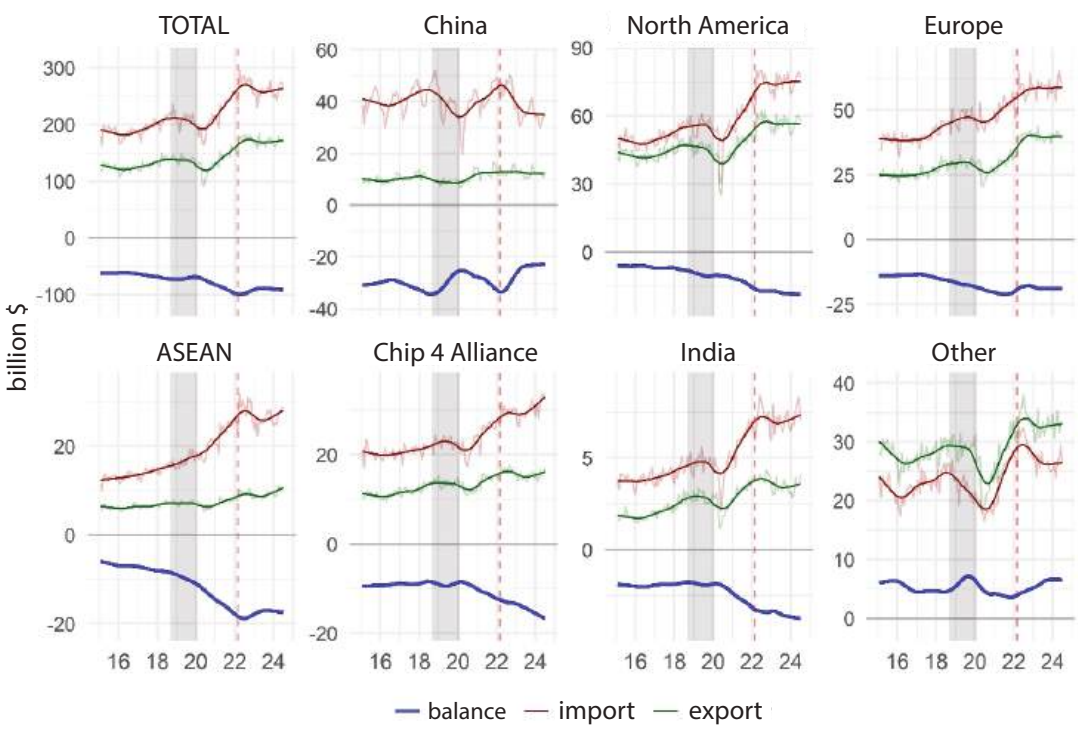
[6] China and ASEAN are now each other's largest trading partners. Importantly, China has publicly announced the possibility of jointly developing infrastructure projects with ASEAN: in particular, within the framework of Xi Jinping's proposed 21st Century Maritime Silk Road initiative [Bi 2021].

[7] The strategies of individual countries in the chip market are explored, for example, in [Kim and Rho 2024].

[8] Adjusted for India's retention of its "strategic autonomy" [Vanvari 2024].

despite a cessation in the growth of imports (see Figure 1 on p. 29). The conjunction of these factors suggests that imports from China have been supplanted by imports from other countries. Nevertheless, the actual substitution was merely partial, as the re-export routes of Chinese products to the United States via ASEAN countries (predominantly through Vietnam) and North America (Mexico, Canada)[9] commenced simultaneously. This is indirectly evidenced by the observed increase in China's foreign trade surplus with the aforementioned regions. Compared to the July 2018 level, the estimated trend growth of China's trade surplus with ASEAN is 46%, while that with North America is 17% (see Figure 2 on p. 30). Europe experienced a degree of benefit from the trade war, with an increase in exports to the United States. However, it is probable that re-exports from China were also a factor in this growth. It is crucial to acknowledge that re-export activities were not exclusive to the initial phase. Subsequently, these processes not only persisted but, based on indirect evidence, may have even intensified.

Figure 1. Dynamics of US foreign trade in goods by key groups of partner countries, January 2015 – June 2024

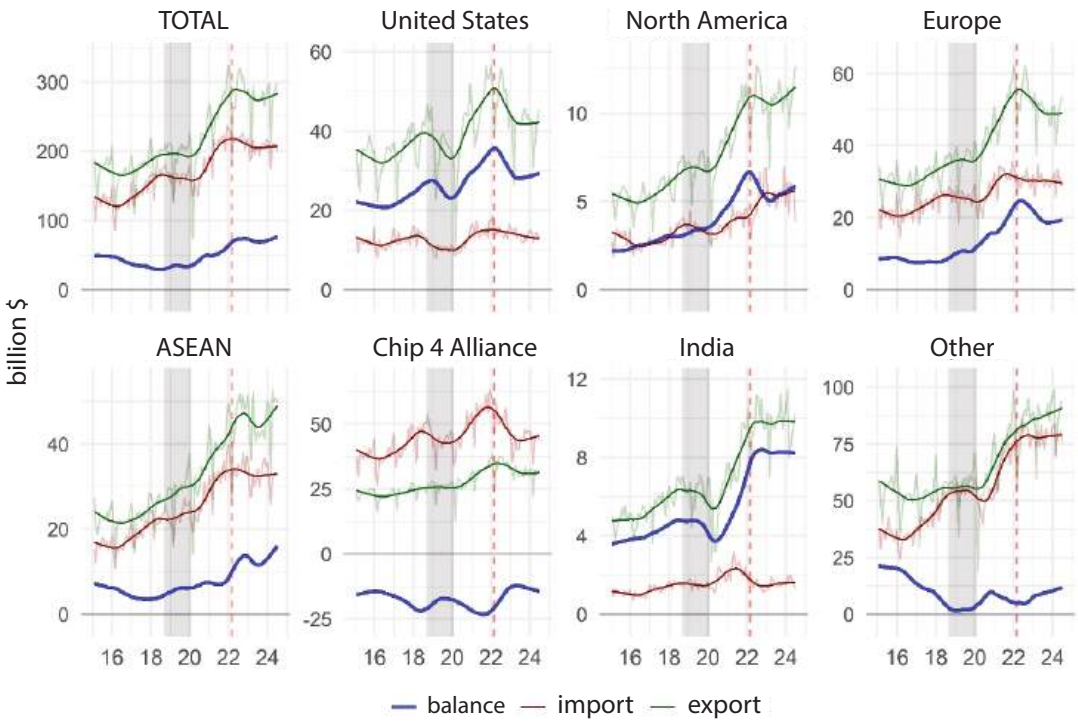


Note: the red dotted line is the beginning of the Special Military Operation in Ukraine, the gray fill is the active phase of the US-China trade war.

Source: Author's calculations based on data from the US Census Bureau.

[9] See in particular the analysis of Nikkei Asia [Kitazume et al. 2019].

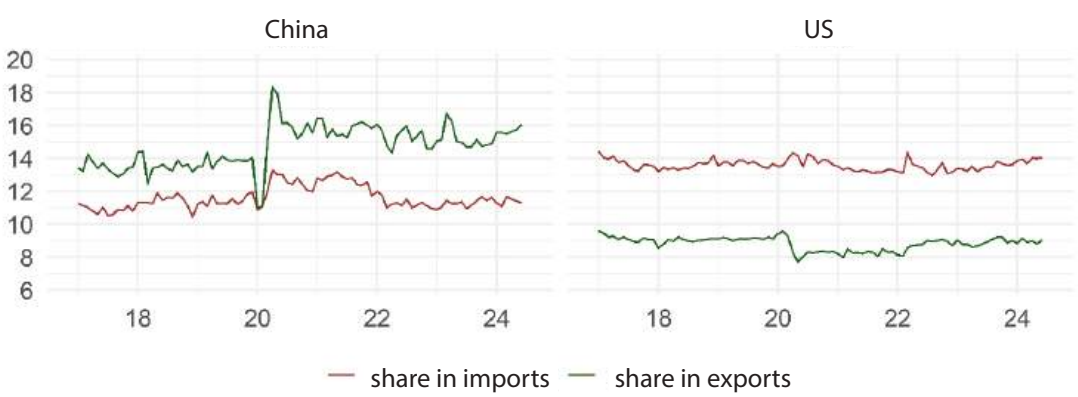
Figure 2. Dynamics of China's foreign trade in goods by key groups of partner countries, January 2015 – June 2024



Note: the red dotted line is the beginning of the Special Military Operation in Ukraine, the gray fill is the active phase of the US-China trade war.

Source: Author's calculations based on data of the General Administration of Customs of the PRC.

Figure 3. China's and the US share of world merchandise imports and exports, January 2017 – June 2024 (%)



Source: Author's calculations based on CPB World Trade Monitor data.

In the second phase, which encompasses the period of the global economic pandemic and the subsequent period of global economic overheating, import growth has outpaced

recovery in much of the world, including the United States. This has allowed China to substantially increase its merchandise exports and reach a record share of global exports, from 14% in 2019 to 16% in 2021 (see Figure 3 on p. 30).[10] Subsequently, China's share exhibited a slight decline in 2023. However, by mid-2024, it recovered to a relatively elevated level, reaching 15.8% in the second quarter of that year. This figure was slightly higher than the US share of world imports, which stood at 14.0%.[11]

At this juncture, the United States' additional demand for imports was predominantly satisfied by goods from the ASEAN and the Chip 4 alliance. During the period of heightened trade tensions, the latter group did not notably expand exports to the United States. In the course of the post-pandemic era, imports of Taiwanese and Korean electronics[12] to the US increased significantly. Imports from Europe continued to increase at a gradual pace, while North American shipments accelerated, and there was a notable intensification of cooperation with India. Although the volume of shipments in this latter case is minimal, their rapid growth suggests a deepening of collaboration, particularly in imports of precious stones and metals, as well as engineering products. Conversely, the results of the trade war in terms of reducing the trade deficit with China have been unsuccessful. By the conclusion of 2021, the deficit had nearly reached the level observed prior to the trade war (and, according to Chinese data, significantly exceeded this level).

During the 2020–2021 period, China observed a notable surge in exports to North American countries, indicating active re-export activities within this region. The primary target for expansion was Mexico, with Chinese exports to this destination demonstrating a 44% increase from 2019 to 2021. This was predominantly attributable to augmented exports of machinery, metallurgy and plastics products. The growth in Chinese exports to Canada was less pronounced, reaching 37%. This was predominantly attributable to machinery and metal products. By the conclusion of the period, China's trade surplus with Europe and India had reached its highest point. In addition to machinery and equipment, which constituted a significant contribution to China's export growth in both directions, there was a considerable increase in shipments of chemical products to India and metal products and automobiles to Europe. China's engagement with ASEAN countries was comprehensive, resulting in a notable increase in both exports and imports from ASEAN to China during the post-COVID recovery period. In contrast with the prevailing trend, China's trade deficit with the Chip 4 countries reached a low point by the end of the period. This was attributable to the active acquisition of high-tech products. Trade with other countries, as well as with ASEAN countries, developed in a balanced manner, with both exports and imports demonstrating consistent growth.

In the third stage, which was characterized by rapid geopolitical and structural changes, there was a notable cooling of trade relations between the two largest economies

[10] Estimates of China's share of world exports are from the CPB World Trade Monitor.

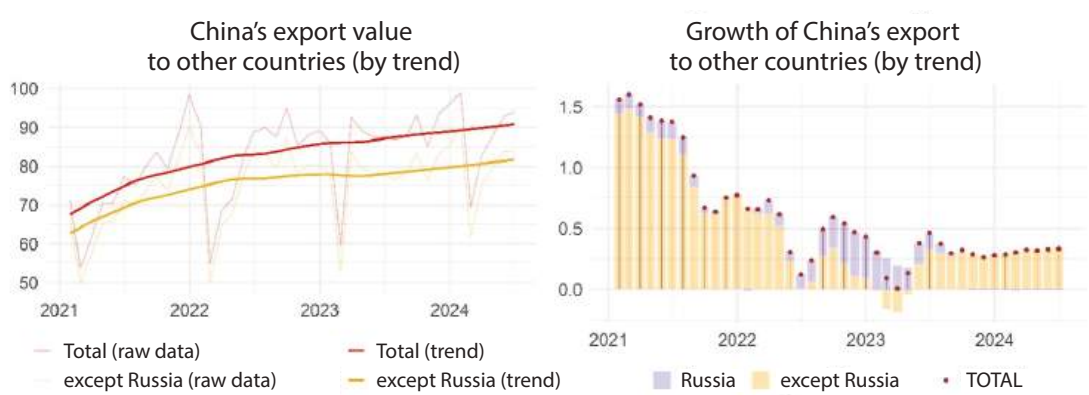
[11] This should be kept in mind when interpreting periodically published negative news about China's exports, such as was the case in March 2024 (see: https://www.reuters.com/markets/asia/chinas-march-exports-imports-shrink-miss-forecasts-by-big-margins-2024-04-12/).

[12] Hereinafter, the sectoral breakdown of trade is based on annual UN Comtrade data at the 2-digit HS Code level. It is beyond the scope of this study to explore deeper sectoral details.

in the world. By 2023, the United States had already significantly reduced its imports from China, particularly in machinery, electronics, plastics, and metal products. The direct trade deficit with China (excluding potential re-exports) was the smallest it had been in recent years, while the aggregate US trade deficit remained at the same elevated levels. Concurrently, the US deficit with ASEAN, the Chip 4, and North America has deepened to the extent that, as of early 2024, it turned out to be only slightly below the US trade deficit with China for each of these groups of countries, while the combined US trade deficit with all these countries substantially exceeded the US trade deficit with China. A notable exception is the trade relationship between the United States and European countries, where a structural shift has occurred, resulting in a slight increase in exports to the EU. This shift can be attributed primarily to the substitution of Russian fuel for other sources.

In the context of the geopolitical structural changes, China has significantly increased its exports to ASEAN. The most significant contribution to this growth was made by Singapore, Malaysia, and Thailand. In terms of products, the most prominent were vehicles, chemical products, plastics, metal products, and petroleum products. Additionally, China sustained a considerable level of shipments to North American countries. In both instances, indirect evidence suggests that these supplies were subsequently re-exported to the United States. Concurrently, there was a discernible reduction in the exports of Chinese goods to Europe (in conjunction with the slow growth of imports), as well as the considerable decline in the imports of goods from the Chip 4 alliance countries to China (as a consequence of their reorientation toward the United States). Consequently, the growth of China's trade with other countries has decelerated following an acceleration between 2020 and 2021. Imports have reached a plateau, while exports are exhibiting moderate growth.

Figure 4. Dynamics of China's exports to other countries, January 2021 – June 2024 (US$ billion)



Source: Author's calculations based on data of the General Administration of Customs of the PRC.

Russia continues to represent a relatively minor market for Chinese goods, apart from automobiles that witnessed more than a fivefold increase in imports from China

over the past two years. Russia assumed a notable role during the latter half of 2022 and the initial six months of 2023. During this period, China's exports to the United States, Europe, and even the ASEAN countries experienced a decline, while exports to the group of other countries except Russia ceased to grow (see Figure 4 on p. 32). Until mid-2023, Russia was one of the few countries demonstrating a consistently rising demand for Chinese goods, driven by the urgent need to substitute products from Western countries.

However, in the second half of 2023 and the first half of 2024, China's export growth to Russia stopped, while exports to other countries, conversely, demonstrated a recovery. This suggests that the spontaneous structural adjustment of the Russian market after the implementation of sanctions has now came to an end. It is anticipated that further trade growth will be contingent upon the development of novel formats of interaction with friendly countries, including within the BRICS framework.

2.2. Trade in services

The limited data on international trade in services by partner country do not allow for the same detailed analysis for services. Therefore, in this part, the dynamics of external trade relations are considered only from the US side (data for China are not presented by partner country). Calculations are based on 2023 WTO data, latest available at the time of analysis.[13]

Overall, an important feature of US foreign trade has been the persistently positive balance of trade in services—as opposed to goods—reflecting the unique role of the US as a provider of intellectual property products, financial and consulting services, and the country's attractiveness as a tourist destination.

2020 marked a turning point in the structure of US trade in services with other countries: the positive balance of trade in services with China and the Chip 4 countries fell sharply, while that with the ASEAN countries continued to rise (see Figure 5 on p. 34). In the years that followed, this process continued actively: by 2022, imports of services from the Chip 4 countries had increased to the point where they were equal to exports.

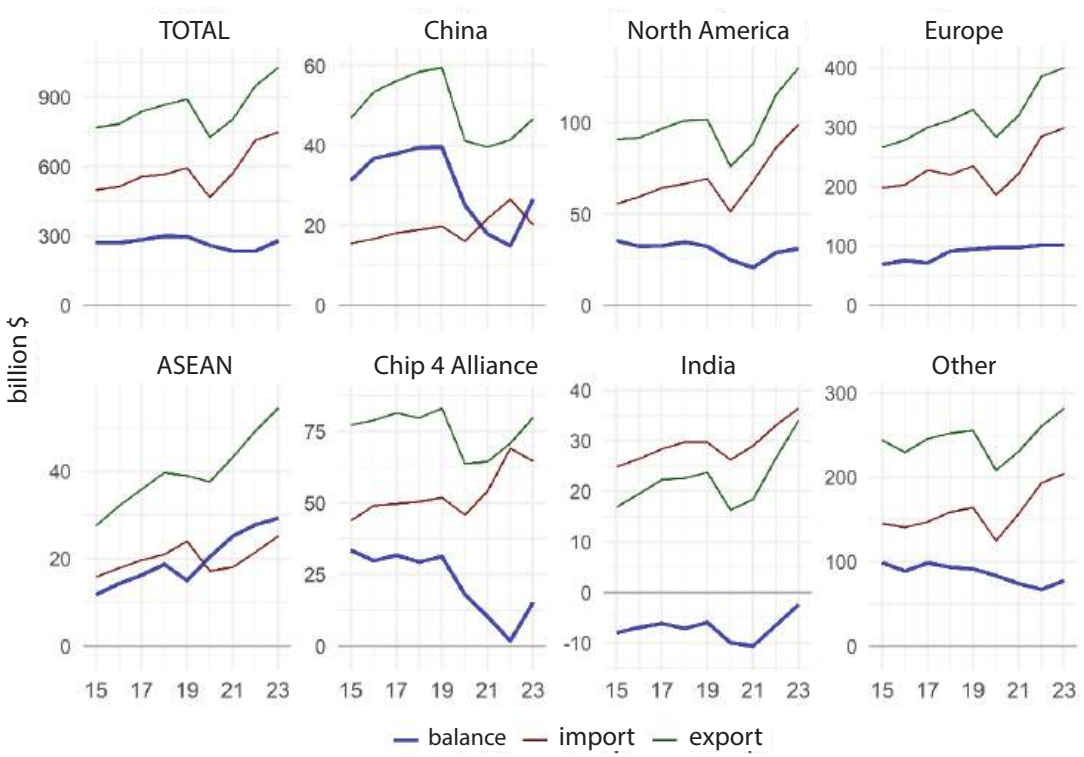
However, the overall picture masks extremely heterogeneous dynamics by type of service (a visualization of the dynamics of US foreign trade by major categories of services is presented in Appendix A on pp. 39–41). The sharp deterioration in the services trade balance in 2020, and its continued decline thereafter, is largely driven by two sectors—transportation services (see Figure A1), the dynamics of which tend to follow those of goods trade, and travel (see Figure A2), which was constrained first by severe coronavirus restrictions and then by an incomplete recovery in demand.

A more balanced view of changes in US trade in services with other countries emerges when these two types of services are excluded from the analysis (see Figure 6 on p. 35). With this focus, the cessation of growth in services exports to China from 2020 is also evident; at the same time, however, the decline in this indicator does not begin until 2022–2023 (while Chinese services imports increase, although they remain small in volume). After 2020, the evolution of US exports to China by type of service diverges: while exports

[13] Trade in services annual dataset, updated July 2024: https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm

of insurance and financial services (see Figure A3) and charges for the use of intellectual property (see Figure A5) decline steadily, exports of telecommunications, computer and information services (see Figure A4) grow rapidly until 2023; China's dependence on the United States remains low for research and development services[14] (see Figure A6).

Figure 5. Dynamics of US foreign trade in services by key groups of partner countries, 2015-2023



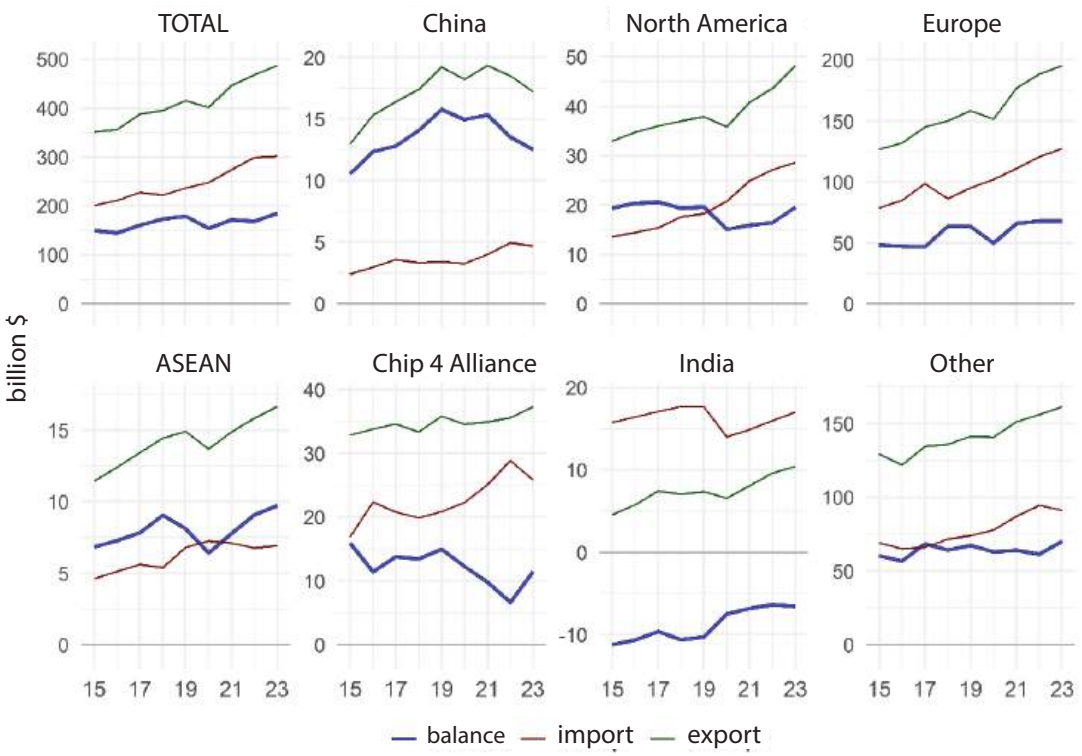
Source: Author's calculations based on WTO data.

Since 2021, the growth of US foreign trade in services with North American countries has accelerated, while that with Europe and a group of other countries has maintained the same pace as in previous years. On the other hand, the dynamics of foreign trade in services with ASEAN countries and India slowed down (and imports from India declined due to the displacement of Indian computer and information services by North American services). The most striking post-COVID structural change was the sharp increase in services imports from the Chip 4 alliance countries, driven mainly by telecommunications, computer and information services, and charges for the use of intellectual property (in the latter case, the growth was not sustained and was not

[14] Research and development services stand for the sales of the results of research and development (R&D) activities, including those formalized by patents; charges for the use of intellectual property stand for the sales of the rights to use the R&D results, as well as intellectual property objects. China's lack of dependence on the US for research and development indicates a self-reliance in scientific work.

observed until 2022). This is probably due to the start of the process of relocation of a number of high-tech industries from developed Asian countries to the US.

Figure 6. Dynamics of US foreign trade in services by key groups of partner countries, 2015-2023 (excluding transport and travel)



Source: Author's calculations based on WTO data.

3. Contours of the outlook for world trade

The analysis of trade statistics shows that China's position in world merchandise trade remains exceptional—its share of world exports starts to rise again after a temporary decline in 2023 and remains almost 2 pp higher in April–May 2024 than before the coronavirus pandemic.

Undoubtedly, China's dynamism will remain the main determinant of changes in world trade in the future. In this respect, it is difficult to agree with the findings of the Boston Consulting Group study [Gilbert et al. 2024] that the main impact on world trade on the horizon up to 2032 will be the industrialization and reintegration of North America (see Table 1 on p. 36). Such projections do not take into account the factor of re-exports from China to the United States: the degree of integration of the United States, Canada and Mexico is clearly overstated in direct trade statistics. If the growth of Chinese exports slows down, the activity of integration processes in North America will also decrease.

Table 1. Five geopolitical drivers of world trade through 2032

Driver	Geopolitical processes	Trade growth, 2032 to 2022, US$ billion	Impact assessment	
			BCG	author
US	Industrial and trade policies strengthen integration in the USMCA	with China -197 with Canada/Mexico +466	1	3
China	Trade barriers with the West deflect trade in other directions	with ASEAN +616 with the West -62	2	1
ASEAN	Beneficial shifts in supply chains, keeping costs low and trade cohesion intact	with China +616 with Japan/Korea +210	3	2
India	Emergence of the country as a major market and supply chain player	with the West +180 with China +124	4	5
Russia	Trade reorientation toward friendly countries after Western sanctions	with China +134 with India +26	5	4

Source: [Gilbert et al. 2024]; last column is the author's expert judgment.

At the same time, it is difficult to disagree with the expectation that ASEAN countries will play a major role in shaping the future of world trade: their active development of cooperation with all the "poles" of the global economy (the US, China, other Asian countries including India) and their unique logistical capabilities make them the second most important force in shaping global trends. Low costs—the factor that is now driving the relocation of production from China—may not be sustainable in the long term,[15] but, as the Chinese experience shows, this does not always lead to a critical slowdown in growth.

The third force is North America: despite its declining share of world GDP, this bloc of countries still has a good chance of bringing back a number of industries, especially high-tech ones, especially if it actively cooperates with the countries of the Chip 4 alliance. Although the process of relocating production facilities may take more than a year, indirect evidence of the seriousness of such intentions is provided by the data on a significant increase in imports of high-tech services from the alliance countries to the United States in 2022.

Russia, despite its relatively small GDP on a global scale, can act as a fourth force: firstly, it will influence international trade in key markets (fuel, metals, fertilizers, food); secondly, as an interested actor, it will drive the process of decentralization of global trade settlements in cooperation with the BRICS countries and the Middle East. It is important to note that interest in BRICS is actively growing—in June, for example, the intention of a number of ASEAN countries to join the association was announced[16]—which in the long term will make BRICS the main platform for consolidating the interests of the countries of the so-called "Global South." And given the important role played by ASEAN in the

[15] Thus, the prices of imported products from Vietnam to the United States are already beginning to rise [Alfaro and Chor 2023].

[16] In June, Russian presidential aide Yuri Ushakov confirmed applications for BRICS membership from Thailand and Malaysia - see: https://www.interfax.ru/russia/967942.

dynamics of world trade in recent years, this circumstance could boost the already active growth of South-South trade.[17]

Finally, India, as the world's most populous country, will undoubtedly also shape the global trade landscape (mainly as a major market), but there are currently doubts about the extent to which it will be able to spearhead global change. It is likely to act more as a participant in broad coalitions (especially with ASEAN countries).

Conclusion

This paper identifies three stages in the dynamics of foreign trade interactions between the world's two largest economies: the active phase of the US—China trade war, the post-COVID recovery of the world economy, and geopolitical turbulence. For each phase, changes in US—China interactions with North America, Europe, ASEAN, the Chip 4 alliance countries (South Korea, Japan, and Taiwan), India, and other countries are described.

A steady decline in US—China trade in goods was observed only in the third stage (as the trade decline during the trade war was temporary and offset by re-export schemes and the subsequent increase in US imports from China), while in services—from the second stage, immediately after the introduction of the coronavirus restrictions (although trade excluding transport and travel services rather stagnated than declined). Both the US and China developed foreign trade cooperation with other suppliers and markets. The US trade deficit with ASEAN, the Chip 4 alliance, and North America deepened; China significantly increased its interaction with ASEAN, India, and other countries.

According to the author's assessment of the importance of countries and regions of the world for the future growth and restructuring of global trade, China, ASEAN, North America, Russia and India are likely to be the most dynamic countries and regions in the long run.

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[17] South-South trade is trade between developing countries. According to the UNCTAD Trade and Development Report [UNCTAD 2023], the share of such trade has increased from 11% in 1995 to 25% in 2020.

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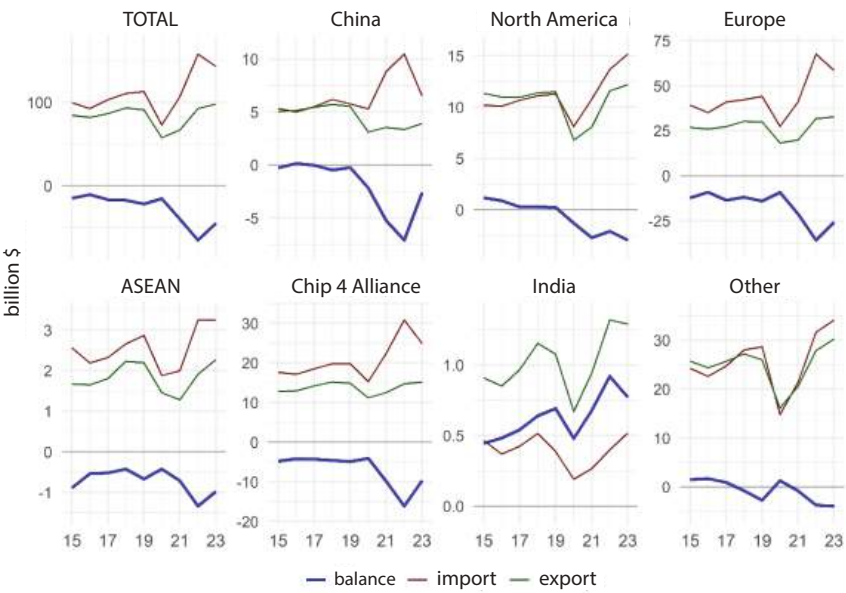
Appendices

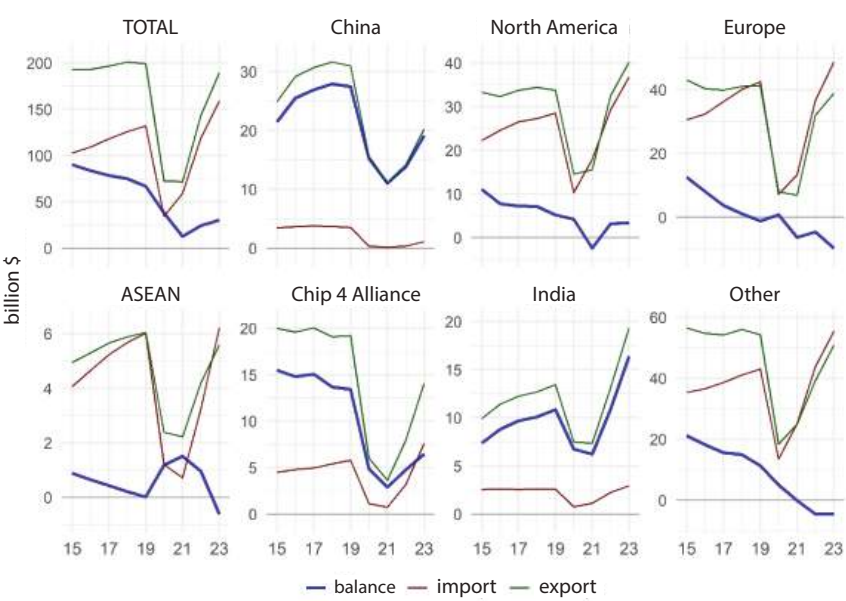
Appendix A

Figure A1. US foreign trade in services by partner country group, 2015–2023: transport



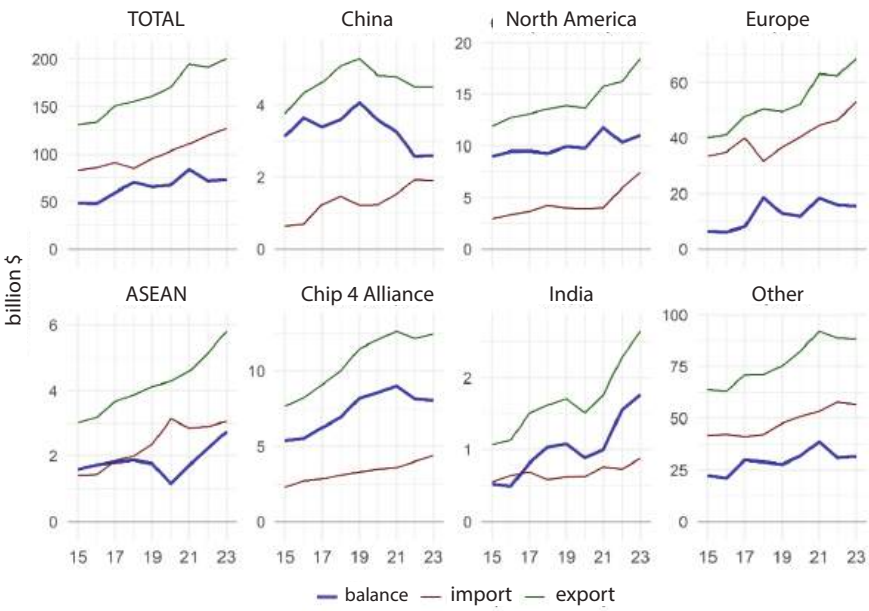
Source: Author's calculations based on WTO data.

Figure A2. US foreign trade in services by partner country group, 2015–2023: travel



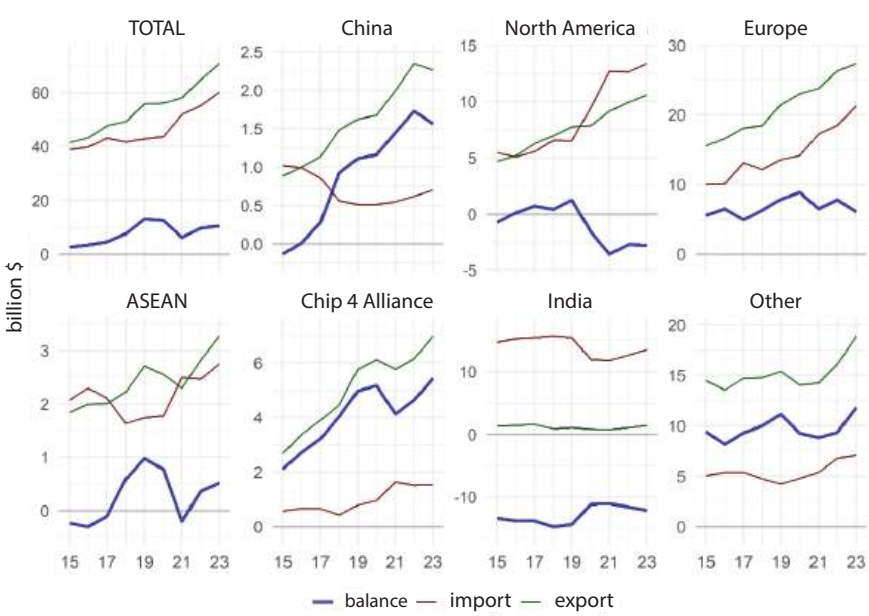
Source: Author's calculations based on WTO data.

Figure A3. US foreign trade in services by partner country group, 2015–2023: financial and insurance services



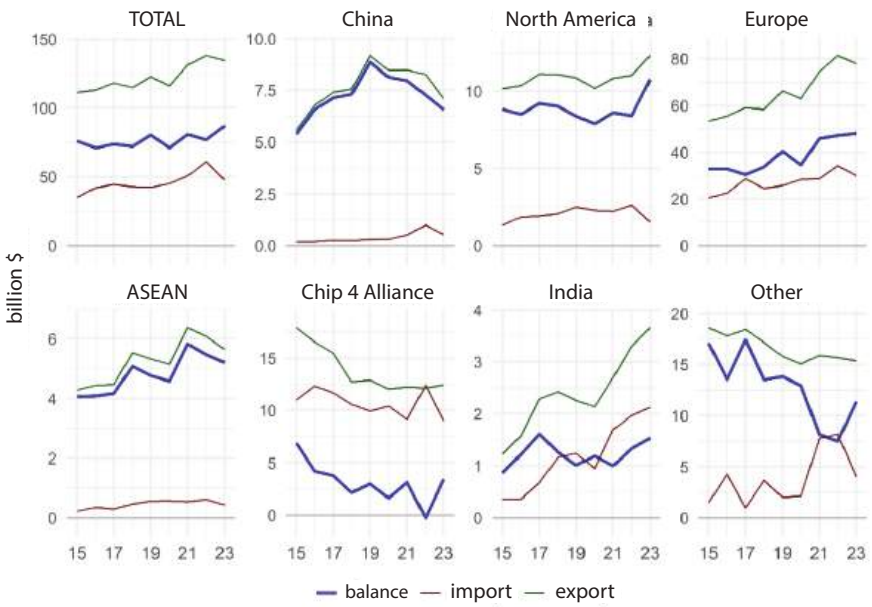
Source: Author's calculations based on WTO data.

Figure A4. US foreign trade in services by partner country group, 2015–2023: telecommunications, computer and information services



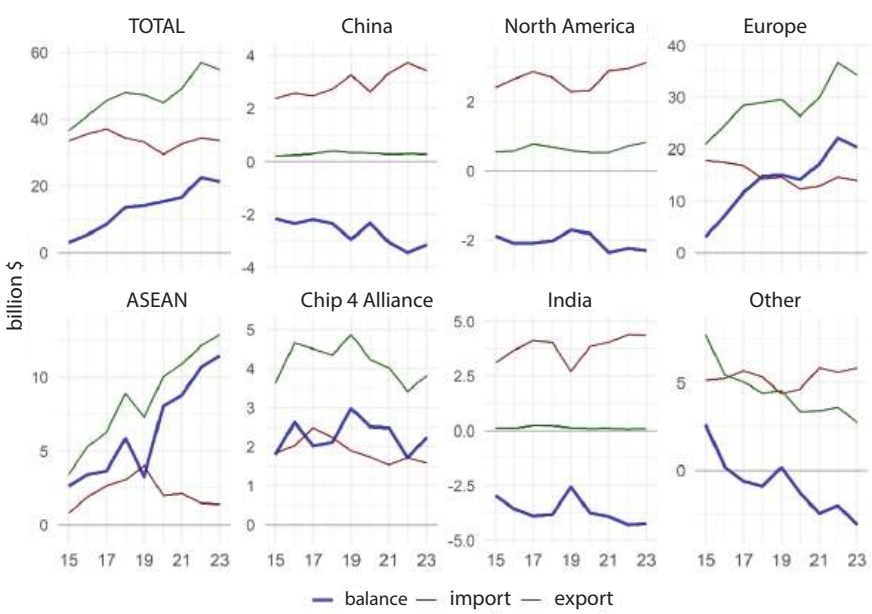
Source: Author's calculations based on WTO data.

Figure A5. US foreign trade in services by partner country group, 2015–2023: charges for the use of intellectual property



Source: Author's calculations based on WTO data.

Figure A6. US foreign trade in services by partner country group, 2015–2023: research and development services



Source: Author's calculations based on WTO data.

EU Sanctions against Russia after February 2022: Major Transformational Trends

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Keywords: enforcement, sanctions, secondary sanctions, weaponized interdependence, EU, Russia.

Abstract

European Union sanctions against Russia have transformed since February 2022. The dramatic increase of Russian persons and sectors of economy now under sanctions indicates serious quantitative changes taking place in the EU's approach to its sanctions policy. However, these shifts also hint at the changing qualitative nature of EU sanctions. Specifically, this includes the EU's revised position on the use of secondary sanctions, in addition to visible shifts taking place in EU sanction enforcement mechanisms. Unfortunately, these changes are poorly reflected in existing academic literature. The purpose of the following article is to fill in the missing gaps pertaining to these changes, as well as address the questions relating to the changes taking place in the EU's approach in implementing sanctions against Russia after February 2022, including its dynamics and features. Supplementing the arguments reached within the article are empirical observations noted in the Russian International Affairs Council's (RIAC) databases on sanctions, as well as an analysis of normative documents tied to the EU's sanctions policy.

Introduction

Over time, a substantial body of academic literature has emerged on EU sanctions. Much of it has examined the legal framework and institutional mechanisms of applying unilateral EU restrictive measures [e.g., de Vries and Hazelzet 2005; Portela 2010; Herlin-Karnell and Gazzini 2011; Giumelli et al. 2021; Arapova and Kudinov 2022]. Other research has focused on the decision-making process concerning the design, approval, and implementation of sanctions [Kranz 2016; Szép 2019; Helwig et al. 2020; Beaucillon 2021; Håkansson 2023; Meissner 2023], as well as on the effectiveness of EU sanctions regimes [Portela 2010; Giumelli 2013; Boogaerts 2020].

The European Union currently implements over fifty country-based or thematic sanction regimes.[1] At times, the specifics of implementing EU country-based sanctions are analyzed using specific databases. However, some of these databases are limited in scope, capturing only specific types of EU restrictive measures [e.g., SIPRI 2022]. Conversely, other databases consider the overall totality of sanction episodes and cases, rather than their specifics [Kreutz, 2015; Giumelli et al., 2021; Timofeev, 2021].

Since 2014, Russia has been the EU's primary focus in terms of implementing sanctions. Historically, the European Union's use of unilateral restrictive measures against Russia has been moderate, incorporating a strategy of "signaling" restrictions, such as individual blocking financial sanctions, limited sectoral restrictions, and selective export control bans. This approach stands in contrast to the US sanctions strategy, characterized by more stringent economic measures [e.g., Timofeev 2021]. The absence of substantial economic pressure from the EU, stemming from their trade and economic interdependence, previously rendered EU sanctions against Russia as politically ineffective [Connolly et al. 2015; Secrieru 2015; Romanova 2016; Fritsz et al. 2017; Doornich and Raspotnik 2020]. Concurrently, this approach led to financial repercussions for European businesses, despite the relatively limited scope of the sanctions [Giumelli 2017; Onderco and Van der Veer 2021].

Following the start of Russia's special military operation (SMO) in Ukraine, the EU's approach to implementing restrictive measures against Russia underwent a substantial transformation [Casier 2023; Meissner and Graziani 2023]. The most notable indicator of this transformation was the significant expansion of the array of restrictive measures employed against Russia. Since February 2022, the EU has utilized nearly the entirety of its accumulated sanctions toolkit, with restrictions being imposed on all economically significant sectors of the Russian Federation [e.g., Gerasimov et al. 2023]. Areas once notable for EU—Russia cooperation—in energy, industry, technology, and humanitarian cooperation—and that previously served as a means of mitigating contradictions, have become increasingly politicized and utilized to inflict substantial economic damage on the Russian Federation. A number of studies have provided preliminary assessments of the effectiveness of EU anti-Russian restrictions, in addition to the negative impacts of EU sanctions [Latipov et al. 2022; Costa and Barbe 2023; Bali 2024; Rosefielde and Bernstam 2024], including in foreign analytical reports [Akhvlediani and De Groen 2022; Kaca

[1] EU Sanctions Map. Last update 04 July 2024. Available at: https://www.sanctionsmap.eu/#/main (accessed 15 July 2024).

2024; Kluge and Portela 2022; Siddharth 2024; Taran 2024], as well as work carried out by Russian researchers [Timofeev 2022; Romanova 2022; Voynikov 2023; Likhacheva 2023; Chizhevskaya 2024].

However, in addition to the increasing volume of EU sanctions, notable qualitative changes in the EU's approach have also become more pronounced. A pivotal aspect of these shifts pertains to the EU's reevaluation of its stance on implementing secondary sanctions. Various research on the matter has noted the emergence of potential mechanisms for the use of extraterritorial sanctions in EU legislation [Kiku and Timofeev 2022; Silingardi 2024]. However, the extent to which these sanctions are applied in the Russian context remains underrepresented both in academic literature and analytical materials.

Recent shifts in the EU's approach to sanctions have emphasized a strategic focus on developing practices and passing legislation aimed at ensuring the efficacy of anti-Russian restrictions. Significant in ensuring sanction compliance is the implementation of coercive measures—whether of an administrative, legal, and criminal nature—against citizens and businesses on the grounds of circumventing sanctions. However, questions remain over the changes in the administrative and criminal prosecution of sanction violations after the start of the special military operation, as well as the peculiarities of implementing such policies domestically in EU member states.

Recognizing these research gaps, the following questions arise: what are the key changes in the EU's approach to implementing sanctions against Russia after 2022? What are the dynamics and peculiarities of these changes? What is the conceptual justification for these changes? With this in mind, the following three hypotheses are suggested: firstly, after the start of the SMO, EU sanctions toward Russia underwent not only quantitative changes, as evidenced by an increase in the volume of restrictions imposed, but also qualitative changes, as demonstrated by the introduction and development of fundamentally new coercive instruments for the EU. While the quantitative use of these instruments remains lower than that of the US, it has surpassed the number of measures employed by other initiators. Secondly, EU sanctions significantly place emphasis on ensuring their efficacy by using legislation to establish mechanisms to monitor sanction compliance. The implementation of these measures by the EU is heterogeneous, yet the dynamics of coercive measures is increasing. Thirdly, the shifts taking place in the EU's approach to its Russia-related sanctions are attributed to a greater transformation occurring in the EU's relationship with Russia.

These hypotheses are tested by analyzing both empirical data—using RIAC's databases on sanctions—as well as EU regulatory documents. The theoretical framework employed in the study conceptualizes sanctions as a means of leveraging economic interdependence as a political instrument [Farrell and Newman 2019]. Since the early 2000s, Russia—EU relations have been characterized as being economic interdependent in various sectors, including in finance, energy, industry, and more. Intensified political contradictions between the two have led to the politicization of this interdependence and its utilization as a means of coercion to attain predetermined political objectives. The fundamental objective of this policy may be to inflict maximum economic harm on Russia, constraining its economic potential and compelling it to alter its political course on the Ukrainian issue. The EU's decision to impose restrictions on energy, diplomatic, finance,

and other sectors—measures it had previously refrained from until 2022—signifies an unconventional approach to its relations with the Russian Federation and a strategic change in its method to achieve political objectives. The extent to which interdependence is utilized as a tool is illuminated through empirical evidence concerning the dynamics of implementing such restrictions. For instance, in addition to the entities targeted, the frequency with which secondary sanctions have been applied offer insight into which domains of mutual cooperation are being used to inflict economic harm. Conversely, the dynamics of implementing coercive measures against violators of the sanctions regime offers insights into the growing role of ensuring anti-Russian restrictive measure effectiveness, as well as the actions being taken by individual EU member states.

The methodological approach of this study consists of several elements. First, a comparative analysis of the EU's restrictive measures against Russia before and after February 2022 is conducted. Then, the key elements of the EU's new approach to its interdependence with Russia and to the implementation of its sanctions policy against Russia are considered. The EU's use of secondary sanctions—before and after 2022—and the frequency of their implementation are also reflected. The development of compliance mechanisms to the sanctions regime against Russia is determined using the examples of administrative and criminal cases tied to sanction violations.

Quantitative changes in EU sanctions: Before and after February 2022

The launch of Russia's special military operation represented a pivotal political development, prompting the European Union to adopt a sanctions policy that places significant emphasis on targeting Russia. This shift is evidenced by a substantial increase in the number of restrictions imposed on Russia, with the EU adopting 14 sanctions packages over the span of two and a half years. These sanctions packages encompassed a wide range of sectors within the Russian economy, including the financial, energy, technological, and military-industrial sectors. The increase in the number of sanctions imposed on Russia is notable; the expansion in restrictive measures, which have been in place since 2014, is evidenced by the emergence of a various shifting trends.

Firstly, from February 2022 to July 2024, approximately 1,500 Russian individuals and around 350 legal entities were subjected to financial blocking sanctions. For example, in the preceding period (2014–2021), financial blocking sanctions were imposed on 203 Russian citizens and 51 companies on similar grounds. New characteristics of such restrictions can also be noted as the EU previously refrained from imposing blocking sanctions on systemically important Russian enterprises. However, in the current context, prominent Russian financial institutions (Sberbank, VTB, Alfa-Bank), military-industrial enterprises (Almaz-Antey, Irkut), technology companies (Rostec, T1), and major metallurgical and mining enterprises (Severstal, Alrosa) are subject to such restrictions.[2]

[2] Council Regulation (EU) No 269/2014 of 17 March 2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0269-20240527 (accessed 24 July 2024).

Secondly, prior to the SMO, financial sectoral sanctions were limited to restrictions related to debt obligations with maturities of longer than 30 days for several major Russian banks,[3] as well as a ban on certain loans for a list of companies in the oil and defense sectors.[4] Since 2022, financial restrictions have significantly expanded, encompassing a prohibition on investing in and purchasing bonds issued by the Russian Government and the Central Bank of the Russian Federation, restrictions on dealing with the assets of the Central Bank of the Russian Federation and its structures, a ban on deposits from Russian persons of more than EUR 100,000, and a restriction on rating Russian companies. The EU's decision to restrict Russian company ratings by EU agencies was driven by the objective of suspending their access to the European financial market, as well as the provision of accounting services and e-wallets to persons from Russia.[5]

Thirdly, the structure of export and import controls against Russia has undergone a fundamental change. From 2014 to 2021, these controls were primarily aimed at creating economic obstacles to the integration of Crimea into Russia, entailing moderate restrictions on dual-use goods and equipment for energy projects.[6] Subsequently from 2022 to 2024, the scope of goods and technologies prohibited to the Russian Federation expanded, encompassing a comprehensive array of dual-use, military, industrial and "luxury" products. This was accompanied by a comprehensive ban on a wide range of financial, technical, legal, consulting, transportation and other services to Russian persons. Furthermore, import controls were extended to ferrous metallurgy products, oil and oil products of Russian origin, Russian gold, and goods "bringing Russia significant income," etc.[7]

The EU's policy on secondary sanctions: Before and after 2022

The utilization of extraterritorial (secondary) sanctions has historically been a distinctive feature within US sanctions. However, these restrictions are not formally defined within the regulatory legal documents of the United States or other initiating countries. However, these restrictions have been extensively mentioned by specialized US agencies and have also been the subject of numerous academic studies [e.g., Meyer 2014; Blockmans 2021; Terry 2022]. Secondary sanctions are currently understood to be targeted financial and trade sanctions against foreign persons for transactions with blocked persons, the circumvention of export controls, etc., that initiating countries consider a threat to

[3] Council Decision 2014/512/CFSP of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1531218093731&uri=CELEX:02014D0512-20171223 (accessed 25 July 2024).

[4] Council Decision 2014/659/CFSP of 8 September 2014 amending Decision 2014/512/CFSP concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014D0659 (accessed 25 July 2024).

[5] Council Regulation (EU) No 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0833-20240224 (accessed 24 July 2024).

[6] Council Decision 2014/512/CFSP of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1531218093731&uri=CELEX:02014D0512-20171223 (accessed 25 July 2024).

[7] Ibid.

national security [e.g., Ruys and Ryngaert 2020]. Until 2022, the United States was the sole initiator of secondary sanctions against third-country nationals and companies. US laws provide a number of mechanisms for their application. One of these is Art. 1 of US Executive Order 14024, which grants relevant agencies the authority to apply blocking sanctions on persons working with several sectors of the Russian economy. Such sectors include technology, energy, mining, the defense industry, and others.[8] Between February 2022 and June 2024, over 500 third-country companies were blocked on these grounds.[9]

In contrast to the United States, the European Union has historically maintained a policy of refraining from the use of secondary sanctions. This approach is partly rooted in the EU's stance that the use of coercive measures outside its own legal jurisdiction is unlawful. However, even prior to the beginning of the SMO, EU companies were periodically subject to secondary US sanctions for engaging with individuals from Iran and other jurisdictions subject to US restrictions. Moreover, the US Department of Treasury actively pursued EU companies under its authority to conduct administrative investigations against foreign companies, even for indirect ties to US jurisdictions. EU companies in the financial sector paid over 90% of the fines for intentional or accidental US sanction circumvention cases [Timofeev 2020].

This US policy contributed to the EU developing measures to reduce the risk of secondary sanctions for their businesses. One such measure was the Blocking Statute, adopted in 1996, which was designed to protect EU companies engaging in international trade in accordance with EU law, but in contravention of third-country sanctions.[10] In 2018, the Statute was renewed following the US withdrawal from the Joint Comprehensive Plan of Action (JCPOA) and the full implementation of previously adopted restrictions on Iran. The renewed Regulation prohibited EU entities from implementing third-country sanctions except as authorized by the European Commission. Some mechanisms were developed to compensate European companies affected by US extraterritorial restrictions.[11]

However, the adoption of the Blocking Statute was a political move rather than a condition for changing the behavior of EU businesses. Having interests in the US market, EU companies chose not to operate in Iran's jurisdiction [Timofeev 2019]. The endorsement of this document at the supranational level signaled the formation of a unified EU stance, characterized by a disapproval of extraterritorial sanctions. In alignment with this stance, the EU refrained from imposing secondary restrictions on

[8] Federal Register, 2021. Executive Order 14024. Blocking Property with Respect to Specified Harmful Foreign Activities of the Government of the Russian Federation. 19 April 2021. Available at: https://www.federalregister.gov/documents/2021/04/19/2021-08098/blocking-property-with-respect-to-specified-harmful-foreign-activities-of-the-government-of-the (accessed 26 July 2024).

[9] Source: RIAC Secondary Sanctions Database.

[10] Council Regulation (EC) No 2271/96 of 22 November 1996 protecting against the effects of the extra-territorial application of legislation adopted by a third country, and actions based thereon or resulting therefrom. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01996R2271-20180807 (accessed 26 July 2024).

[11] Commission Delegated Regulation (EU) 2018/1100 of 6 June 2018 amending the Annex to Council Regulation (EC) No 2271/96 protecting against the effects of extra-territorial application of legislation adopted by a third country, and actions based thereon or resulting therefrom. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R1100 (accessed 26 July 2024).

third-country companies for noncompliance with its own sanctions legislation, including on the grounds of violating sanctions against Russia.

However, a notable shift in the EU's stance regarding the implementation of secondary sanctions became evident following the beginning of the SMO. During the brief period spanning from October 2022 to February 2024, the European Union unveiled a series of legal and regulatory frameworks that endowed the EU Council with the authority to impose sanctions on individuals and entities for infringing on its own sanctions regime. One such mechanism is the expansion of criteria for imposing blocking sanctions, now grounds including "violations of Ukraine's sovereignty and territorial integrity" (Art. 3 of Regulation 269/2014). Notably, a new criterion, "facilitating the circumvention of previously imposed sanctions," has been added to this article. A distinctive aspect of this mechanism is its continued and ongoing application to Russian individuals. As of July 2024, five companies engaged in the production and supply of high-tech goods, along with three of their managers, have been subject to this sanction.[12]

An alternative mechanism for the implementation of EU secondary restrictions is provided by Art. 5a of EU Council Decision 2014/512. This mechanism pertains to secondary trade sanctions, which entail a prohibition on the exportation of specific military and dual-use goods and industrial products to entities involved in the supply of such goods to Russia. The objective of this prohibition is to impede the flow of goods that are deemed to "contribute to the strengthening of the military and industrial capabilities of the Russian Federation."[13] However, there have been no documented instances of the implementation of this mechanism to date.

An additional expansion of secondary trade sanctions has been documented, involving the inclusion of several companies from third countries in Annex IV of Regulation 833/2014. These companies are subject to heightened restrictions on dual-use goods. By July 2024, these restrictions will encompass companies from Iran (8), the People's Republic of China (7), Uzbekistan (3), the United Arab Emirates (2), Turkey (1), Thailand (1), Kazakhstan (1), Serbia (1), Sri Lanka (1), India (1), Singapore (1), and Syria (1).[14] Notably, all designated enterprises are engaged in the high-tech and military-industrial complex sectors.

Previously developed mechanisms have also been used to impose secondary restrictions on third country businesses. Regulation 269/2014 provides the possibility of using blocking sanctions on the grounds of Art. 1: "Engaging in activities that undermine or threaten the territorial integrity and sovereignty of Ukraine." Since 2014, this provision has been used to exclusively block Russian persons. Also following the start of the special

[12] Council Regulation (EU) No 269/2014 of 17 March 2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0269-20221006 (accessed 26 July 2024).

[13] Council Regulation (EU) No 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0833-20231001 (accessed 29 July 2024).

[14] Council Regulation (EU) 2024/745 of 23 February 2024 amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine // https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0833-20240625 (accessed 27 July 2024).

military operation, the sanctions list was augmented with several organizations operating extraterritorially. Consequently, in February and June 2023, several Iranian companies fell subject to restrictions for supplying Russia with drones and equipment for their development. Concurrently, the International Settlement Bank (ISB), registered in South Ossetia, faced sanctions for establishing branches in the Kherson and Zaporizhzhya regions, subsequently offering financial services in these areas.[15]

The ambiguity surrounding the definition of secondary sanctions is evident in both EU legal documents and within research. Notably, the European Union does not categorize the sanctions imposed under these mechanisms as secondary sanctions, despite their de facto status. The absence of a clear definition of secondary sanctions and their application parameters hinders the assessment of the number of cases in which these restrictions are applied. Formal criteria indicate that the number of affected companies is in the dozens. The majority of these sanctions target enterprises in the defense and high-tech industries. In contrast, the US imposes secondary restrictions on companies across a broader spectrum. These include suppliers of microelectronics, military and dual-use goods, industrial products, exporters of various types of services, and persons carrying out financial transactions for blocked citizens and companies.[16]

Overall, while the European Union's practice with secondary sanctions is currently limited, it is gradually expanding. The frequency of their application, in addition to their sectoral coverage, currently seem to be lower than the US but higher than other state-initiators. The EU's relatively limited use of secondary sanctions, as evidenced by the small number of cases in which restrictions have been applied, suggests a "deterrent" rather than a coercive nature of these measures. The EU's use of such restrictions can be interpreted as a political signal to third-country companies regarding the potential risks associated with engaging in business activities with EU entities. Conversely, the application of these restrictions indicates a shift in the EU's stance regarding the use of extraterritorial restrictive measures.

Changing the EU approach in ensuring sanction effectiveness

In contrast to the application of secondary sanctions, administrative and criminal prosecution against violations has been implemented since 2014 in the European Union. Art. 8 of EU Council Regulation 833/2014 establishes the general provisions of such a policy, stipulating that Member States must develop liability measures for sanctions violations and the rules concerning the confiscation of assets are rooted in these violations.[17] Given that the content of these measures fall within the jurisdiction

[15] Council Implementing Regulation (EU) 2023/429 of 25 February 2023 implementing Regulation (EU) No 269/2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.LI.2023.059.01.0278.01.ENG&toc=OJ%3AL%3A2023%3A059I%3ATOC (accessed 29 July 2024).

[16] RIAC Secondary Sanctions Database.

[17] Council Regulation (EU) No 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine // https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R0833-20230427 (accessed 30 July 2024).

of the member states, EU legislation envisaged the possibility that their implementation might differ from country to country. Data on EU sanctions violations through 2022 and related investigations in this area reflect these patterns.

From 2014 through 2021, RIAC's Sanctions Database records three cases of investigations concerning EU export control violations against Russia. Each of these investigations involved the shipment of manufactured goods and construction materials to Russia, which were prohibited under EU Council Decision 2014/512[18] and Regulation 692/2014[19]. Two of these investigations were initiated in Germany and concerned supplies of metalworking machine tools and equipment for the construction of the Crimean Bridge.[20] The most recent investigation took place in the Netherlands and was for similar offenses.[21] The penalties for the violations differed: in Germany, in addition to fines, individuals were imprisoned, while Dutch citizens were punished with community service and penalties were imposed only on legal entities. Investigations by relevant authorities in other EU member states are not listed in the RIAC's Sanctions Database, although some liability measures for violations of EU sanctions had been developed in Belgium, Italy, Lithuania, and a number of other member states by this time.

This indicates that the measures of responsibility for sanction violations, as well as the activity of law enforcement agencies, exhibit significant heterogeneity. Approaches in Russian-related sanction enforcement measures have undergone substantial changes since the start of the SMO. A notable indicator of this shift is the substantial increase in the number of administrative and criminal prosecutions relating to sanction violations. RIAC's Sanctions Database documents over fifty criminal cases initiated after February 2022. However, the RIAC's Sanctions Database exclusively contains official information on said investigations, suggesting that the actual figure is likely to be considerably higher.

Secondly, there has been a substantial geographical expansion in the scope of such investigations, with German and Dutch authorities leading the way in initiating criminal cases. Concurrently, analogous investigations are underway in other jurisdictions as well. Bulgaria (concerning the provision of dual-use and military goods to the Russian Federation[22]), Denmark (e.g., 12 cases initiated against domestic companies for violating

[18] Council Decision 2014/512/CFSP of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine // https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014D0512 (accessed 30 July 2024).

[19] Council Regulation (EU) No 692/2014 of 23 June 2014 concerning restrictions on the import into the Union of goods originating in Crimea or Sevastopol, in response to the illegal annexation of Crimea and Sevastopol // https://eur-lex.europa.eu/eli/reg/2014/692/oj (accessed 30 July 2024).

[20] Strafbefehl gegen Unternehmen. *Taggeschau*, 2023, March 15. Available at: https://www.tagesschau.de/investigativ/swr/eu-sanktionen-krim-unternehmen-kiel-strafgeld-101.html (accessed 30 July 2024).

[21] Straffen voor Nederlandse bedrijven en personen vanwege betrokkenheid bij bouw Krimbrug. *Openbaar Ministerie*, 2023, Oct. 13. Available at: https://www.om.nl/actueel/nieuws/2023/10/13/straffen-voor-nederlandse-bedrijven-en-personen-vanwege-betrokkenheid-bij-bouw-krimbrug (accessed 30 July 2024).

[22] Bulgaria arrests 12 people for violating EU sanctions on exports to Russia. *AP News*, 2023, Oct. 3. Available at: https://apnews.com/article/bulgaria-russia-ukraine-sanctions-illegal-export-c22833aa43a8c44326864541a1d407c5 (accessed 31 July 2024).

sanctions against Russia and Belarus[23]), Estonia (e.g., cases of illegal shipments of drones at the Estonian-Russian border[24]), Finland (e.g., charges of supplying electronics to Russia to circumvent sanctions[25]), Sweden (charges of illegal export of equipment through a Finnish electrical firm[26]), Luxembourg (e.g., a case of supplying satellite photos to Russia[27]), France (e.g., case of supplying dual-use technologies to Russia and China[28]), Poland (e.g., allegations of illegal supply of UAV parts to Iran for their subsequent re-export to the Russian Federation[29]), Switzerland (e.g., allegations of exporting raw materials to the Russian Federation through the UAE and other states[30]), and the Czech Republic (case of supplying "luxury" cars to Russia[31]).

Thirdly, the activity of national EU law enforcement agencies is supported by increased cooperation with US specialized agencies. In several cases, the detention of suspected sanctions violators occurs at the request of US authorities. Thus, between October 2022 and July 2024, there have been at least five arrests in Latvia, Estonia, and Greece. In one of these cases, an accused individual was extradited to the United States for further judicial proceedings.[32] The US approach to administrative and criminal prosecutions significantly exceed the European Union's, both in terms of quantitative metrics and the availability of relevant institutional and legal mechanisms. Consequently, cooperation with the United States may contribute to the development of the European

23 In Denmark, 12 cases of violation of anti-Russian sanctions have been initiated. *RBC*, 2022, Oct. 26. Available at: https://www.rbc.ru/politics/26/10/2022/63595c989a7947493b92da97 (accessed 31 July 2024) (in Russian).

24 Estonia detains entrepreneurs suspected of violating sanctions on Russia. *TVP World*, 2023, Sept. 14. Available at: https://tvpworld.com/72711094/estonia-detains-entrepreneurs-suspected-of-violating-sanctions-on-russia (accessed 31 July 2024).

25 Helsinki company suspected of violating anti-Russian sanctions. *YLE*, 2023, Sept. 1. Available at: https://yle.fi/a/74-20048113 (accessed 31 July 2024) (in Russian).

26 A man accused of espionage in Sweden organized the supply of sub-sanctioned goods to Russia through Finnish firms. *YLE*, 2023, Aug. 31. Access mode: https://yle.fi/a/74-20048009 (accessed 30 July 2024) (in Russian).

27 Space company investigated over alleged Russian ties. *Euractiv*, 2023, March 15. Available at: https://www.euractiv.com/section/politics/short_news/space-company-investigated-over-alleged-russian-ties/ (accessed 30 July 2024).

28 France is investigating suspected smuggling to China and Russia of advanced chip technology. *AP News*, 2023, July 27. Available at: https://apnews.com/article/france-china-russia-chip-technology-smuggling-66a8a4edcaf7137e109a16d6d300cd94 (accessed 30 July 2024).

29 Polish state firm investigated over parts used in Iranian drones. *Reuters*, 2024, July 18. Available at: https://www.reuters.com/world/europe/polish-state-firm-investigated-over-parts-used-iranian-drones-radio-zet-reports-2024-07-18/ (accessed 30 July 2024).

30 Swiss prosecutors reportedly probing Russia sanctions breaches. *SWI swissinfo*, 2024, Feb. 13. Available at: https://www.swissinfo.ch/eng/multinational-companies/swiss-prosecutors-reportedly-probing-russia-sanctions-breaches/72527163 (accessed 30 July 2024).

31 The Czech Republic for the first time convicted a local resident for violating anti-Russian sanctions. *Radio Prague International*, 2024, July 13. Available at: https://ruski.radio.cz/v-chehii-vpervye-osudili-mestnogo-zhitelya-za-narushenie-antirossiyskih-sankciy-8822704 (accessed 30 July 2024) (in Russian).

32 US Department of Justice. Suspected Russian Intelligence Operative Extradited from Estonia to Face Charges Related to Providing American-Made Electronics and Ammunition to Russian Military. 2023. July 14. Available at: https://www.justice.gov/usao-edny/pr/suspected-russian-intelligence-operative-extradited-estonia-face-charges-related (accessed 31 July 2024).

Union's enforcement measure practices. Furthermore, sanction initiators are actively cooperating to tighten and harmonize export controls. For instance, in September 2023, the EU, in collaboration with US and UK regulatory bodies, developed the Common High Priority List (CHPL) in their sanctions against Russia. These items include electronic integrated circuits, processors, radio navigation equipment, semiconductors, and equipment for their development. It is highly probable that enforcement measures will be initiated based on the exports of these products.

Fourthly, following start of the special military operation, the European Parliament and the Council of the EU initiated efforts to align legislation across the EU, with the objective to ensure the consistent and coordinated enforcement of sanction violations. Since February 2022, numerous draft directives have been developed to establish uniform criteria for EU sanction breaches and the associated liability measures. One of them was approved in April 2024. This directive delineates the parameters for establishing administrative and criminal liability for offenses, defines uniform penalties for individuals and legal entities—including fixed fines and prison terms—and establishes common aggravating and mitigating circumstances in determining liability.[33] Given that the provisions enshrined in the Directive must be transposed into national law within a year, the results of this work can only be assessed further. So far, there is an ongoing imbalance in EU member state approaches to the enforcement implementation process. This imbalance has led to the effective control of transactions and operations prohibited under EU law in some member states, while these same transactions appear to persist in other EU countries. Concurrently, the EU's strategic shift in sanction enforcement coordination—involving also US cooperation and the systematic enhancement and expansion of enforcement practices—signifies a notable evolution in the EU's approach to ensuring the efficacy of its sanctions regime against the Russian Federation.

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Since February 2022, the European Union's approach to implementing sanctions against Russia has undergone a substantial transformation. These fundamental shifts in the EU's approach to its sanctions policy have reflected broader changes in the EU's economic interdependence with Russia. The economic interdependence that has evolved since the early 2000s once ensured that political contradictions between the parties, including on the Ukrainian issue, would not fundamentally affect the scope of their economic cooperation. Consequently, from 2014 to 2021, sanctions imposed by the European Union primarily served as political signals, rather than a means to inflict substantial harm on pivotal sectors of the Russian economy.

However, the further aggravation of political contradictions between Russia and the EU contributed to interdependence between the two to become politicized. The start of Russia's special military operation in Ukraine signified the culmination of these contradictions, leading to a transition away from a cooperative and collaborative

[33] Directive (EU) 2024/1226 of the European Parliament and of the Council of 24 April 2024 on the definition of criminal offences and penalties for the violation of Union restrictive measures and amending Directive (EU) 2018/1673. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401226 (accessed 29 July 2024).

interdependence to a weaponized state of rivalry and competition. Sanctions have emerged as a pivotal instrument of such a policy.

Quantitatively, this became evident in the substantial surge in the imposition of financial blocking restrictions, and a discernible tightening of export and import controls. Qualitatively, evidence is found in the broadening of the sanctions instruments employed. Notable shifts have occurred on the issue of ensuring sanction effectiveness, particularly on the sanctions regime against Russia. Initially, the European Union rejected the use of secondary sanctions and criticized their application by the United States. However, it subsequently developed its own legal mechanisms for imposing such restrictions and began to actively implement them against Russian and foreign persons. Secondly, there has been a notable escalation in the frequency, geography, and scale of administrative and criminal prosecutions of Russia-related sanction violations. Prior to the beginning of the special military operation, these cases were characterized by their extreme moderation and rather uncoordinated actions of EU member states.

International relations theories may offer a framework for interpreting these shifts: a preliminary interpretation could involve a transition from the neoliberal interpretation of interdependence, which characterized EU-Russia relations in the 2000s, to a more neorealist approach. In the eyes of neorealism, interdependence is analyzed in terms of rivalry and competition, rather than cooperation and mutual benefit. The shift from the neoliberal paradigm to this neorealist interpretation is predicated on the inapplicability of the neoliberal model to adequately describe the post-2022 relationship between Russia and the EU, a relationship that is now largely determined by one factor: confrontation.

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Analysis of ESG Ratings Methodologies in the Russian Market: Transparency and Convergence Issues

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Abstract

The reliability of ESG ratings as a tool for assessing the sustainability performance of organizations has been extensively studied and often questioned by researchers and international organizations. In response to the criticism, national regulations have emerged to address the problems identified in the ratings and their causes. Russia is no exception, where the market for ESG ratings has grown significantly in the last two years.

The aim of this article is to assess the level of transparency of ESG ratings methodologies in the Russian market and to determine whether there is a convergence of methodologies.

To achieve this goal, based on the publications of foreign and Russian authors, international organizations and the Bank of Russia, the author analyzed the methodologies for assigning leading Russian ratings, developed and applied a methodology for assessing the level of transparency of such methodologies on the basis of ten parameters.

The article provides a brief overview of the main problems inherent in ESG ratings and addressed in the literature, as well as the way they are addressed by regulatory norms in a number of foreign countries and in the Russian Federation. In order to verify the implementation of the Bank of Russia's recommendations in the updated ESG rating methodologies, the approaches of four agencies—Analytical Credit Rating

Agency, Expert RA, RAEX, and National Rating Agency—were analyzed from the point of view of transparency and convergence; the methodologies of the agencies were assigned transparency scores.

Conclusions were drawn on a certain convergence of the agencies' approaches to ESG assessment, mainly in terms of rating scales and weighting of ESG components, as well as on the generally high level of transparency of Russian ESG rating methodologies.

Introduction

In light of the decision by the majority of foreign agencies to cease assigning ESG ratings to Russian companies, there has been a notable surge in the number of requests from Russian entities seeking domestic assessments of their sustainability performance. In the country in question, a market has emerged wherein ESG assessment is reflected in a rating, ranking, or index. The former product is distinguished by the fact that a company or other entity applies to an agency for a rating and can provide internal documents in addition to the publicly accessible sources utilized by agencies. Completing a questionnaire and participating in an interview has become practice for an entity rated. In the current context, the primary motivation for pursuing a rating is to obtain an impartial external evaluation of performance, namely to assess the quality and maturity of sustainability practices [National Rating Agency and Kirillova 2022]. The second category of products comprises rankings and indices that rank and group organizations selected by agencies based on an assessment of publicly available information. In certain instances, however, questionnaires are also employed in the formation of such assessment instruments.

In light of the growing number and scope of Russian ESG ratings, it is crucial to gain insight into the current methodological approaches employed by Russian agencies in the compilation of these ratings, particularly in the context of the introduction of "soft" market regulation in the country. The objective of this study is to analyze these methodologies and assess their level of transparency.

The first section presents a theoretical and practical overview of ESG ratings, while the second outlines the recommendations of the Bank of Russia aimed at ensuring harmonization of ESG ratings. The third section analyzes the methodologies of existing Russian ratings and assesses their transparency. The final section presents the key findings and conclusions of the analysis.

The article employs a number of terms related to methodologies that require clarification. In particular,

- *ESG component (or block)* – one of the three components of the ESG rating: environmental, social responsibility or corporate governance; it is at the second level of detail after the composite rating;
- *Element* (third level of detail) – a thematic aspect of a component, representing a group of indicators (e.g., climate, waste management, occupational health and safety, risk management, governance bodies);

- *Indicator* (or metric) – a quantitative or qualitative indicator of the most detailed level (e.g., greenhouse gas emissions of a particular coverage, employee turnover, lost time injury frequency rate, proportion of independent members on the board of directors); all calculations are based on the indicator score.

1. Theoretical and practical foundations of ESG rating

The objective of an ESG rating is to provide market participants with information regarding the potential risks to which an organization may be exposed and which may impact its economic and financial position. Additionally, ESG ratings offer insight into the quality of corporate programs in the domains of environmental protection, social responsibility, and corporate governance. The predominant approach to assigning sustainability ratings is to assess the degree of exposure to ESG risks and the quality of their management. However, there is no clear consensus in the academic literature or in practice as to whether ESG rating models predict investment risk or investment returns [Larcker et al. 2022]. Additionally, some agencies seek to quantify the environmental and social impact, the degree of transparency in information disclosure, and the level of commitment to the ESG agenda.

A key issue inherent to ESG ratings is the phenomenon of divergence, whereby the ratings assigned to the same company may differ significantly. The phenomenon of divergence in ESG ratings has been the subject of extensive study in the international literature and has been addressed in publications by Russian authors. A number of reasons for divergence have been identified in the literature. Firstly, the divergence is attributed to the utilization of differing data sources, including solely public data, questionnaires completed by organizations, and supplementary information obtained privately from the rated individuals [Halper et al. (2022); Larcker et al. (2022)]. Secondly, a variety of methodological discrepancies exist. These include the use of different groups of items and different indicators for the same elements, the application of different weights to indicators, elements, and each of the three ESG components, and the use of differing rating scales [Berg et al. 2022; Halper et al. 2022; Larcker et al. 2022; Fukami et al. 2022]. Methodological aspects can also include the manner in which analysts determine how to handle missing data [Larcker et al. 2022]. Thirdly, researchers have identified a tendency for higher ratings to be assigned to larger companies, which can be attributed to the greater availability of resources for the preparation and disclosure of information. Additionally, different ratings are observed across geographical regions [Halper et al. 2022; Larcker et al. 2022]. For instance, European companies are rated more highly than their US counterparts, while organizations in developing and transition countries are rated less favorably than those in developed countries. This may be attributed to disparate levels of regulatory oversight pertaining to the sustainable development agenda.

The consequence of the divergence problem is that fund managers use unreliable information when making investment decisions and informing investors, taking into account multiple ratings at the same time, which entails the cost of studying each rating agency's approach to rating companies, as well as the introduction of their own ESG rating models by large investment companies and banks.

Some authors see the solution to the divergence problem in the development of regulatory standards for the publication of high-quality, verifiable non-financial reporting [Levashenko et al. 2023]. However, a number of researchers [Larcker et al. 2022; Christensen et al. 2022] point out that increasing the level of disclosure of ESG information does not lead to a reduction in rating divergence, as it is not the availability (and volume) of information that matters, but how it is interpreted. That is, the more information, the wider the field for divergent interpretations.

Other suggestions in the literature include the approach of rating each component (environment, social responsibility, and corporate governance) separately, as investors and asset managers of funds may prioritize certain ESG areas [Larcker et al. 2022] (e.g., for some aspects of the climate agenda are of greater weight and importance).

Other shortcomings of the ESG rating market identified in academic articles and regulatory publications in the period 2020–2023 are the conflict of interest associated with the simultaneous provision of rating and advisory services by agencies, and the problem of user perception of the outcome of the rating (when the impact of environmental, social and governance factors on the performance and sustainability of organizations is actually assessed, but it may seem that there is an assessment of the impact of the rated entity on the environment and society) [Halper et al. 2022; Larcker et al. 2022; Fukami et al. 2022].

The problems identified and their solutions are reflected in the International Organization of Securities Commissions (IOSCO) 2021 report [IOSCO 2021], whose activities have become the driving force behind the development of national regulations of ESG ratings markets. Many foreign regulatory initiatives focus on increasing transparency, solving the problem of conflicts of interest and improving internal control systems in agencies, and do not contribute to the convergence of ESG ratings [Khachatryan 2022]. This approach is in line with the recommendations of IOSCO and the Organization for Economic Co-operation and Development, whose publication emphasized the importance of ensuring the transparency of the rating process, methodologies and data sources used for institutional investors [Fukami et al. 2022]. However, as some researchers have noted [Larcker et al. 2022], transparency of approaches alone will not promote convergence; consensus on the methodologies themselves is needed.

Similar to some countries, the Central Bank of the Russian Federation has chosen the path of "soft" regulation, publishing recommendations on methodology development and ESG ratings in 2023 [Central Bank 2023]. As illustrated in the following section, the Bank of Russia has put forth a series of measures aimed at addressing a more expansive array of concerns, including the issue of divergence.

2. Recommendations of the Bank of Russia on approaches to ESG ratings

The document of the Bank of Russia states that the purpose of the developed recommendations is to harmonize ESG ratings. This concept includes ensuring visibility, transparency and comparability of sustainable development ratings [Central Bank 2023]. The Central Bank points to the need to harmonize the definition of ratings and the rating scale (Table 1 on p. 61 reflects the scale proposed by the Bank), as well as the use of a

minimum set of elements. The regulator's focus on these three issues appears to be a step toward addressing the problem of divergence in ESG ratings.

Table 1. ESG rating scale recommended by the Bank of Russia

Aggregate level	Level / Detailed category
ESG-A – high level	ESG-AAA
	ESG-AA
	ESG-A
ESG-B – medium level	ESG-BBB
	ESG-BB
	ESG-B
ESG-C – low level	ESG-C

Source: [Bank of Russia 2023].

One of the most important components of the harmonization objective is to increase the transparency of ESG ratings issued in the Russian market, for which the Bank of Russia recommends that agencies disclose the following aspects: subject matter (explanation of what the rating expresses), sources of information used, procedures for data collection, processing and weighting; calculation values and basic calculation methodology, significant adjustments, individual ratings by component and the procedure for combining the three components into a composite rating, as well as the values of the elements by component. In addition to the recommendations on disclosure of the above, the Bank of Russia proposes a number of procedures—in particular, regular (annual) review of methodologies and updating of the rating of each entity, regular (quarterly) monitoring of individuals, and assigning ratings on a comparative basis (by means of intra-group comparison of individuals).

The regulator also proposes the introduction of a number of measures to address conflicts of interest (including the separation of ESG rating staff from sales staff), to address the qualifications of analysts conducting the assessment and to ensure communication with the rated entity (including the introduction of a feedback process that is highly relevant to the companies whose performance is being assessed).

In connection with the updating of sustainability rating methodologies by leading agencies following the publication of the Bank of Russia's recommendations, it is interesting to analyze the current approaches to rating, particularly in terms of the transparency of rating methodologies and the prospects for their convergence.

3. Analysis of ESG rating methodologies

3.1. Methodologies of leading Russian ESG ratings on request

This section reviews the methodologies of the agencies selected by the number of ESG ratings assigned in the on-demand format as of early June 2024. The main focus is on key issues related to unification and transparency of methodologies.

ACRA

The Analytical Credit Rating Agency (ACRA) is a credit rating agency that has been accredited by the Bank of Russia. Additionally, the agency assigns ratings in the domain of environmental, social and governance (ESG) criteria. Currently, twenty organizations have been assigned this type of rating. The assessment methodology and relevant annexes for individual entities are published on the ACRA website, thereby facilitating the incorporation of industry-specific considerations. In particular, thematic supplements have been developed for non-financial companies, financial organizations, sub-sovereign entities (constituent entities of the Federation and municipalities), and leasing and insurance companies. The rating list, accessible via the website, includes several mutual funds that underwent the rating procedure in 2023.

In the underlying methodological document, ACRA states that it assesses "organizations' performance in the field of environmental and social responsibility, corporate or public governance" [ACRA 2024]. The multicomponent nature of the assessment subject is revealed through three distinct stages, which are outlined in each of the three ESG blocks. In order to assign quantitative scores to non-financial companies, it is first necessary to analyze the indicators which characterize the activities of the rated entities in the blocks of environment, social responsibility and governance, including impact aspects. This stage is accorded a weight of 40%.

Secondly, the assessment evaluates the actions undertaken by the entities to mitigate and resist the environmental, social and corporate governance risks inherent to their operations. This stage accounts for 30% of the total weight. In regard to ESG risks, ACRA's approach is as transparent as possible, with lists of social and environmental risk factors presented for twelve industries, as well as a universal list of risks related to the governance block. The methodological applications for non-financial organizations and financial institutions can be characterized as also being of an informational and educational nature. In addition to providing a list of risk factors for companies by industry, the descriptions of possible negative consequences allow rating objects to either form (or increase) the level of understanding of the relevance and significance of ESG risks.

Thirdly, ACRA assesses the compliance of the rated entity with the best practices presented by the agency for each of the ESG blocks and for each type of entity in the respective thematic annexes. Notable examples of best practices among non-financial companies in the domain of environmental responsibility include the calculation and verification of product carbon footprints, the external verification of greenhouse gas emissions data, the implementation of biodiversity conservation programs with defined quantitative targets, and the conduct of scenario analysis to evaluate the impact of climate change on organizational operations. Among the less prevalent ESG indicators in the social domain is collaboration with higher education institutions to promote human resource sustainability. In addition to the aforementioned practices, supporting key national development goals and government programs is also common practice. This may include, for example, parental support and employee housing programs. The latter are in place at major Russian industrial holdings. The practices presented in the corporate governance block have long been well known to large non-financial companies that are guided by Russian regulations (primarily the Corporate

Governance Code issued by the Bank of Russia in 2014) and are familiar with foreign ESG ratings.

The difference between the stages of assessing financial institutions is that the first stage assesses the risks of the organization's portfolio; the weights of the stages are also different (see Table 2 on p. 63).

In the case of sub-sovereign entities, there are two stages of the assessment—quantitative analysis and qualitative consideration of factors affecting the environment, society and governance.

Table 2. Weights of stages of assigning grades to non-financial companies and financial institutions for each block of ACRA ESG rating

No	Stage for non-financial companies	Weight	Stage for financial institutions	Weight
1	Performance evaluation	40%	Risk assessment / portfolio relevance	40%
2	Assessment of actions to minimize risks	30%	Own risk assessment	20%
3	Level of compliance with best practices	30%	Level of compliance with best practices	40%

Source: [ACRA 2024].

The ACRA rating scale comprises seven categories and 17 levels, with each level being assigned based on the numerical score falling within a specific range. The letter scale of the non-financial rating is reflective of the recommendations set forth in the model methodology, with the exception of the categorization of the ESG-B category, which is characterized as a low result rather than an average result, as proposed by the regulator.

The relative weight of each of the three blocks in the assessment of non-financial companies and financial institutions is identical, equating to one-third of the total assessment. Furthermore, the scoring system for the indicators is transparent and readily comprehensible. It is noteworthy that the methodology employs a system of positive and negative modifiers, whereby good practices are rewarded with additional points, while incidents and inappropriate impacts on society and the environment are penalized with points. Examples of such bonuses include the proportion of recycled water used in water consumption exceeding 85%, generation or consumption of a significant proportion (exceeding 70%) of energy from renewable sources, annual salary revision of 100% of employees at a level not lower than inflation, a high proportion (exceeding 30%) of women in top management and among board members, disclosure of audit results of quality control systems, training of suppliers on ESG aspects, and others.

In regard to the documentation of incidents, the assigned score is contingent upon the severity of the impact and the elapsed time since the occurrence. The penalty point is highest when the incident took place within the past year and lowest when it occurred more than five years ago. In the case of low-impact incidents, no penalty point is applied when the time period in question exceeds five years. In accordance with the established methodology, the response of the responsible organization is not a factor in this assessment.

The Agency provides a detailed account of the procedure for revising the methodology, noting that this occurs on an annual basis and that each change is subject to disclosure on the official website.

In the event that the rated entity consents, the agency analysts, in collaboration with representatives of this entity, prepare a press release for the website, which discloses the principal aspects of the assigned rating.

Expert RA

The Expert RA Rating Agency is accredited by the Bank of Russia and has considerable experience in the assignment of credit ratings. Twenty organizations have been assigned an ESG rating. The rating agency's opinion is based on an assessment of the extent to which the key decision-making process of the rated entity is oriented toward sustainable development in the environmental, social, and governance areas. [Expert RA 2023]. The environmental block is concerned with the analysis of the rating object's approaches to policy and the actual environmental impact. In the domain of social responsibility, the agency also elucidates its assessment of the organization's policy approaches and its tangible interactions with employees, clients, and the broader society. In the third ESG area, the assessment encompasses the governance issues and the actual protection of stakeholder rights.

The indicators utilized for the three aforementioned blocks, in addition to the scoring procedure (which incorporates positive and negative adjustments), are presented separately for companies, regions, and urban districts. The indicators for companies are largely universal; however, there are indicators that are specific to financial organizations, such as the responsible investment policy.

The relative weights of the various factors are subject to variation, depending on the specific object under consideration (see Table 3 on p. 64). It is noteworthy that the environmental component of the rating carries less weight for non-financial companies and regions. However, the environmental impact of companies can cause significant damage. Secondly, in its rating, which essentially represents an impartial third-party assessment of the quality of sustainable development activities and serves as a benchmark for best practices, the agency does not accord sufficient importance to environmental issues that fall under the purview of the relevant regional and city ministries and directly impact the health and quality of life of the population.

Table 3. Expert RA ESG rating factor weights by object

Factor	For financial companies	For other companies	For regions and urban districts
Environment (E)	15%	30%	30%
Society (S)	40%	35%	50%
Governance (G)	45%	35%	20%

Source: [Expert RA 2023].

With regard to the rating scale, it should first be noted that the methodology was updated in December 2023. This provides a comparison of the categories and levels of the agency's scale with that recommended by the Bank of Russia. Secondly, a recalculation of the numerical scores is presented in the format of ranges for each of the seven levels of the Bank of Russia's recommended scale.

Expert RA enumerates the adjustments that may result in an increase or decrease in the assessment of indicators. It is crucial to highlight that the agency mandates analysts to substantiate adjustments and present them to a designated committee, thereby reducing the potential for subjectivity in assessments that may arise from such adjustments (a topic addressed in [Buchinskaya 2023]). Stress factors encompass significant incidents, instances of legislation non-compliance, and a negative business reputation of the organization, its proprietors, or its management. In the event of a critical incident (defined by the agency as a natural disaster, social conflict, or complete shutdown of production by a company, or the risk of such a shutdown), regardless of the scores assigned to other indicators, the object will be assigned one of the two lowest ratings (ESG-V or ESG-W), corresponding to the ESG-C category according to the model methodology. Nevertheless, there is a potential avenue for avoiding this "punishment" that considers the actions of the rated entity to mitigate the consequences of the events and prevent their recurrence in the future.

RAEX

RAEX (RAEX-Analytics) is another ESG rating agency that was previously part of Expert RA media holding (and later separated into a separate consortium). Over the past few years, it has gained popularity in the corporate environment due to the regular publication of ESG rankings. In 2024, the agency published a new methodology, the key aspects of which are discussed in the following section. It is noteworthy that in the presentation of its new methodology, the agency highlighted a distinction between two types of ratings: those formed on the basis of exclusively public sources of information (referred to as "publicly observed"), which form the basis for rankings, and those prepared on request.

The RAEX ESG rating represents the agency's assessment of the extent to which the rated entity effectively manages its exposure to environmental, social and governance risks [RAEX Rating Consortium 2024]. Concurrently, the agency indicates that "reasonable efforts have been made" to guarantee the principle of double materiality. Despite the derived definition, the assessment conducted by RAEX also attempts to consider the impact of the company in question—the rating object—on the environment, society, and the economy. Nevertheless, the scale discussed below indicates that the primary focus of the assessment is the quality of risk management.

The methodology was developed with the introduction of aspects of International Financial Reporting Standards (IFRS) in the field of sustainable development and climate change (known under the acronyms IFRS S1 and S2) and with consideration of the recommendations of the Bank of Russia. The risks (indicators) are analyzed and assessed in accordance with IFRS S1 in three areas that are already well-known to ESG-aware companies, representing "channels of influence on ESG risks." These areas are governance and strategy (weight: 20%), risk management system (30%), and achievement of efficiency (50%). The "governance and strategy" strand encompasses policies, programs,

and strategies, whereas the "performance achievement" category gathers objectively quantifiable characteristics, typically observed over a four-year period. The detailed metrics are organized according to the aforementioned three channels of influence, which are then aggregated into a thematic element value, with the weighting of each of the three areas indicated in parentheses above. Two categories of elements were established: basic, which are common to all objects, and unique, which reflect the particular characteristics of a given industry and are prepared in accordance with the standards set forth by the International Financial Reporting Standards (IFRS) for non-financial reporting.

The rating system considers not only industry-specific factors but also incorporates values from country, industry, and territorial risk matrices, as well as the individual characteristics of the rated entity, in order to assess the level of exposure to various types of ESG risks. However, in contrast to ACRA, the agency under consideration does not publish a list of risk factors organized by industry, country, or territory.

The ESG rating scale is analogous to the national and international credit rating scale, comprising nine levels, each corresponding to a specific range of scores expressed in percentages. The relative weight of each factor (E, S, and G) is held constant, and the calculation procedure, as outlined in the formulas, is transparent and as detailed as possible.

In regard to stress factors, public information regarding controversies in the current year and the previous two years is analyzed in order to calculate them. This approach is particularly appealing to the corporate sector, because in the case of foreign ratings agencies such as MSCI, Sustainalytics, ISS ESG, and others, each negative incident may have a prolonged impact on the assessment. In a manner analogous to the assessment of penalties for incidents in foreign ratings, RAEX considers both the level of severity (evaluated according to the scale and seriousness of the impact) and the rated entity's response to such incidents. This response is assessed in terms of the entity's actions taken to address the incident, the elimination of consequences, and the implementation of preventive measures to avoid a recurrence of the situation in the future. To illustrate, in the event of a high level of severity and a high level of response, the penalty score would be 25% out of 100%. In contrast, a score of 100% would be assigned when the company does not respond and does not accept responsibility for the event.

Similar to ACRA, RAEX delineates the circumstances under which its methodology is subject to revision and is obliged to publicly disclose any modifications made. A further noteworthy aspect of the agency's methodology is its consideration of the extent to which companies' non-financial reporting is subject to third-party verification.

National Rating Agency

The National Rating Agency (NRA) is included in the register of credit rating agencies maintained by the Bank of Russia. The number of organizations that have been assigned ESG ratings by the National Rating Agency is fewer than those discussed above. As evidenced by the rating list published on the NRA website, the agency has been assigning sustainability ratings since the end of 2020. In contrast with the aforementioned ratings, the website lists a constituent entity of the Federation, namely the Yamalo-Nenets Autonomous District, which received a high rating this year.

The subject of the assessment is twofold: firstly, the characteristics of the Rated Entity's sustainability performance, which reflect potential environmental and social impacts; and secondly, the exposure to and management of ESG risks over a horizon of one to three years [National Rating Agency 2023].

In its approach to the assessment, the NRA adheres to the principle of sectoral diversification, which entails the selection of elements for analysis based on the organization's attribution to a specific industry. To reflect the particular characteristics of each sector, a table is provided for each group of indicators, indicating which of them are not applicable to certain sectors.

Another principle, that of averaging, concerns the calculations. In its description of the methodological approaches, the NRA draws attention to the leveling of the significance of the impact of any of the indicators by applying arithmetic mean values in the calculation of scores for each of the three blocks. The same approach of equal significance is applied to the calculation of the composite rating. The NRA ESG rating scale is entirely consistent with the one proposed by the Bank of Russia.

In addressing negative events, the NRA employs a two-pronged approach. Firstly, specific indicators are dedicated to these aspects within each block. Secondly, a dedicated section on negative adjustments is presented, noting that the factors can be identified throughout the rating maintenance period. However, the agency does not specify the circumstances under which their consideration in the assessment might be removed. In the event of violations pertaining to environmental and social issues, the NRA considers the degree of transparency exhibited by the entity responsible for the violations. Additionally, the agency takes into account the measures implemented to directly address the consequences of such incidents within the context of environmental assessments.

As with ACRA and RAEX, the NRA methodology is subject to annual revision, with the grounds for this specified in the methodology document.

Furthermore, all four agencies disseminate press releases on their websites regarding the assigned ratings. However, the degree of detail in these releases varies, which may be attributed not only to agency practice but also to the willingness of the rated entity to disclose a specific amount of information. In general, agency press releases provide a brief rationale for the assigned ratings, a list of the key assumptions utilized in the rating process, and, in some cases, factors that may potentially affect the rating level in the future. The rating levels by ESG components (according to the agencies' scales) are presented by all except Expert RA.

3.2. Assessing the level of transparency of methodologies

In light of the aforementioned theoretical and methodological aspects of ratings, as well as the recommendations of the Bank of Russia and practical experience in the field of sustainability ratings (in corporations), we put forth a methodology for assessing the level of transparency of ESG rating methodologies assigned to companies and financial institutions.

Ten indicators (or parameters), which are presented (or not presented) in ESG rating methodologies, were selected for evaluation (see Table 4 on p. 68). The selection of parameters for analysis is primarily based on the recommendations set forth by the Bank

of Russia. The majority of parameters are evaluated according to a 0-1 system, whereby the lowest level indicates the absence of an indicator in the methodology, and the highest level signifies its disclosure. Several parameters allow for a broader range of scores. In particular, the indicator reflecting the presentation of formulas and calculation procedures varies depending on the degree of their detail and ease of presentation (including a clearly laid out structure). This indicator also includes the Central Bank's recommendation to disclose the algorithm for combining ESG components into a consolidated rating. The indicator of industry specifics is graded on a scale of 0-0.5-1, with the intermediate option representing the presence of information on sectoral aspects in the methodology without the specification of sectoral details. Another crucial parameter for companies that receive ESG ratings is the description of the methodology employed to account for adverse events pertaining to the activities of the rated organization, such as accidents or violations of laws and regulations. The corporate environment has expressed criticism of the methodologies employed by numerous leading foreign agencies, including MSCI, Sustainalytics, and ISS, which stipulate the reduction of points over an extended period following the occurrence of a negative event. Furthermore, the failure to acknowledge the efforts made by the culpable organization detracts from the quality of the rating and its favorable perception by organizations. In this regard, it is crucial for those seeking an ESG rating to have comprehensive insight into the methodologies employed in accounting for such events. This information is incorporated into the scoring system for this parameter, as outlined below:

- 0 points – stated consideration of events in the assessment without additional information or events are not considered at all;
- 0.25 – it is noted that negative events are accounted for and scores are indicated;
- 0.5 – points are indicated, and events taken into account are listed;
- 0.75 – scores are indicated, events are listed, and either there is information on the timing of the agency's consideration of the event or response actions are considered;
- 1 – points are given, factors are listed, there is information about the timeframe for taking the event into account and the company's response measures are taken into account.

The final score is compiled by summing the scores for the ten parameters.

Table 4. Indicators for assessing the level of transparency of ESG rating methodologies

No	Disclosable parameters	Possible points
1	Defining the subject of the evaluation (what the rating expresses)	0; 1
2	List of information sources	0; 1
3	Description of evaluation steps/procedure	0; 1
4	Scale	0; 1
5	Weighing	0; 1
6	Details of formulas / calculation procedure, including algorithm for combining ESG components	0; 0.5; 1
7	Indicators (metrics) and their scores	0; 1
8	Consideration of industry specifics	0; 0.5; 1

No	Disclosable parameters	Possible points
9	Approach to accounting for adverse events	0; 0.25; 0.5; 0.75; 1
10	Procedure for revising the methodology	0; 1
–	**Total**	**0–10**

Source: compiled by the author.

A score falling within a certain range gives a certain level of transparency to ESG rating methodologies (see Table 5 on p. 69).

Table 5. Scale for assessing the level of transparency of ESG rating methodologies

Level (category)	Points
Highest level	9–10
High	7–8
Medium	5–6
Low	3–4
Extremely low	1–2

Source: compiled by the author.

Based on the analysis of the methodologies of the above reviewed agencies, their transparency was assessed according to the proposed methodology, the results of which are presented in Table 6 (p. 69). Three agencies—ACRA, NRA, and RAEX—were assigned scores allowing them to be classified in the highest category; Expert RA methodology was assessed as having a high level of transparency.

Table 6. Assessment of the level of transparency of methodologies in Russian ESG ratings

No	Disclosable parameters	ACRA	Expert RA	RAEX	HPA
1	Determination of the subject matter	1	1	1	1
2	List of information sources	1	1	1	1
3	Description of the evaluation steps / procedure	1	1	1	1
4	Scale	1	1	1	1
5	Weighing	1	1	1	1
6	Details of formulas / calculation order, including algorithm for combining ESG components	1	0.5	1	1
7	Indicators and their scores	1	1	1	1
8	Consideration of industry specifics	1	0.5	0.5	1
9	Approach to accounting for adverse events	0.75	1	1	1
10	Procedure for revising the methodology	1	0	1	1
–	**Total**	**9.75**	**8**	**9.5**	**10**

Source: compiled by the author.

Conclusions

The examination of the methodologies utilized by prominent Russian agencies in their ESG rating processes enables the formulation of conclusions pertaining to the convergence of approaches promoted by the Bank of Russia. It is notable that two agencies, ACRA and NRA, have rating scales that are identical to the one proposed by the Bank of Russia. Furthermore, the RAEX levels are comparable, and Expert RA provides a table of compliance with the scale based on the recommendations of the Bank of Russia. Secondly, ACRA, RAEX, and NRA assign equal weights to ESG components (Expert RA's weights vary), which also indicates a convergence of approaches to assessment. Thirdly, there is no unification of the formal definition of ESG ratings. However, it is notable that the NRA definition coincides with the one recommended by the Bank of Russia.

The examination of the parameters that define the level of transparency in the methodologies of the leading ESG ratings revealed that the agencies have incorporated the recommendations of the Bank of Russia regarding information disclosure. In particular, the methodologies provide transparency regarding the definition of the rating, the sources of information utilized, the procedures for data processing and weighting, the method of combining components into a consolidated rating, and the evaluation indicators. In addition, three out of the four agencies under review have established transparent procedures for revising their methodologies, in accordance with the recommendations of the regulatory authority. The official websites of the agencies include press releases on the ESG ratings, which disclose information on individual components and, in some cases, on elements. The combination of these factors allows us to conclude that the procedures for assigning ESG ratings by Russian agencies are highly transparent.

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Transformation of the European Union's Foreign Economic Policy in the Context of Open Strategic Autonomy

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Abstract

Changing parameters of economic globalization along with the transforming nature of the world economic hierarchy leads to the fact that key players in the world economy have to reconsider not only their place and role in the changing system, but also traditional approaches to economic policy and its main instruments. The European Union is no exception in this system, which today sets rather ambitious tasks to maintain its position in the global economy, as well as to transform its geoeconomic power into geopolitical one. At least, this is how one might interpret the tasks set in the framework of the concept of open strategic autonomy of the European Union, which actually unambiguously unites different components of the Union's security (military, political, economic, etc.). This allows us to consider the EU trade and investment (foreign economic) policy (together with a number of other areas of activity) through the prism of the realist paradigm in the framework of international relations theory and to try to identify new political economy features of the EU's approach to its activities in the field of regulation of international trade and capital flows. By adjusting and transforming some key elements

of external economic policy (primarily revising the parameters of preferential trade regimes, as well as approaches to bilateral and multilateral investment agreements), along with creating new coordination mechanisms and barriers to trade and capital flows (such as the Foreign Direct Investment Screening Mechanism and the Anti-Coercion Instrument), the European Union is strengthening the "protective" component of its integration model, trying to adapt the EU's integration model to the changing parameters of the global economy. The mutual intertwining of the main directions of the EU's activities is clearly visible, which also applies to relatively new aspects of the union's positioning in the external arena (geoeconomic anticrisis policy, financial and monetary policies), which can potentially lead to new contradictions and limitations in the course pursued, taking into account the specifics of the integration structure.

Introduction

The contemporary global economy is undergoing a significant restructuring of established norms and patterns of interstate relations, accompanied by a profound transformation of the global economic hierarchy. If we apply the terminology of political sciences to the global economic system, we can talk about a kind of chaotization of processes [Lebedeva 2019], which should lead to the creation of a novel economic configuration of the world. In general, this formulation of the question reflects the tendency to reinforce the connection between global political and economic actors, which marks the return of global political economy as an explanatory paradigm of global development. The increasing complexity of international interaction, expanding conflict, growing economic interdependence, deepening digitalization, and rapid technological development contribute to the rising vulnerability of national economies, including to external influences, which many national governments perceive as significant threats. This, in turn, prompts key players to implement specific trade and other restrictions in the name of national economic security, with considerations of economic efficiency often becoming secondary, indicating a general securitization of the policy of global economic interaction [Hrynkiv 2022]. The most striking illustration of this phenomenon was the trade conflicts between the United States and China, as well as the evident "decoupling" in trade relations between the European Union and Russia.[1]

In this context, it is of academic interest to study the tactics and strategies of the leading centers of power in adapting to the changing environment and their vision of their future place and role within the transforming economic order. One particularly intriguing subject for investigation is the European Union. For an extended period, the EU has pursued a strategy of combining the advantages of free trade with a degree of protection in areas where its capabilities are constrained. This approach may be characterized as a form of "managed globalization" [Drynochkin, Sergeev 2023]. This

[1] See: Altman, S., Bastian, C., 2024. DHL Global Interconnectedness Report 2024. Available at: https://www.dhl.com/global-en/delivered/globalization/global-connectedness-report.html

paper proposes to examine the changes in the EU's external economic (self-) positioning through the prism of the concept of open strategic autonomy (OSA), leaving aside the discussion of the EU's membership. This approach will facilitate the identification of the EU's potential actions in pivotal global markets, where competition is likely to intensify, and the constraints imposed by the distinctive features of the EU's integration structure on the realization of its strategy.

Conceptualizing the changing role of the EU in the global economy

The most significant context within which the transformation of the European Union's policy on its participation in globalization processes is taking place is the gradual but still steadily decreasing weight in the world economy and the reduction of competitiveness in a number of key industrial positions and technologies. A number of authors have even posited that the European Union is undergoing a geopolitical economic decline [Diesen 2023]. This situation aligns with the broader trend of rebalancing global forces and the decline of developed countries' influence, which has prompted discussions on revisiting the stance of leading countries on globalization [Sjöholm 2024. P. 49–72]. Indeed, it is from this logic that the noteworthy report of M. Draghi for the new composition of the European Commission 2024–2029,[2] which proposes more proactive measures to preserve and enhance the competitiveness of the EU, emerges.

It seems reasonable to posit that a similar political economy premise may also prove instrumental in facilitating the EU's gradual transition toward a more robust and resilient global engagement, characterized by enhanced protection against contemporary manifestations of globalization. Furthermore, it may also inform the necessary adjustments to certain foreign economic instruments.

In light of the mounting tensions and crises, many of which have been of an emergency and exogenous nature for the European Union, the research community of the countries belonging to the association has expressed a desire for a "geoeconomic awakening" of the EU [Ribeiro 2023]. It is imperative for the EU to pursue this course of action in light of the disruption of global value chains, its critical dependence on numerous key goods and suppliers, geopolitical instability, and a desire to maintain its position in the international community. The aspiration to transform the EU's preeminent role in the global economy into its geopolitical influence is regarded as a pivotal aspect of this "awakening" [Fabry 2022]. Furthermore, the objectives of addressing external economic imbalances, protecting against economic coercion, establishing a link between foreign economic strategy and EU values and sustainable development, and protecting critical assets and chains have been identified [Gehrke 2022]. In essence, the majority of researchers view all contemporary EU actions as an expression of this "geoeconomic awakening" [Olsen 2022], which can be considered a unifying paradigm.

[2] European Commission, 2024. The future of European competitiveness. Part A. A competitiveness strategy for Europe. Available at: https://commission.europa.eu/document/download/97e481fd-2dc3-412d-be4c-f152a8232961_en?filename=The%20future%20of%20European%20competitiveness%20_%20A%20competitiveness%20strategy%20for%20Europe.pdf

It seems reasonable to posit that the EU policy itself is, in a certain sense, a reflection of these discussions in the research environment. This is because the decision-making system in the EU is largely technocratic and relies heavily on the expert environment to formulate its policy [Gornitzka, Sverdup 2010]. It is therefore unsurprising that the current trajectory of the EU is viewed as largely inevitable.

It seems that the logic of the transformation of the EU foreign economic policy should be considered in a kind of "realist" way (for details see: [Sergeev, Soroka 2024]), as well as in the spirit of the concepts of structural power and power transit, traditional for political economy, taking place in the modern world, which is quite consistent with the specifics of the moment in modern European studies [Postnikov 2020]. It is evident that the EU institutions are pursuing a policy that aims to exert influence on global affairs, leveraging the Union's status as a major trading entity [Meunier, Nicolaidïs 2011] as well as a prominent regulator [Lavenex, Serrano, Büthe 2021]. Indeed, as a leading actor in global trade in goods and services, as well as capital flows, the EU is likely to employ these instruments to exert influence over its counterparts. It is similarly reasonable to anticipate the utilization of the right of access to the Union's internal market by third countries as a competitive instrument. It is also noteworthy that there is a desire to extend the EU's own standards, norms, practices, and "understandings" to its partners.

In light of the waning of traditional competitive advantages and economic development factors within the EU, this approach appears logical and, in many respects, non-alternative. This is particularly evident in the context of the slowing of economic globalization, which has resulted in a reduction in the intensity of major economic flows, the cessation of inexpensive energy, and the exhaustion of low- and medium-tech industries, which have largely shaped the face of EU industry [Guerrieri, Padoan 2024]. If we view the evolving globalization as an external shock to the EU, an exogenous crisis that will inevitably transform the Union's behavior, then we can expect the EU to respond in a similar manner to previous crises. This response will entail the utilization of the EU's strengths in the fight against crises and the creation of anticrisis "superstructures" in areas where its capabilities are limited. It appears that the EU's efforts to articulate and operationalize the notion of open strategic autonomy should be interpreted within this framework.

At the heart of the EU's current economic planning and programming is the concept of open strategic autonomy, within which the EU responds to the changing world order [Miró 2022]. As defined by the European Commission, it means "the EU's ability to make its own choices and shape the world through leadership and engagement that reflects its strategic interests and values."[3] Indeed, the very debate on strategic autonomy is inextricably linked to the evolution of the EU's (and member states') attitude toward the question of EU "sovereignty" [Dupré 2022]. The emergence and development of the concept is extremely curious, as the idea of autonomy originally emerged in the sphere of the Union's defense and security, only later (against the background of the Coronacrisis

[3] European Commission, 2021. An Open, Sustainable and Assertive Trade Policy. Brussels, Feb. 18. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5bf4e9d0-71d2-11eb-9ac9-01aa75ed71a1.0001.02/DOC_1&format=PDF

and the subsequent disruption of supply chains) moving to economic issues (the term "open" in this case means that the EU should maximize the use of its extremely extensive network of trade agreements to solve strategic problems, including reducing dependence on critical suppliers). In essence, we are talking about the extension of security principles not only to traditional defense issues but also to the economy—the securitization of the Union's economic policy is taking place.

It should be noted that the scope of the OSA is quite broad: from trade policy (with the inclusion of an investment component) to finance. In the area of trade, the EU's objectives include reforming the WTO; supporting the green transition and the development of sustainable value chains; supporting the digital transition and trade in services; strengthening the EU's regulatory influence; deepening the EU's global partnerships with countries in the neighborhood, in the future enlargement and in Africa; and focusing on the conclusion of trade agreements.[4] In the area of finance, objectives include enhancing the global role of the Euro; building a strong, competitive, and resilient EU financial sector that supports the real sector and avoids reliance on third country financial instruments and infrastructure; ensuring the protection and resilience of financial market infrastructure; developing an effective sanctions management mechanism; and cooperating with partners.[5]

The revival of the EU industrial policy discourse is also an important element of the OSA concept [Drynochkin, Sergeev 2023]. It should be noted that for a long time, researchers have set themselves the task of linking the EU's external economic policy with the overall competitiveness of the European Union [Gustyn 2017]. To a large extent, the OSA acts as such a link, as it aims to achieve greater resilience of the Union through the implementation of a more active industrial policy.[6]

Perhaps the need to maintain the EU's competitiveness as a prerequisite for the implementation of the concept is even more important than the traditional reasons that appear in official EU documents. The most common reasons are the disruption of energy supplies from Russia and China's restrictive measures against Lithuania. However, the goals of open strategic autonomy are set in 2021 (i.e., before the next wave of the EU energy crisis actively develops). Thus, it seems that the desire to preserve its competitive advantages and, in some cases, to protect itself from competition from third countries, underlies the adjustment of the EU's main external economic instruments.

Is it possible to perceive open strategic autonomy as a conceptual phenomenon capable of structuring and transforming the EU integration construct in a new way (by analogy with the way some authors propose to consider the "green course" [Kaveshnikov 2024]), but in foreign economic policy? The answer to this question will be multidimensional. First, OSA cannot lead to the fulfillment of all the set goals due

[4] European Commission, 2021. Questions and Answers: An open, sustainable and assertive trade policy. Feb. 18. Available at: https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_645

[5] Council of the European Union, 2022. Note on Council Conclusions on the EU's economic and financial strategic autonomy: One year after the Commission's Communication. Available at: https://data.consilium.europa.eu/doc/document/ST-6301-2022-INIT/en/pdf

[6] OECD, 2024. Procompetitive Industrial Policy – Note by the European Union. June 12. Available at: https://one.oecd.org/document/DAF/COMP/WD(2024)18/en/pdf

to its extreme ambition [Sidorova, Sidorov 2023]. Second, if one accepts that the key problem for the EU is its "critical dependencies," the concept of OSA should have very limited manifestations in implementation issues, since according to various estimates "critical dependencies" account for less than 10% of EU trade [Mejean, Rousseaux 2024]. Third, the limitations and peculiarities of the EU's integration construct do not allow for the implementation of all the aforementioned issues at the supranational level. Of all areas, only trade policy (and the movement of foreign direct investment; FDI) falls within the exclusive competence of the EU. Neither portfolio and other investments nor financial issues (with the exception of monetary policy in the euro area) can be regulated exclusively at the EU level.

Nevertheless, the OSA is a rather ambitious and far-reaching economic strategy. Most probably, it can and should be perceived as the European Union's construction of its foreign policy and, to a large extent, its external economic identity (with all the limitations of the applicability of this term to the EU). By adopting a large number of strategic documents in this area, the EU seems to draw a certain picture of its foreign economic strategy and how it wants to be perceived internally and by third countries.

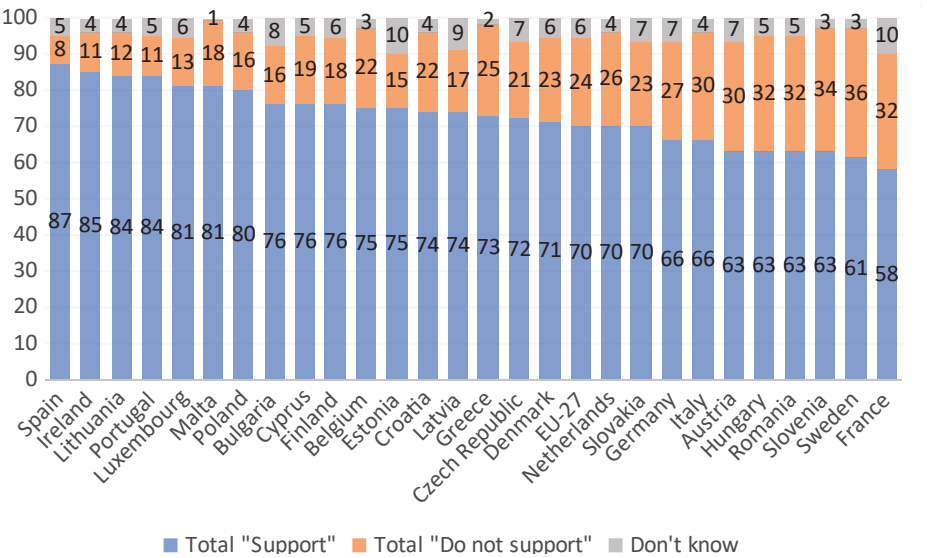
Indirect confirmation of this thesis is a kind of securitization of Special Eurobarometer surveys. In contrast to the 2019 trade policy survey, the most recent 2024 survey added a section on economic security. In addition, there is an increase in "protectionist" sentiment: according to 61% of respondents, the EU should apply higher import tariffs [Special Eurobarometer 2024. P. 81] (vs. 56% in 2019 [Special Eurobarometer 2019. P. 72]). The addition of a section on investment is interesting, reflecting the trend toward a growing link between trade and investment policies in the EU. In this section, one can also notice a rather obvious securitization component, expressed in the way respondents answer the questions on attracting foreign investment and on the purchase of national companies by foreigners differently (see Figures 1 and 2 on p. 78).

In general, the above set of issues and areas of the OSA fits into the logic outlined in the new EU Economic Security Strategy, which combines (quite in the spirit of the EU) three pillars:

- Promoting EU competitiveness and growth, strengthening the single market, supporting a strong and sustainable economy, and strengthening the EU's scientific, technical and industrial base.
- Protecting EU economic security through a range of policies and instruments, including specific new instruments where necessary.
- Partnering and further strengthening cooperation with countries around the world that share EU concerns and with whom the EU has common economic security interests.[7]

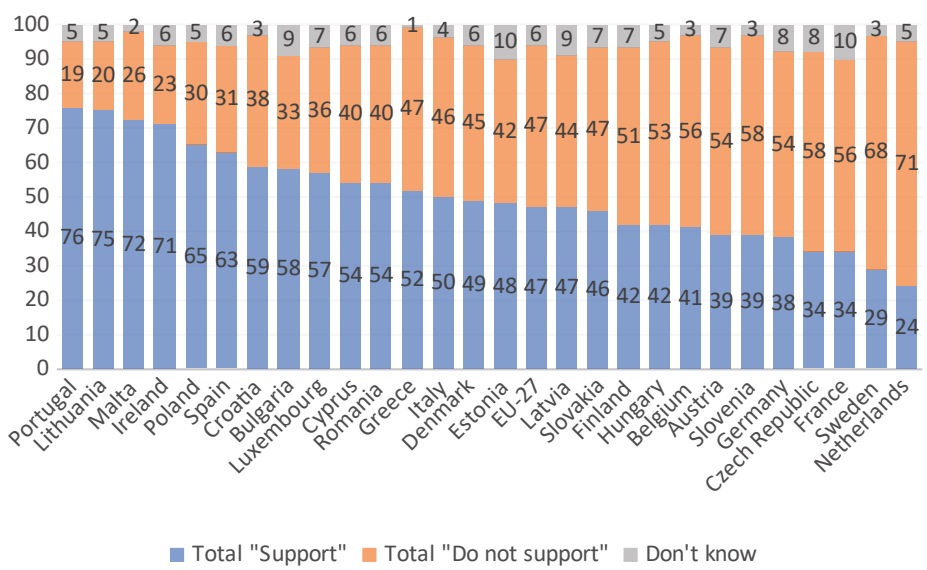
[7] European Commission, 2024. Commission proposes new initiatives to strengthen economic security. Jan. 24. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_24_363

Figure 1. Response to the question "Businesses often invest in other countries. To what extent do you support or oppose the following: Foreign business from outside the EU investing in (OUR COUNTRY) (%)?"



Source: Special Eurobarometer 554. Europeans' Attitudes on Trade and EU Trade Policy. P. 60.

Figure 2. Response to the question "Businesses often invest in other countries. To what extent do you support or oppose the following: Foreign business from outside the EU buying businesses in (OUR COUNTRY) (%)?"



Source: Special Eurobarometer 554. Europeans Attitudes on Trade and EU Trade Policy. P. 61.

Vectors of transformation of the main elements of the EU foreign economic policy

The emergence of the EU's new articulated economic autonomy objectives is associated with a shift in the EU's primary strategic orientations. Firstly, there is a certain degree of overlap between the EU's principal areas of activity in the implementation of the concept of open strategic autonomy. Provisions pertaining to distinct domains of activity have a pervasive impact on adjacent domains. The issues of sanctions, trade in goods and services, the movement of investments, the conclusion of trade and investment agreements, economic, financial, and even hard security are inextricably linked and mutually intertwined. Secondly, the implementation of sanctions by the "geopolitical commission" has led to a significant expansion in the institutional role of the European Commission, while the involvement of member states in the initiation and adoption of sanctions has diminished considerably [Portela 2023]. Thirdly, a transformation is occurring within the Commission itself, with the objective of aligning its activities more explicitly with the goals of open strategic autonomy [Couvreuer 2024]. In summary, this illustrates the process of the EU's re-emergence as a supranational institution in the context of crises.

In conclusion, the implementation of the provisions of OSA is already resulting in a notable transformation of the Union's foreign economic instruments (for a detailed illustration of these changes, please refer to Table 1 on p. 80). The primary objective of this transformation is to integrate the established tenets of the EU's foreign economic policy with the concerns of economic security. Furthermore, the aspiration to bolster the EU's overall competitiveness adds another dimension of the new anticrisis "superstructure" of foreign economic policy instruments, which can be seen as a novel approach to aligning the goals of foreign economic policy with the industrial competitiveness of the EU [Guerrieri, Padoan 2024].

It is also noteworthy that, in light of the imperative to maintain the EU's global standing, areas of EU activity that are not directly related to foreign economic activity are subject to some degree of revision (or, more accurately, adaptation). This is generally consistent with the challenges facing the Union, as a systemic change requires a systemic response. Consequently, in addition to the external aspects of economic transformation, the internal elements of the economic system are also being revised [Miró 2022]. Consequently, numerous conventional elements of integration (chiefly within the financial sector) that had previously impeded economic coordination are now being linked to the challenges of OSA. The necessity for further reform is also made evident by the Union's overall competitiveness. This can be described as a form of securitization. Therefore, it is evident that there is a necessity for a reinforcement of the supranational element within the EU's financial sector, which has become increasingly evident in the aftermath of the financial and debt crises. This objective should be pursued within the context of open strategic autonomy.

Table 1. Broad interpretation of new elements in the EU foreign economic policy

Policy direction	Task	Novel elements
New trading and quasi-trading instruments	Protection from "non-market" (according to the EU) competition of third country companies	Foreign Subsidy Regulations.[8] Use of increased import duties as a tool to combat non-market competition (example: increased duties on electric cars from China)[9]
	Reducing the risks of exposure to countries that account for a significant share of exports/imports	Anti-Coercion Mechanism (potential measures include import duties, restrictions on trade in services, intellectual property, restrictions on market access for FDI and government procurement).[10] State aid rules for states affected by the actions of third countries (Lithuania and PRC trade restrictions)[11]
	Termination (minimization of risks) from loss of industrial competitiveness in a number of key positions	Export controls (especially on dual-use goods; example: restriction of exports of microchip manufacturing equipment from the Netherlands in 2023), commercial transaction controls, European Commission instructions to reduce foreign interference in R&D[12]
	Global dissemination of EU internal market standards	New EU standardization strategy[13]
	Creating and maintaining global rules of the game on climate issues, maintaining the EU's competitiveness in the energy transition environment	Carbon Border Adjustment Mechanism as a trade instrument
Trade agreements	Diversification of geographic trade structure to address critical dependence on key supplier, access to critical elements	Expansion of the network of preferential trade agreements, new initiatives to engage partners (e.g., Global Gateway strategy)
	Protection against competition from third countries in foreign markets	Incorporating MFN provisions into trade agreements [Bohnenberger, Weinhardt 2022]
	Global dissemination of EU standards and "understandings"	Attempt to introduce "essential conditions" (old—rule of law and human rights, new—"green transition" norms) into the EU's general system of trade preferences,[14]exclusion from preferential treatment for non-compliance with conditions (no agreement has been reached so far).[15]

[8] Foreign Subsidies Regulation. European Commission, 2023. Available at: https://competition-policy.ec.europa.eu/foreign-subsidies-regulation_en

[9] European Commission, 2024. Commission imposes provisional countervailing duties on imports of battery electric vehicles from China while discussions with China continue. Jul. 4. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_24_3630

[10] European Commission, 2023.New tool to enable EU to withstand economic coercion enters into force. Dec. 27. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6804

[11] European Commission, 2022. State aid: Commission approves €130 million Lithuanian scheme to support companies affected by discriminatory trade restrictions. April 26. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2665

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[13] Standardisation strategy. European Commission, 2022. Available at: https://single-market-economy.ec.europa.eu/single-market/european-standards/standardisation-policy/standardisation-strategy_en

[14] A new GSP Framework. The GSP Hub, 2023. Available at: https://gsphub.eu/about-gsp/gsp-review)

[15] Ensuring Continuity: EU Extends Generalized Scheme of Preferences (GSP) Regulation until the end of 2027. The GPS Hub, 2024. Available at: https://gsphub.eu/news/GSP-extension-2027

Policy direction	Task	Novel elements
Trade agreements *(continuation)*	Global dissemination of EU standards and "understandings" *(continuation)*	Proposal to introduce a sanctions mechanism in case of "serious violations of key sustainable development provisions in trade, especially fundamental labor rights endorsed by the International Labor Organization, as well as the provisions of the Paris Climate Agreement";[16] introduction of "climate conditionality" prior to trade agreements
Investment instruments	Harmonization and deepening of integration in the domestic market	Attempts to move from bilateral investment agreements concluded at the member state level to agreements concluded on behalf of the EU and to resolve contradictions between them [Sergeev, Soroka 2024]
	Protection against competition from third countries and protection against foreign interference in key assets	FDI Screening mechanism[17]
	Dissemination of EU norms and standards	Green Investment Agreements (compliance with Green Deal norms in exchange for investment): first agreement with Angola in 2024[18]
Reforming the global trade regime	Restoration of WTO capacity	EU proposals for WTO reform:[19] through resolving the controversy surrounding the Appellate Body to meaningful reform; intensifying cooperation with individual partners within the WTO; creating a Multilateral Interim Agreement on Appeals and Arbitration
New anticrisis (non-trade) instruments in the field of economic security (Geoeconomic anticrisis policy)	Protection of the domestic market from sudden commodity crises	Instrument for the protection of the single internal market in emergency situations (monitoring of the situation on commodity markets, warehousing and procurement of necessary goods on behalf of the EU in times of crisis)
	Impact on an agent who violates the economic "rule-based order" (sanctions as an external economic instrument)	Export restrictions, control over commercial transactions (e.g., price ceiling mechanism for Russian crude oil and petroleum products)
Currency policy	The challenge to increase the global role of the euro	Decision to deepen EMU integration[20] (no practical steps so far); proposal to introduce a digital euro to strengthen its international role
Financial policy	"A strong, competitive and resilient EU financial sector that supports the real sector, avoiding reliance on third country financial instruments and infrastructure"	Calls to finalize banking union, capital markets union; use of common EU debt instruments (including to improve their sovereign rating) to finance OSA activities
	Raise funds to realize the objectives of the OSA	Use of the "NextGenerationEU" fund to finance "autonomization" in member states (to complete the energy and digital transition)

16 European Commission, 2022. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The power of trade partnerships: together for green and just economic growth, COM (2022) 409 final, 2022. Available at: https://circabc.europa.eu/ui/group/8a31feb6-d901-421f-a607-ebbdd7d59ca0/library/8c5821b3-2b18-43a1-b791-2df56b673900/details (accessed 18 September 2023).

17 https://policy.trade.ec.europa.eu/enforcement-and-protection/investment-screening_en

18 https://www.consilium.europa.eu/en/press/press-releases/2024/03/04/eu-angola-council-gives-final-greenlight-to-the-eu-s-first-sustainable-investment-facilitation-agreement/

19 https://circabc.europa.eu/ui/group/7fc51410-46a1-4871-8979-20cce8df0896/library/42115f40-e2ba-4a49-9162-de92098f15bd/details

20 Council of the EU, 2022. Council Conclusions on the EU's economic and financial strategic autonomy: one year after the Commission's Communication, 2022. Available at: https://www.consilium.europa.eu/en/press/press-releases/2022/04/05/council-adopts-conclusions-on-strategic-autonomy-of-the-european-economic-and-financial-sector/

Policy direction	Task	Novel elements
Financial policy (continuation)	"Development of an effective sanctions management mechanism" (protection against the extraterritoriality of other countries' (US) sanctions combined with the impact on countries violating the EU sanctions regime)	Reactualization of the EU Blocking Statute [Lonardo, Szep 2023], but attempts to interpret "EU territories" expansively to address sanctions circumvention;[21] the idea of using access to the EU internal market as leverage against third countries [Bismuth, 2023]

Source: compiled by the author based on McCaffrey C., Poitiers N.F., 2024. Instruments of Economic Security. Bruegel Working Paper 12/2024. Available at: https://www.bruegel.org/system/files/2024-05/WP%2012%202024_0.pdf; Baba et al., 2023. Geoeconomic Fragmentation: What's at Stake for the EU. IMF Working Paper No. 2023/245. Available at: https://www.imf.org/en/Publications/WP/Issues/2023/11/29/Geoeconomic-Fragmentation-Whats-at-Stake-for-the-EU-541864; The EU's Open Strategic Autonomy from a central banking perspective. ECB, 2023. Available at: https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op311~5065ff588c.en.pdf ; Council Conclusions on the EU's economic and financial strategic autonomy: one year after the Commission's Communication, 2022. Available at: https://www.consilium.europa.eu/en/press/press-releases/2022/04/05/council-adopts-conclusions-on-strategic-autonomy-of-the-european-economic-and-financial-sector/; own elaborations.

In the context of trade policy, the primary new remedial instruments are measures designed to address what the EU perceives as unfair market competition (for further details, see Table 1 on p. 80). Additionally, there are efforts to influence the association through the exploitation of its vulnerabilities by third countries. In this context, the Foreign Subsidies Regulation becomes relevant. Its implementation has already resulted in the imposition of higher tariffs on electric cars imported from China. Moreover, the mechanisms of protection against economic coercion have become a significant element of the policy landscape. These instruments are based on areas where the EU's role remains highly influential, such as trade in services and the movement of foreign direct investment (FDI), or in sectors where the EU's market is particularly attractive, such as public procurement. It would be remiss to ignore the use of export restrictions by the EU, which has employed this strategy with increasing frequency in its trade policy.

Of particular significance are non-tariff trade measures, which are employed with the objective of disseminating EU norms and standards, particularly in the context of climate policy. Additionally, the utilization of a Carbon Border Adjustment tax as a novel trade instrument has been observed [Baba et al. 2023]. In the context of EU trade agreements, the primary objective is to enhance the EU's access to foreign markets while minimizing the adverse effects of competition from third countries.

It is notable that there has been a distinct increase in the link between trade and investment issues in EU activities, which is primarily expressed in attempts to resolve problems around bilateral investment treaties. Furthermore, there has been an apparent extension of securitization principles to FDI attraction policies. This is evidenced by

[21] Official Journal of the European Union, 2022. Council Regulation (EU) 2022/1905 of October 6, 2022 amending Regulation (EU) No 269/2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022R1905

the introduction of a foreign direct investment (FDI) monitoring mechanism, which involves joint FDI screening mechanisms but allows the final decision to be made at the country level. The degree of harmonization and effectiveness of this instrument remains relatively low, a fact that has not gone unnoticed by the European Commission, which has proposed further harmonization.[22] In general, the implementation of the superstructure (albeit in an extremely fragmented and point form) in the EU investment policy is consistent with the trend toward a more selective approach of key players (primarily the US and the EU) to FDI inflows [Zuev, Ostrovskaya, Gilmanova 2022]. Similarly, the same can be said of all trade and quasi-trade measures. The EU policy, as evidenced by the issue of sanctions, is aimed at creating institutionalized mechanisms that allow for selective influence over counterparties, enabling the adjustment of parameters within its relations with them [Lonardo, Szep 2023]. In practice, the external economic provisions of the OSA concept extend beyond the domain of trade and investment. If we consider the EU's position in the global economy as that of an integral player, the set of provisions stated in its conceptual documents gradually brings the EU's actions (or intentions) closer to the foreign economic policy of national states. This includes, in addition to trade, elements of monetary, fiscal, and exchange rate policies [Oleinov 2016]. An evaluation of these developments (see Table 1 on p. 80) reveals a decline in the EU's activity and effectiveness as it addresses matters beyond its exclusive competence, such as fiscal policy, and where the European Central Bank plays a more prominent role than the Commission in matters related to monetary and exchange rate policies. Nevertheless, there is a discernible inclination toward the hybridization of the EU's areas of activity. For instance, sanctions issues are increasingly intertwined with the dynamics of financial markets. The imperative to enhance the Union's competitiveness is becoming contingent upon financial mechanisms, such as the "NextGenerationEU" fund, or the oversight of such mechanisms, as exemplified by state aid rules. Moreover, the objective of strengthening the global role of the euro is being integrated with the pursuit of deeper financial integration. In consequence, the scope of matters assumed by the supranational level of governance (and, most notably, by the European Commission) is progressively widening.

Conclusion

In comparison to global practices, the measures taken by the European Union appear to be less innovative. Rather, it is the particular approach of the association to the trends that are currently prevalent in the global economy that is noteworthy. In the context of global trade, the primary challenges pertain to the difficulty of reforming the global trade regime and the proliferation of "neoprotectionism 2.0" instruments [Milovidov & Asker-Zade 2020]. Similarly, in the realm of capital flows, the strengthening of national restrictions and the introduction of novel protective mechanisms [Bulatov 2023] represent significant developments. In general, these trends reflect a growing emphasis on geopolitical considerations in the global economy. It seems probable that the EU, like

[22] Ibid.

many other key players, will tend to employ restrictive instruments and practices that are "convenient" and "habitual" for itself. In contrast to China, which is more inclined to act through informal channels, the EU is more likely to utilize formats that have already been disseminated domestically (e.g., state subsidy regulations for companies, the application of which is now de facto internationalized) or in which its role in the global economy is relatively significant.

The emergence of a "geoeconomic crisis" has prompted the European Union to initiate a process of transformation with regard to the instruments through which it engages in global economic processes. This transformation cannot be described as comprehensive or profound, as its primary objective is to facilitate the establishment of institutional mechanisms enabling the EU as an association and its member states as individual entities to participate in globalization on a selective basis and engage with their counterparts on a selective basis as well. This strategy may be regarded as reactive and even conservative in nature, reflecting a response to the structural changes occurring in the global context. Conversely, the ongoing transformation is genuinely systemic, with cosmetic changes permeating nearly all aspects of the Union's foreign economic engagement. In general, the concept of open strategic autonomy, as it evolves and gradually expands in scope, provides convincing evidence to support this thesis.

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Bricks for the Pyramids: Foreign Participation in Egyptian Megaprojects

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Keywords: Egypt, megaprojects, external debt, budget deficit, BRICS.

Abstract

This is not the first time Egypt has resorted to implementing large-scale projects and attracting foreign funds in order to solve the problems of economic development. In the 19th century, the Suez Canal became such a project, and in the 20th century, the Aswan Dam. Each time, Egypt had to pay a high price for these initiatives. In the 21st century Egypt faces many economic problems: overpopulation, food shortages, unemployment, overload of the energy system, inflation and devaluation of the national currency, budget deficit, etc. The centralized governing model again led Egypt to the idea of megaprojects and again forced it to turn to the resources of other countries. However, this time Egypt is being cautious and trying to diversify foreign investment. In a sense, joining BRICS is a manifestation of this caution. The work identifies three groups of countries and examines their contribution to the megaprojects being implemented in modern Egypt. Based on this analysis, it is concluded that the OECD and BRICS-5 countries participate both as investors and as contractors, while the GCC countries almost always act as investors. At the same time, the BRICS-5 and GCC countries are usually represented by state corporations

and sovereign funds, while the OECD countries are more often represented by private companies. This fact emphasizes the importance of BRICS as a platform for interstate negotiations that can expand cooperation between Egypt and other member countries of this organization. However, when choosing partners, Egypt is guided more by economic rather than political considerations, wanting to maintain neutrality in world politics and not become dependent on any of the political blocs. The country's economic future is uncertain, so maintaining financial and political independence in the future is a challenge for Egypt.

Introduction

On January 1, 2024, Egypt, along with Ethiopia, the United Arab Emirates and Iran, became a member of the BRICS group of countries. By joining the international organization, Egypt expects BRICS to assist the country in overcoming some of its economic, social and demographic challenges. These expectations are articulated by the country's senior officials. Prime Minister Mustafa Madbouly has discussed the potential for Egypt to receive preferential loans from the New Development Bank, which was established by BRICS member countries. Finance Minister Mohamed Maait has indicated his expectation that Egypt's accession to this organization will result in increased investment and new export opportunities, facilitated by deeper economic cooperation between Egypt and the member states [Abdelaziz 2023]. Today, Egypt is particularly in need of external financing, as President Abd al-Fattah as-Sisi has led the country down the path of implementing megaprojects, and many traditional creditors refuse to encourage large-scale budget spending. Consequently, the International Monetary Fund has pledged to extend greater assistance to Egypt if the country reduces its expenditure on infrastructure projects [IMF 2024a].

The concept of addressing social and economic challenges through large-scale infrastructure initiatives is not a novel one in Egypt. The term "megaproject" is a widely used designation for a country's largest construction projects. Nevertheless, it is evident that Egypt's rulers employed comparable strategies during the 19th and 20th centuries, albeit without using the term "megaproject" to describe them. Throughout modern history, the state has played a pivotal role in the country's economy. The realization of significant economic breakthroughs has necessitated not only the determination to pursue specific "megaprojects," but also the availability of unrestricted funds, which have always had to be sought abroad. The aforementioned tasks have proven to be challenging for Egypt. Therefore, in light of their historical experience, the country must exercise caution when selecting external creditors and contractors, in order to avoid becoming politically or economically reliant on other countries.

This article will examine the role of "megaprojects" and external debt in the history of modern Egypt, the country's current economic situation and the problems that modern megaprojects are designed to solve, as well as the participation of foreign actors in the implementation of these megaprojects in the context of Egypt's accession to BRICS and the

perennial budget deficit. The objective of this study is to identify the principal external investors and contractors involved in the implementation of megaprojects in Egypt.

"Megaprojects" and foreign debt in the history of modern Egypt

The Suez Canal – the "megaproject" of the 19th century

Egypt embarked on the path of modernization in the early 19th century, when Muhammad Ali, the viceroy of the Ottoman sultan, decided to use the country's potential to strengthen his own power. He initiated the recruitment of European specialists and the dispatch of Egyptian nationals to Europe for study, thereby establishing an army and an administrative system that were at the vanguard of their time [Fahmy 2012. P. 65, 99, 106]. Despite the considerable advancements, Egypt's development was, and to a considerable extent remains, a process of catching up with more developed countries. In order to continue Muhammad Ali's modernization policy, his successors were compelled to seek external financing, a strategy that Egypt has employed on numerous occasions throughout its history and continues to do so. The initial attempt was particularly careless.

Muhammad Ali's own son, Said, was the first who attempted to secure external financial assistance. He came to power in 1854 and, in the same year, under the influence of his friend and former French consul Ferdinand de Lesseps, initiated the planning of the first "megaproject" of modern Egypt: The Suez Canal [Lebedev and Mirsky 1964. P. 7]. However, the implementation of this plan, as well as the launch of other modernization projects, necessitated the availability of financial resources, which were not readily accessible within the country. The construction of the Suez Canal was completed between 1859 and 1869. To initiate the construction, Said had to purchase shares at a cost of 88 million francs (equivalent to over 3.5 million pounds), a sum that was considerably higher than the 16 million francs (approximately 640 thousand pounds) that had originally been budgeted for. Furthermore, Egypt was obliged to pay an additional 44 million francs (approximately 1.75 million pounds) to the Suez Canal Company in 1863, in the form of penalties, due to the fact that the Ottoman Sultan, under pressure from Britain, ordered Said's heir Ismail, who had already succeeded Said, to take back some of the lands that had been transferred to the company and to prohibit the forced labor of Egyptian peasants at the construction site [Lebedev and Mirsky 1956. P. 9–11].

The Egyptian leadership initially resorted to the utilization of debt instruments in the period preceding the commencement of the construction of the Suez Canal. In 1858, Said attempted to issue treasury bonds, and in 1860, he borrowed in excess of one million pounds (equivalent to 28 million francs) from the French banking house on his personal account. Two years later, he secured a government loan for 3.3 million pounds with the approval of the Ottoman Sultan. Khedive Ismail, who assumed power following Said's demise in 1863, pursued a similar policy of attracting foreign capital. The initial years of his tenure coincided with the American Civil War, which precipitated a significant surge in global cotton prices. Ismail was of the opinion that the influx of funds would facilitate the repayment of all outstanding debts with relative ease. From 1862 to 1867,

the Egyptian leadership issued government bonds on five occasions in the financial houses of Paris and London, for a total of 18 million pounds. However, following the conclusion of the American Civil War, there was a decline in the price of cotton, which meant that Ismail was forced to consider taking out further loans in order to repay his existing debts. In 1868, the Khedive procured an additional 11.9 million pounds from the Imperial Ottoman Bank, Société Générale and Oppenheim, stipulating a five-year moratorium on further debt accumulation. Nevertheless, this strategy was not effective enough in resolving Ismail's financial challenges. In 1872, he sought new loans from the Franco-Egyptian Bank, and in 1873, he secured the largest loan in the country's history, amounting to 32 million pounds, from multiple financial institutions. By that time, the total of all debt repayments equaled the total of all revenues received by the Egyptian state budget [Tunçer 2021. P. 76–77].

It is evident that the court of the Khedive did not always utilize the funds for the benefit of the country. Corruption and waste were hallmarks of the state apparatus at the time. Furthermore, Ismail himself utilized the available funds to offer bribes to his relatives with the intention of securing their consent for his son to succeed him as ruler, rather than the eldest descendant of Muhammad Ali [Dawkins 1901. P. 492]. Nevertheless, the policy of foreign lending had a positive impact on the country's economic growth. The funds were invested in a number of infrastructure projects, including the construction of irrigation canals, dams, railroads, repair shops, weaving workshops, and sugar and paper mills [Hunter 1999. P. 40].

By 1875, despite persistent efforts to increase taxation and other strategies employed to mobilize domestic resources, Egypt was bankrupt [Hunter 1999. P. 40, 180–181]. The Khedive attempted to sell his 44% stake in the Suez Canal initially to the French and subsequently to Britain, which agreed to purchase it for 4 million pounds [Tunçer 2021. P. 77]. This deal was one of the most successful in British history, with the value of these shares reaching 24 million pounds in 1901 and approximately 32 million pounds in 1910 [Dawkins 1901. P. 495; Lebedev and Mirsky 1956. P. 12]. In 1876, Egypt ceased all payments on outstanding bonds. The Khedive was compelled to consent to the establishment of the Public Debt Fund, which was to be managed by foreign commissioners, and which commenced the collection of funds directly from local governments. The fund received a variety of taxes, including those levied in Cairo, Alexandria and numerous other provinces, as well as salt and tobacco taxes, trade duties and revenues from railroads and the port of Alexandria. Egypt pledged to refrain from reducing these taxes or incurring new debts. In order to restore its financial sovereignty, Egypt was required to repay the total debt of 91 million pounds [Tunçer 2021. P. 82]. Nevertheless, the loss of financial sovereignty was followed by the loss of political sovereignty. The suppression of the Urabi Pasha uprising against foreigners in 1882 resulted in the occupation of Egypt by Great Britain.

The Aswan Dam – the "megaproject" of the 20th century

The subsequent effort to steer Egypt towards a trajectory of catching-up development was undertaken by Gamal Nasser. It is also noteworthy that his economic policy was

characterized by a search for foreign funds to implement a new "megaproject"—the construction of the Aswan High Dam (AHD). Concurrently, whereas a century earlier Egyptian rulers had been reliant solely on European capital, Nasser was compelled to navigate the more competitive landscape of the emerging bipolar world.

The concept of an AHD was first proposed during the British occupation by an Egyptian agronomist of Greek origin, Adrian Daninos. His plan, which did not attract the attention of the British at the time, was received favorably by the new leadership of the "free officers" [Shokr 2009. P. 12]. The discussion of construction commenced a few months after the revolution in 1952, but the decision to commence exploration work was made after Nasser finally established himself in power in 1954. A budget of 17 million dollars was allocated for preliminary work, which was conducted with the assistance of German experts and a French company [Joesten 1960. P. 57]. In addition to experts from Germany, consultations were held with leading specialists from around the world, primarily Americans. Germany demonstrated particular interest and commitment to allocating resources for the planning of the dam, motivated by a desire to avoid compromising its relations with the Arab world, particularly given the necessity of providing compensation to the Jews of Israel. The German experts estimated that the construction of the dam would cost Egypt 210 million Egyptian pounds, with the total cost of the entire project reaching approximately 400 million (or approximately $600 million and $1.15 billion, respectively) [Tayie 2018. P. 425–426]. Other estimates, presumably utilized by the Egyptian leadership in subsequent deliberations, suggest that the cost of the dam itself was to be at least $1.3 billion, with the project's overall cost reaching $2.2 billion, including the construction of hydroelectric power plants at the dam and the development of infrastructure around Aswan to accommodate workers and foreign specialists [Joesten 1960. P. 58].

Nasser lacked the financial resources to fund the construction of the dam independently. Consequently, he sought assistance from the World Bank, with the objective of securing the necessary funds to advance his country's economic development. Egypt was prepared to raise $900 million of its own funds over the course of the 10-year construction period. However, at least an additional $400 million had to be sourced from external sources. Initially, the World Bank indicated its willingness to provide $100 million, subsequently increasing this to $200 million, contingent upon the Bank's rigorous monitoring of expenditure. However, this was still insufficient, and concerns began to emerge regarding Egypt's capacity to repay the debt. At that time, the World Bank engaged representatives of the United States and the United Kingdom to discuss the initiative. These representatives expressed their willingness to provide funds in the format of grants, subject to certain conditions. One of the conditions attached to the loan was that Egypt was to refrain from seeking any further external loans during the construction of the dam. The situation was further complicated by the fact that, towards the end of 1955, following the Israeli attack on Egyptian forces in the Gaza Strip, Egypt began to purchase Soviet weapons through Czechoslovakia. This development caused concern in the United States and Great Britain, yet together with the World Bank, these countries offered Nasser financing in the amount of 270 million dollars. The Egyptian president consented to the proposed conditions, despite the evident inadequacy of the

promised funds, the curtailment of his sovereignty, and the USSR's concurrent interest in participating in the construction of the AHD. On February 9, 1956, a preliminary agreement was concluded with the President of the World Bank. However, on July 19, 1956, perhaps as a result of increased diplomatic contact between Egypt and the USSR, the Egyptian ambassador to the United States was informed that, following discussions with Congress, the American president had decided not to provide financial support for the AHD. On July 20, the US State Department made a public announcement that the AHD project would result in Egypt experiencing 12–15 years of economic hardship. In the subsequent week, Nasser proceeded to announce the nationalization of the Suez Canal, which was to be finally taken over by Egypt in ten years' time, in 1966 [Tayie 2018. P. 426–428; Joesten 1960. P. 59–60].

The unleashed Suez crisis ended successfully for Egypt and led to closer relations with the Soviet Union. Revenues generated by the Suez Canal were approximately $140 million annually, while revenues derived from the nationalization of the assets of British and French banking institutions could potentially exceed $1 billion [Mirsky 1965. P. 40]. In the autumn of 1958, negotiations on the construction of the AHD with the Soviet side commenced, and on December 27, an agreement on the first phase of construction was concluded. The USSR allocated 400 million rubles (approximately $100 million) for this purpose. The agreement stipulated that Egypt would repay the funds in 12 annual instalments, commencing in 1964, at a rate of 2.5% per annum. Despite a temporary cooling of relations in the spring of 1959, due to the anti-communist campaign in Egypt, cooperation continued, with construction commencing in the summer. During this same period, an agreement was concluded with Sudan, which permitted the flooding of its territories in exchange for compensation amounting to approximately $43 million. On August 27, 1960, an agreement was concluded whereby the USSR undertook to provide the necessary finance for the completion of the dam. The loan of 900 million rubles (equivalent to approximately $225 million) was intended to cover the costs associated with additional studies, the development of the final design, the installation of the sluice and hydroelectric power plant, and the provision of technical equipment for irrigation projects [Tayie 2018. P. 431–432; Joesten 1960. P. 61]. The construction of the dam also had negative consequences, including the flooding of areas, water losses due to evaporation from the reservoir formed in the middle of the desert, and a reduction in silt inflow with water. Nevertheless, the positive effects were found to outweigh the negative ones. It was anticipated that the dam would generate sufficient revenue to offset its costs in a relatively short timeframe [Tayie 2018. P. 434–435].

This period in Nasser's rule is characterized by a shift in orientation towards the socialist bloc. Despite his aversion to definitive alignment with either superpower in the Cold War, Nasser's trajectory towards Arab socialism and the comprehensive nationalization policy of 1961 offers compelling evidence of Soviet influence. In consequence, nationalization enabled Nasser to appropriate approximately one billion Egyptian pounds (equivalent to almost three billion US dollars) in assets. Over the period between 1953 and 1963, there was a significant increase in state investment in industry, with a nearly 30-fold increase in the value of investment. By 1962, 96% of the economy was under state ownership. Approximately one hundred industrial facilities

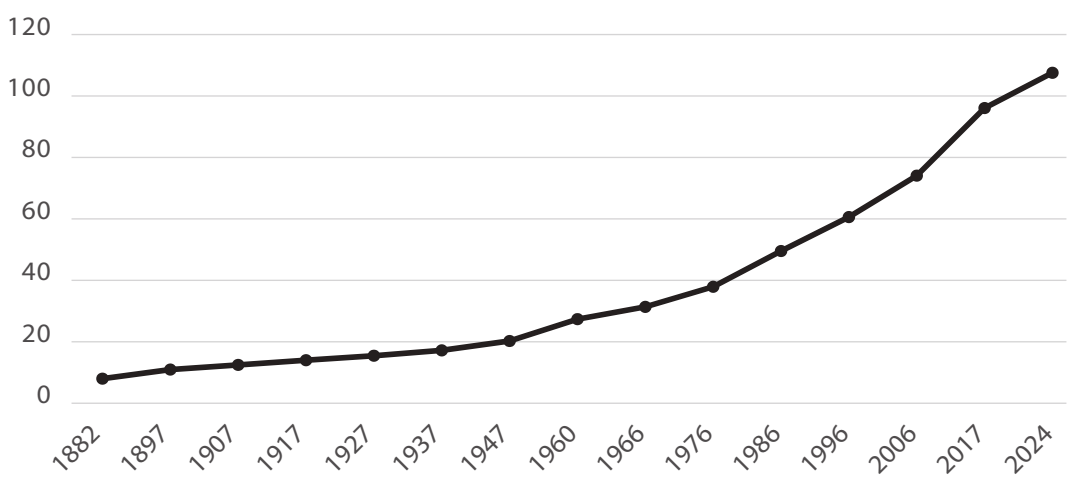
were constructed with the assistance of the Soviet Union [Mirsky 1965. P. 45–46, 55]. It is argued that, in addition to financial assistance, the USSR exerted considerable influence over Egypt with remarkable rapidity, to the extent that the country's sovereignty was significantly constrained. This may be identified as one of the factors contributing to the shift in the country's political trajectory following the ascendance of Anwar Sadat to power [Fahim 2013. P. 26].

Egypt's economic problems

Demographic problem

One of the problems to be solved by the construction of the Aswan Dam was the lack of land suitable for farming. Controlling the flow of the Nile River made it possible to better plan irrigation works and supply more areas with water. Even then, the solution to this problem was related to the threat of overpopulation in Egypt, which began to be actively discussed in the 1930s [Shokr 2009. P. 16–17]. Since the construction of the AHD, the population of Egypt has quadrupled. In 2024, the country's population exceeded 106 million people [CAPMAS 2023] (see Figure 1 on p. 93).

Figure 1. Population of Egypt (million people)



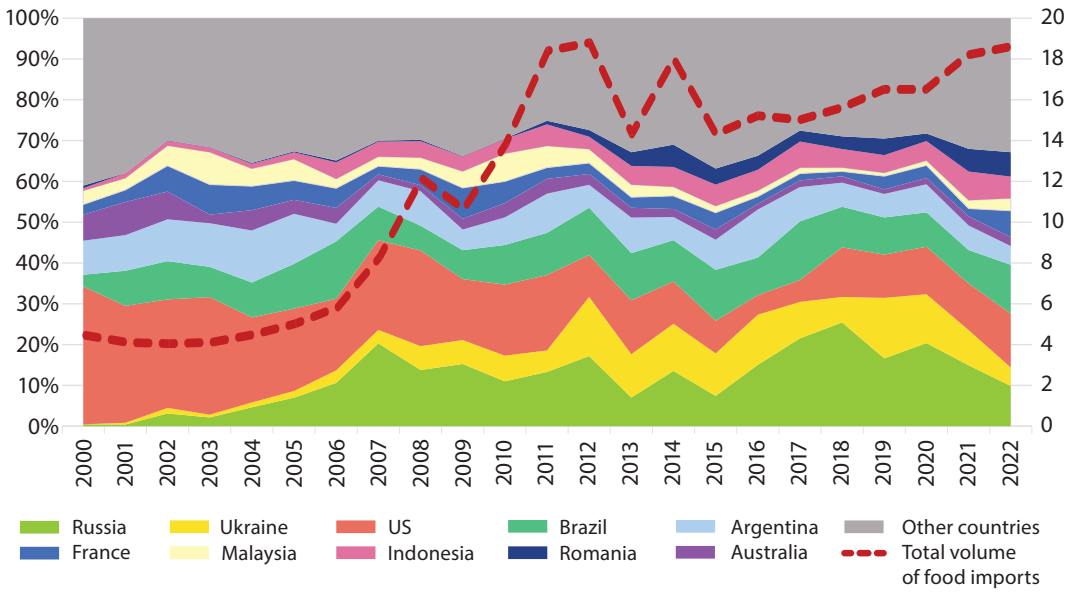
Source: CAPMAS – Central Agency for Public Mobilization and Statistics. Egypt in Numbers.

Food problem

Although Egypt's total territory is large, only a small part of it—the Nile Valley and the coast—is habitable. The increase in the number of people in the 20th and early 21st centuries has led to a dramatic increase in population density, which has had a negative impact on the environment, the deterioration of infrastructure and the overall quality of life. In addition, high population density has meant that what was once an agricultural powerhouse is

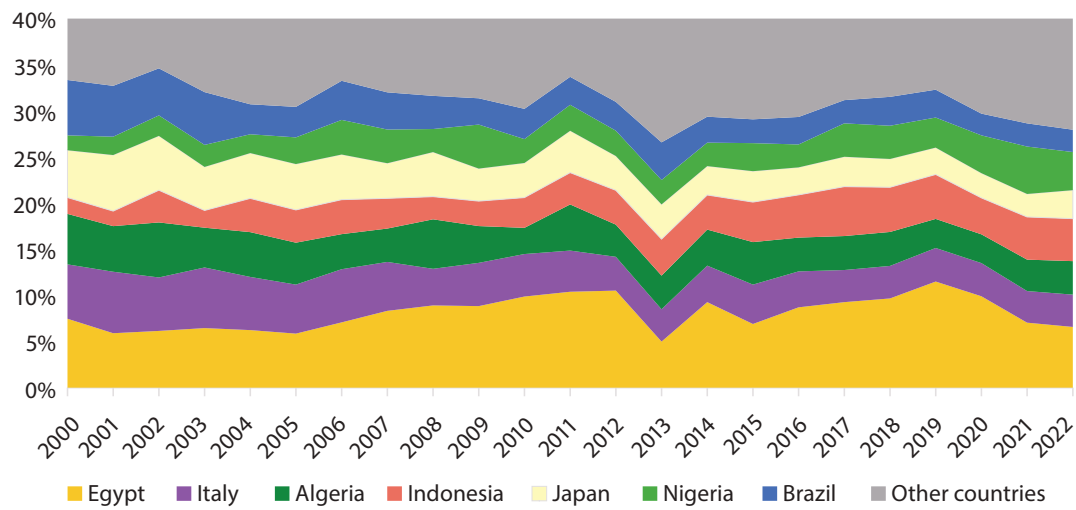
now completely dependent on food imports: the available land is not enough to meet the national demand for staple foods such as wheat and oilseeds [Chansiri 2023. P. 44]. Egypt buys about half of the wheat it consumes abroad [Barnes 2022. P. 6]. Growth in food imports was particularly rapid between 2006 and 2011 (see Figure 2 on p. 94).

Figure 2. Distribution of Egypt's food imports by country (left axis) and Egypt's total food imports (right axis) ($ million).



Source: Observatory of Economic Complexity.

Figure 3. Share of major importers in world wheat imports

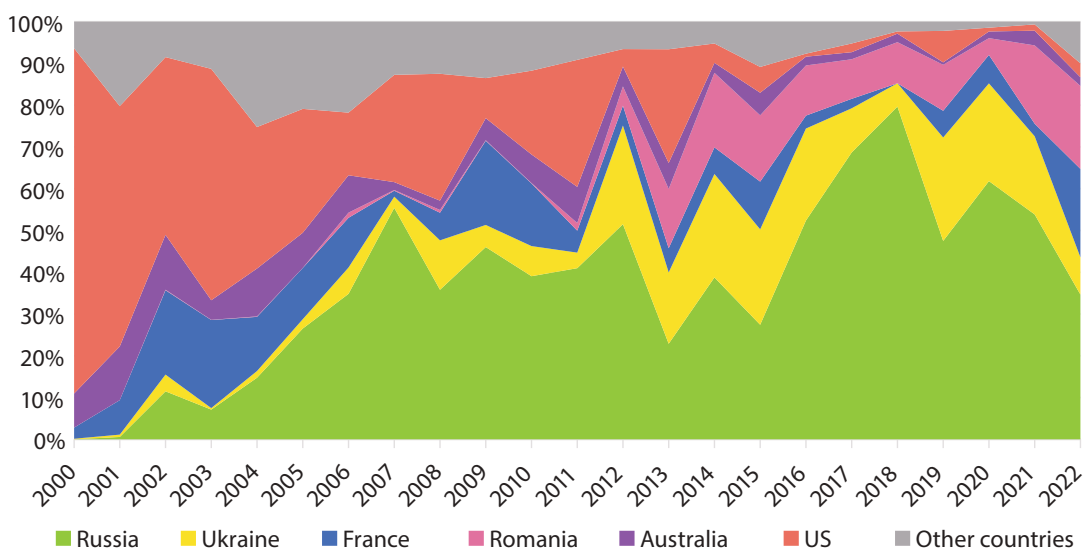


Source: Observatory of Economic Complexity.

The consumer basket in Egypt differs from the European one: it is not so expensive, as it contains less meat, fish, vegetables and fruits, but more wheat. Flatbreads, couscous, bulgur, pasta (for example, as part of the Egyptian national dish koshari) form the basis of the Egyptian diet. Wheat consumption per person in Egypt, as in many other countries of the Arab World, is twice as high as the world average [World Population Review 2024]. Egypt, the largest Arab country, has been the largest importer of wheat for many years (see Figure 3 on p. 94).

Figure 4 (p. 95) shows that in the early 2000s, Egypt bought almost all the wheat it needed from the United States, but gradually reoriented toward Russia and, to a lesser extent, Ukraine. By 2022, the import basket for this commodity was not sufficiently diversified. The armed conflict in Ukraine reduced the share of combined Russian and Ukrainian wheat imports to the 2006 level and forced Egypt to start looking for new suppliers.

Figure 4. Distribution of wheat imports to Egypt by country ($ million)



Source: Observatory of Economic Complexity.

It is important to acknowledge that in Egypt, the prices of essential commodities, including bread, are maintained at relatively low levels through the implementation of subsidies. Prior to the ascendance of the current President, Abd al-Fattah as-Sisi, the subsidy system was subject to relatively lax regulation. The state provided bakeries with flour and the requisite means to sell bread at a low price. However, this policy resulted in the exploitation of loopholes, with individuals purchasing quantities of bread exceeding their actual requirements. In some instances, bread was even used as animal feed. The purchasing of bread was subject to lengthy queues, with shortages occurring on occasion. In 2014, a reform was implemented, whereby special plastic cards were introduced,

allowing citizens to receive a limited quantity of bread at a significantly reduced price of five flatbreads per person per day. Abuses of this system are also present in Egyptian society. For example, employees of public bakeries have been known to cheat citizens by recording larger purchases on their cards in order to save flour for other products. On occasion, citizens have been observed to provide their cards to bakers in collusion with them, allowing the bakers to charge the full amount permitted by the state. Nevertheless, the new system has demonstrated its efficacy, reducing the number of queues and making bread more affordable [Barnes 2022. P. 159–167]. However, the provision of these subsidies represents a significant financial burden for the state. Subsidies for bread, as well as for a number of other essential goods, account for approximately 4% of total state expenditure [Breisinger 2024. P. 112]. The government is currently attempting to reduce the proportion of the population receiving subsidies from 70–80% to 50–60%. However, it is unable to restrict access to subsidized bread, even for the middle class, who, as a result of this measure, are able to maintain their standard of living and avoid falling into poverty [Barnes 2022. P. 167].

Consequently, the level of state expenditure in Egypt is significantly influenced by global wheat prices, as these determine the amount of funding that must be allocated to subsidize the domestic price of bread, which the government is obliged to maintain at a low level. For example, the sharp increase in wheat prices resulting from the Russian–Ukrainian conflict has caused significant concern among the country's leaders (see Figure 5 on p. 96). The Egyptian government has prohibited the export of select commodities, including pasta, flour, and various cereal grains, such as wheat, which it previously sold to neighboring countries on a periodic basis [Al-Ahram 2022]. The country's leadership is acutely aware that a shortage of bread or an increase in bread prices could incite mass protests, as evidenced by historical precedents in 1977, 2008, and 2011 [Barnes 2022. P. 3].

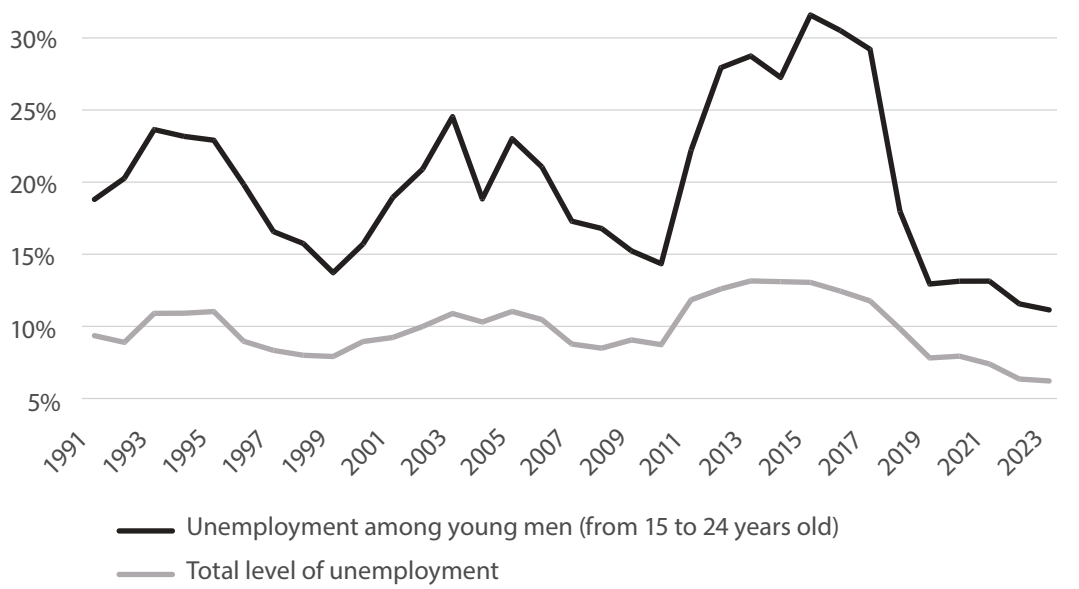
Figure 5. Prices in the world wheat market ($/bushel)

Source: Trading Economics.

Problems of low living standards and unemployment

Another important socio-economic factor that affects the level of discontent of the Egyptian population is unemployment. A significant part of the protesters in Egypt during the Arab Spring was represented by young people who could not find a job even after receiving higher education [Korotayev and Zinkina 2011. P. 23]. However, after the arrival of Abd al-Fattah as-Sisi, the situation began to improve. In recent years, both general unemployment and youth unemployment have shown record low rates for Egypt (see Figure 6 on p. 97).

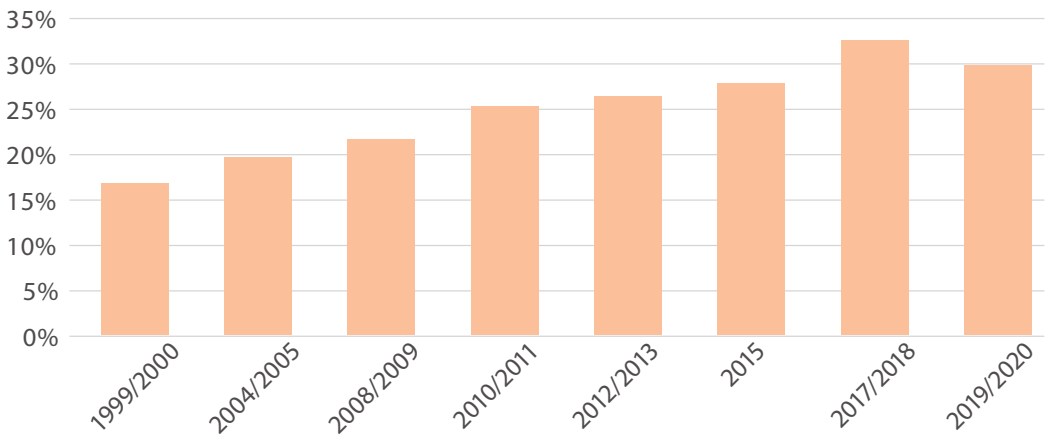
Figure 6. Unemployment in Egypt



Source: World Bank.

Although Egypt has a very low poverty rate (the proportion of people living on less than one dollar a day), poverty is a big problem for the country. For example, in 2019, more than 40% of the population spent less than five dollars per day [PIP 2019]. Due to the inflation of the national currency, the government has changed the thresholds for defining poverty several times in recent years. However, according to government statistics, poverty has steadily increased in recent decades, at least until recently (see Figure 7 on p. 98). While in some muhafazahs poverty is around 5%, in others it exceeds 50%. This is especially true in the Upper Egypt muhafazahs, where more than half of the rural population cannot meet basic needs [Elshahawany and Elazhary 2024. P. 112, 116–117].

Figure 7. Proportion of Egypt's population living below the nationally defined poverty line

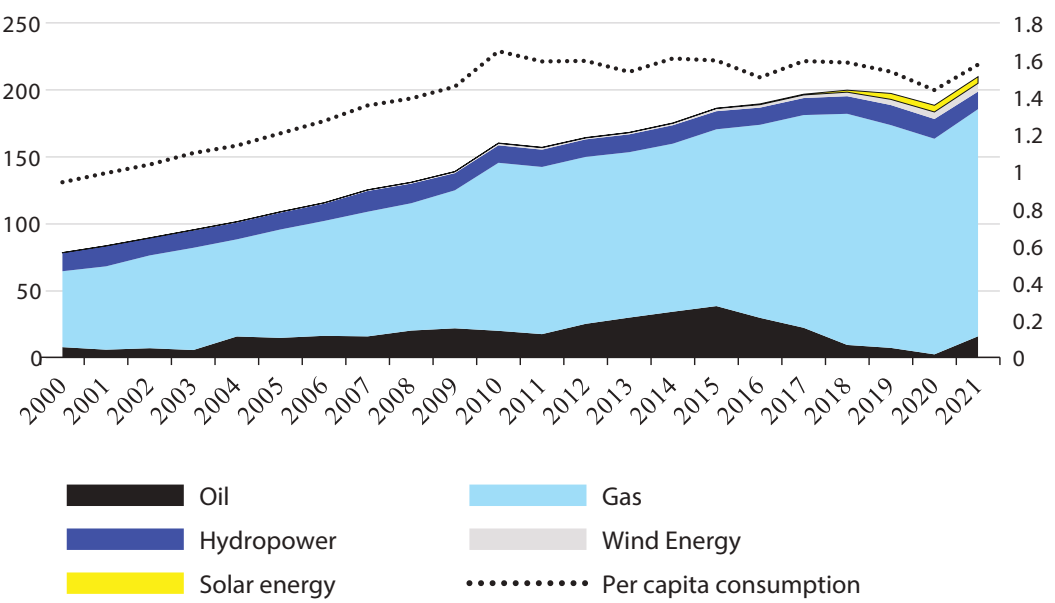


Source: CAPMAS.

Energy problem

The construction of the Aswan Dam had a profound impact on Egypt's energy potential. In the late 1960s and 1970s, the Aswan HPP was responsible for the production of over 50% of the country's total electricity consumption [Tayie, 2018. P. 434].

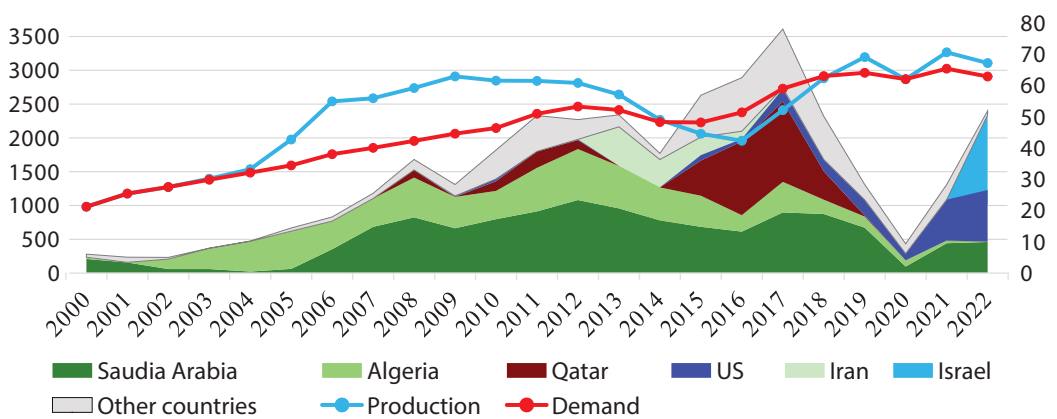
Figure 8. Distribution of electricity production in Egypt by energy source (left axis; TW·h) and electricity consumption per capita in Egypt (right axis; mW·h/person).



Source: IEA.

Nevertheless, by the beginning of the 21st century, the contribution of hydropower plants to the country's total electricity production had declined to 20%, and by the early 2020s, it had further diminished to 6%. Currently, the majority of the country's electricity is generated through the combustion of gas. Concurrently, the growth of electricity consumption per capita has ceased since 2010 (see Figure 8 on p. 98). The majority of gas used for electricity generation is produced domestically, with only a minor proportion imported (while at the same time there is gas export from the country). Consequently, between 2015 and 2017, when domestic gas production was insufficient to meet demand, Egypt increased its imports. In 2018, the commencement of gas production at the Zohr field resulted in a decline in imports. Furthermore, in 2020, when energy consumption declined due to the pandemic, Egypt temporarily ceased importing gas [Rana and Khanna 2020. P. 9–10]. This is illustrated in Figure 9 on p. 99.

Figure 9. Distribution of Egypt's natural gas imports by country (left axis; $ million) and domestic natural gas production and demand (right axis; billion m^3)



Source: OEC, OPEC.

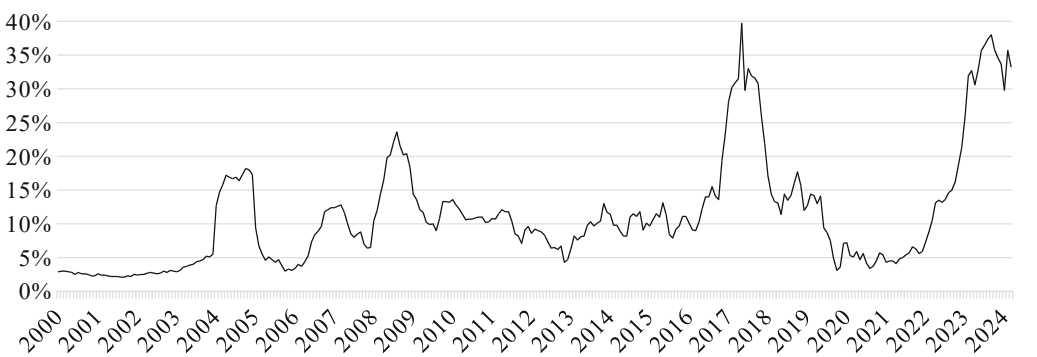
It is notable that by 2007, 99% of Egyptian households had already gained access to electricity. Despite this fact, the energy sector was still experiencing internal problems. The primary issue is that electricity in Egypt is subsidized and sold at a price that is significantly below the cost of production, resulting in considerable budgetary expenditure. In 2013, energy subsidies constituted 22% of government expenditure, representing approximately 6% of GDP. The low price of electricity prevented private energy companies from entering the market without government support. Concurrently, amidst political turbulence and a dearth of administrative resources, the country endured a series of recurrent disruptions in its energy supply between 2012 and 2014. The government has demonstrated considerable concern about the situation, implementing annual reductions in subsidies and raising electricity tariffs in response. From 2014 to 2019, the price of electricity in Egypt increased three and a half times [Rana and Khanna 2020. P. 10–15, 25–29]. Nevertheless, the resolution of the power outage problem represented a notable achievement of Abd al-Fattah as-Sisi's tenure. However,

since August 2023, due to the lack of production capacity to meet the growing demand, outages resumed [Ayoub 2024] and the problem persists to this day [Morsy 2024].

Macroeconomic challenges

It is not only electricity prices that are rising in Egypt. While most of the time the Central Bank of Egypt has managed to keep inflation at 10–15%, in 2017 and from 2022 to today, inflation can be characterized as galloping (see Figure 10 on p. 100).

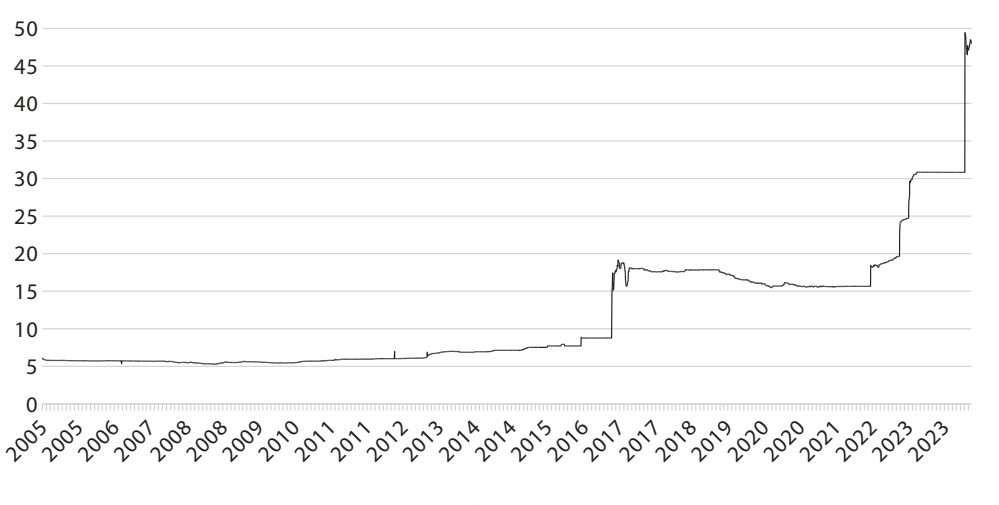
Figure 10. Consumer price index in Egypt



Source: Trading Economics.

At the same time, there was also a significant devaluation of the Egyptian pound against the dollar. Recent years have been particularly difficult for the Egyptian national currency (see Figure 11 on p. 100).

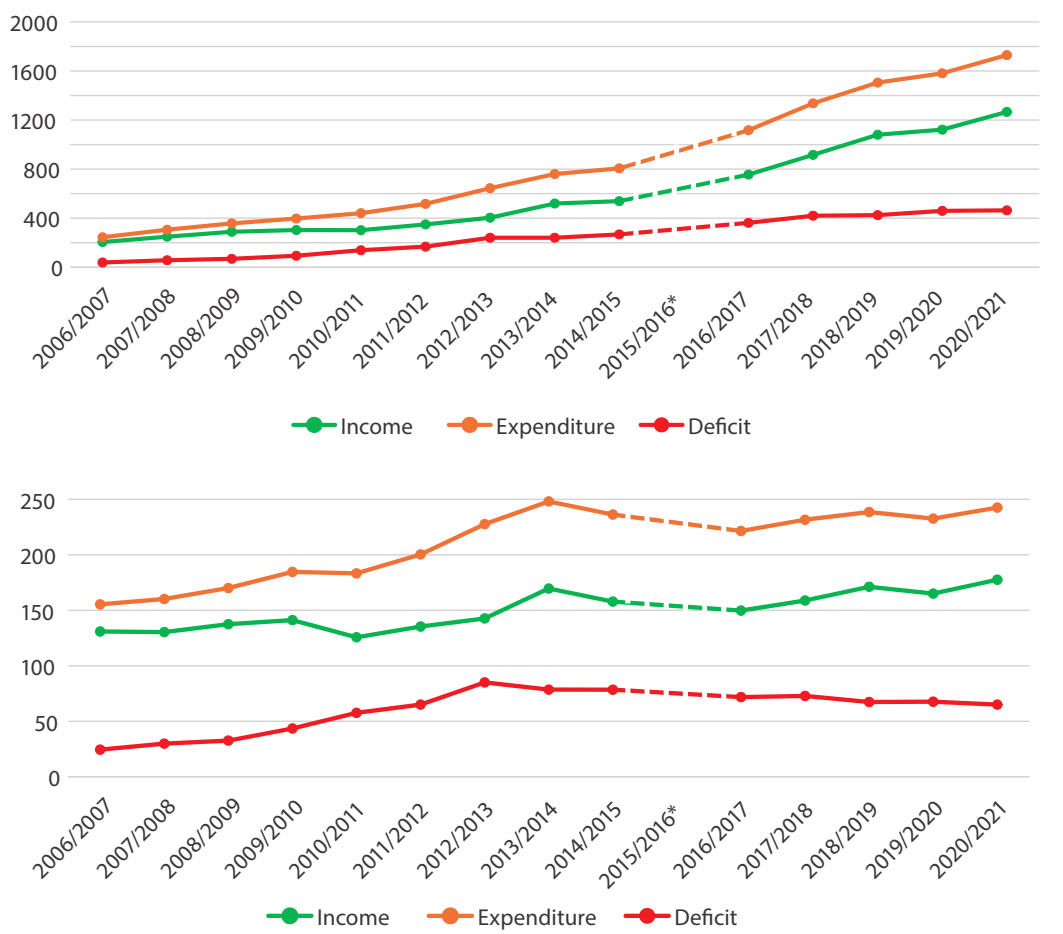
Figure 11. Value of the US dollar in Egyptian pounds at the official exchange rate



Source: Central Bank of Egypt.

Inflation has resulted in a persistent expansion of the budget deficit in nominal terms. However, when adjusting for inflation, it appears that since Abd al-Fattah as-Sisi came to power in 2014, the budget deficit has even started to decline, although it still remains high (see Figure 12 on p. 101). The Egyptian government has historically addressed its budget deficit through the issuance of domestic debt, which has increased significantly since the mid-2000s. However, Abd al-Fattah as-Sisi has adopted a markedly more external-financing-oriented approach to deficit financing. In the initial phase of the pandemic, when the deficit declined, he was once again compelled to resort to increasing domestic debt in order to meet the deficit (see Figure 13 on p. 102). Furthermore, the outbreak of the Russia–Ukraine conflict contributed to inflation and the subsequent collapse of the exchange rate. During the tenure of the current president, the country's external debt has increased significantly, largely due to the attraction of funds from China and GCC countries, as well as international organizations [Roll 2022. P. 8, 15, 19].

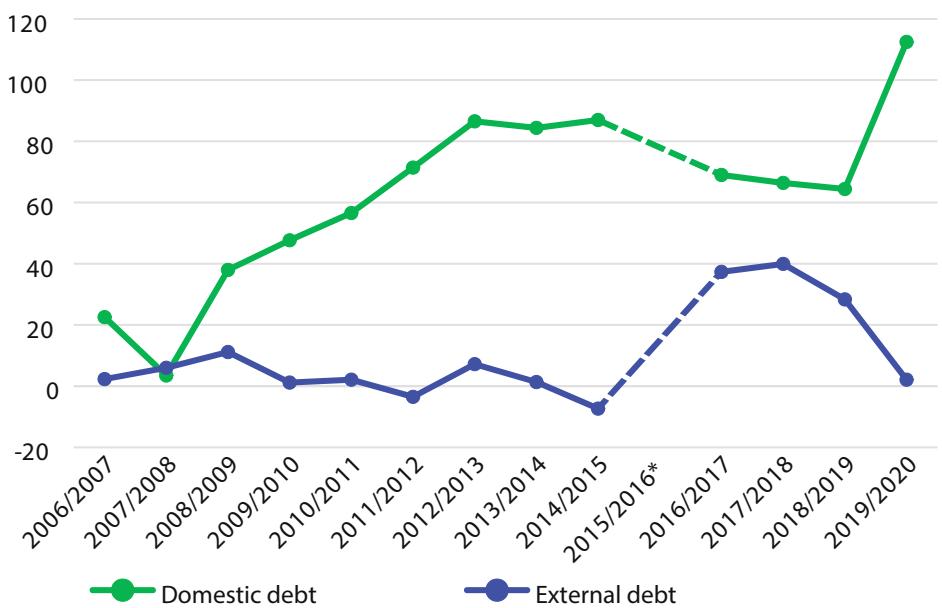
Figure 12. Egyptian government budget in current prices (top; billion Egyptian pounds) and inflation-adjusted in 2000 prices (bottom; billion Egyptian pounds 2000)



* No data available for fiscal year 2015/2016.

Source: Central Bank of Egypt.

Figure 13. Egypt's inflation-adjusted domestic and external debt in 2000 prices (billion Egyptian pounds 2000)



* No data available for fiscal year 2015/2016.

Source: Central Bank of Egypt.

Megaprojects are the problem solution

Egypt is currently facing a challenging situation in which it must select between two unfavorable policy options. The first option entails a reduction in public expenditure, thereby curbing the budget deficit and net imports. Nevertheless, the result of such austerity measures will be a decline in GDP, a reduction in living standards and an increase in unemployment, as a decrease in public spending will lead to a decrease in economic activity. Macroeconomic stabilization at such a cost could weaken the position of Egypt's current elites and reduce a popular support. The second strategy is to maintain or increase spending, which would serve to maintain the level of economic activity and employment. Nevertheless, the consequence of augmented government expenditure is an expansion of the budget deficit and net imports.

Although both strategies entail significant costs, the Egyptian government has, as might have been anticipated, opted for the second. Egypt persists in pursuing a stimulative fiscal policy, maintaining a high level of expenditure [IMF 2024b. P. 7]. One of the reasons for this choice is that austerity is politically costly. Those who have lost their jobs and been deprived of part of social assistance may begin to express their discontent publicly. Such a scenario is to be avoided.

Consequently, the Egyptian leadership is pursuing a strategy of megaprojects. There is no official set of criteria defining what constitutes a megaproject. The term is used in the media and official documents in relation to large infrastructure projects, for

example, as in the Egyptian strategic plan, "Egypt Vision 2030" [Egypt Vision 2030. P. 17]. Accordingly, in the following text, the term "megaproject" will be used to refer to those large projects that have been so labelled in other sources, primarily in the media.

The implementation of megaprojects serves to address the following issues currently facing the country:

1. The issue of overpopulation and the deterioration of infrastructure can be addressed through the implementation of transportation and urban development megaprojects.
2. Land reclamation projects for agricultural and fish farming purposes are designed to address the food security challenge.
3. The involvement of the population in the execution of megaprojects, coupled with the creation of new employment opportunities at the facilities, can help to alleviate socio-economic issues.
4. The construction of numerous power plants based on both fossil and renewable sources, as well as the large Ad Dabaa nuclear power plant, is intended to address the issue of energy scarcity.
5. Finally, the creation of a positive image of megaprojects and the attraction of funds from abroad can help to mitigate macroeconomic problems.

Furthermore, megaprojects have the potential to exert a significant influence on the political landscape. In contrast to the mere enhancement of macroeconomic indicators, megaprojects can serve as a demonstration of development and prosperity, thereby securing support in favor of the government. The political effect of megaprojects is further enhanced by the fact that "great construction projects" are distributed across different regions, thereby demonstrating the economic power of the country to the population.

The government is effectively subsidizing the political benefits at the expense of the country's budgetary constraints, as evidenced by the IMF's [IMF 2024a] observation that infrastructure projects place a significant burden on the country's finances. Furthermore, the profitability of these projects, including the largest ones such as the New Administrative Capital and the expansion of the Suez Canal, is often subject to scrutiny [Roll 2022. P. 27–28]. In order to mitigate this burden, the Egyptian leadership endeavors to attract foreign investment and seeks external contractors (see Appendices 1–5). In many cases, the volume of investment is considerable. For instance, on February 23, 2024, the UAE pledged to invest $35 billion in the Ras al-Hekma construction project in return for a 65% stake in the project [NewArab 2024].

Foreign involvement in modern Egyptian megaprojects

Methodology

Since there is no single up-to-date list of megaprojects, the authors compiled this list independently for the purposes of the study. For this purpose, they analyzed materials from the following media outlets: Al-Qahira Al-Ikhbariya (Arabic. القاهرة الإخبارية), Al-Ain

Al-Ikhbariya (Arabic. العين الإخبارية), Oxford Business Group, CSR Egypt, SkyNews Arabiya, al-Ahram, Reuters, CNN, al-Arabiya, The Impossible Build, Indian Construction Info, Ventures Onsite, Construction Review, The New Africa Channel, MEED, Vlaanderen. Examination of media data from different countries and profiles yielded a fairly broad list of 44 megaprojects. Of these 44 megaprojects, two have not been implemented (King Salman Bridge and Hamrawein coal power plant) and ten have not been identified as relating to foreign involvement. This does not mean that foreign companies were not involved in these projects, as it is possible that such involvement was not publicized or covered by the media.

In order to identify the countries from which the investors in the megaprojects under consideration originated, the Google News aggregator was used to systematically search for mentions of the specific megaprojects and their investors in news reports. In the initial stage of the process, the names of the megaprojects were provided in English, accompanied by the relevant forms of participation. To illustrate, the following example is provided:

"New Administrative Capital + Foreign Investment"

The above search term was employed to search for references related to foreign investments in the New Administrative Capital. Furthermore, the name of the megaproject was entered in conjunction with the names of countries. At the outset of the investigation, the search was conducted using a list of Egypt's ten principal import trading partners for the period between 2012 and 2022 (PRC, US, Russia, Saudi Arabia, Germany, Turkey, Italy, Ukraine, India, and UAE) [OEC n.d.]. To illustrate:

"New Administrative Capital + Saudi Arabia"

In the future, when a new country was mentioned, it was incorporated into the list of countries to be searched. As a result, it was possible to identify the notable involvement of the Republic of Korea, Japan, United Kingdom, and other countries in Egyptian megaprojects. Such a comprehensive and meticulous search ensured the identification of crucial information and the avoidance of erroneous inferences.

It is possible that the authors may have collected incomplete information, as the names of countries were absent from the articles and the presence of foreign entities was identified through the names of foreign companies. Nevertheless, this potential issue does not appear to be significant. As a general rule, the frequency of new references to the megaproject declined with the number of queries.

Once the search had been concluded, the list of countries was divided into three distinct groups. The OECD, BRICS-5 and GCC countries. Despite the UAE's ascension to full BRICS membership on January 1, 2024 and Saudi Arabia's active involvement in numerous BRICS activities, it was determined that the Gulf monarchies should be grouped separately. It is typical for Saudi Arabia, the UAE, Kuwait and Qatar to participate in megaprojects in a particular manner, namely through the utilization of financing provided by sovereign wealth funds. To illustrate, the Abu Dhabi Development Holding Company (ADQ), a sovereign wealth fund owned by the United Arab Emirates (UAE), is involved in the construction of Ras al-Hukma city [The New Times 2024]. Additionally, the

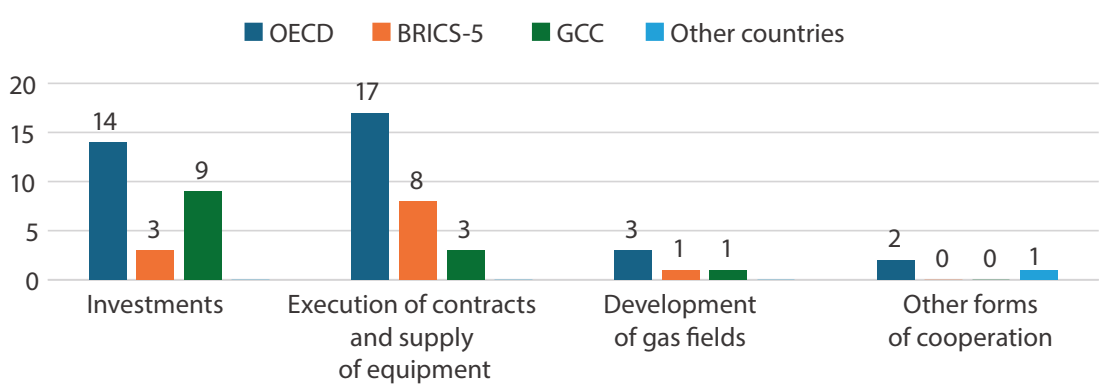
Benban Power Plant is managed through Masdar, a company owned by the UAE sovereign fund Mubadala Investment Company [Casey 2023]. The OECD is included in the analysis because it comprises the majority of developed countries, which allows for a comparison of the influence of BRICS countries and developed countries on the development of Egyptian megaprojects.

For each country, the format of participation in the project was indicated in parentheses: G indicates the involvement of the state, sovereign fund or public corporation; P denotes the participation of the country through private companies; NS denotes a form of participation that is not specified (for further details, please refer to Appendices 1–4).

Findings

Analysis of the data shows that OECD countries are involved in most of the megaprojects in Egypt, both as investors and as contractors. Their active participation is explained by the positive relationship between a country's GDP per capita and the volume of its foreign investment, due to the higher capital intensity of developed countries and the resulting lower return on domestic investment, which makes companies from developed countries more willing to invest in developing countries [Bano and Tabbada 2015]. This also explains why the GCC countries are more often investors than contractors, as the Gulf monarchies, in an effort to save oil revenues, channel them into sovereign wealth funds that can invest in, among other things, Egyptian megaprojects (see Figure 14 on p. 105).

Figure 14. Number of megaprojects involving foreign investors and contractors belonging to different country groups, by type of participation



Source: compiled by the authors on the basis of media data.

The active participation of OECD countries in Egyptian megaprojects as contractors is linked to their overall level of technological and economic development, which ensures

leadership in the production of transport and energy equipment. The contribution of the BRICS countries, led by China, is much higher than that of the Gulf monarchies, where high-tech manufacturing is less developed.

The participation of different groups of countries in megaprojects reflects Egypt's neutral status and shows that the country favors one foreign partner or another based on the quality of its services rather than geopolitical considerations. Rosatom is the leading company in the field of nuclear energy, which is why it was chosen to build the Ad Dabaa nuclear power plant. China is the leader in housing construction and therefore plays a crucial role in the construction of the New Administrative Capital and New Alamein. And the German company Siemens is one of the leaders in the field of energy equipment manufacturing, which is why Egypt favored its services in the construction of the Beni Sueif and Burullus thermal power plants [Egypt Independent 2024; Ngugi 2023; Power Online 2016; Power Technology 2019].

Foreign participation in Egyptian megaprojects varies considerably. OECD countries are much more likely to be represented by private companies, while BRICS and GCC countries are represented by state-owned enterprises and sovereign wealth funds. This is due to the structure of the economies of the investor and contractor countries—the role of state-owned enterprises is much higher in the BRICS and GCC countries.

The level of foreign participation in Egypt's megaprojects is also uneven. It is impossible to make an accurate assessment because little of the information is public and the forms of foreign participation vary. According to S. Roll's estimates, the largest amount of foreign direct investment comes from the GCC countries, mainly Saudi Arabia and the UAE. Their cooperation with the BRICS countries has significantly strengthened the organization's position in Egypt. Although the number of megaprojects involving BRICS countries still lags behind the number of megaprojects involving OECD countries, BRICS is likely to overtake the largest Western economies in terms of direct financing, largely due to the crucial contribution of Arab sovereign wealth funds [Roll 2022].

Conclusions and discussion of findings

The study demonstrates that foreign participants are frequently engaged in the execution of Egyptian megaprojects in the capacity of contractors (28 megaprojects) rather than solely as investors (26 megaprojects). This can be attributed to the fact that megaprojects are financed not only by private investors, but also by government funds. The rapid growth of the Egyptian population is forcing the country to address the issue of unemployment, as well as the lack of energy and the poor quality of its infrastructure, through the implementation of megaprojects. Nevertheless, the implementation of these projects places a considerable burden on the state budget, thereby increasing the risk to the Egyptian economy.

It is hypothesized that Egypt's accession to the BRICS may have a beneficial impact on the country's economy, given the enhanced opportunities for interaction with the organization's members, which could facilitate the conclusion of new contracts. It is also noteworthy that OECD countries are involved in the financing

and implementation of megaprojects indirectly. Typically, the Egyptian government enters into contracts with companies from these countries, rather than with their governments. In contrast, the situation with the BRICS countries, which will include the UAE from 2024 onwards, is characterized by the presence of state-owned corporations and sovereign wealth funds, which represent the main actors in the Egyptian economy. Consequently, in order to utilize the services of a state corporation or a sovereign fund from a BRICS country, a contract must be concluded at the state level. Furthermore, whereas Egypt is only able to offer financial assistance to a private firm, an agreement between the two states is more likely to encompass a significant non-financial political component.

The question of whether international cooperation can provide a solution to Egypt's economic challenges remains unanswered. While the significance of the Suez Canal and the Aswan Dam, which continue to exert a considerable influence on Egypt's economy, was once unquestionable, the extent to which modern megaprojects can facilitate economic recovery remains uncertain. In this context, it is of paramount importance for the country, while seeking external assistance, to avoid becoming overly reliant on any particular political bloc and to refrain from becoming a victim of the growing global contradictions.

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Appendices

Appendix 1. Investor countries in Egypt's megaprojects

Project name	Type of project	OECD	BRICS-5	GCC
The new administrative capital	Town planning		China (G), South Africa (NS)	UAE (NS)
Line 3 of the Cairo Metro	Transport	South Korea (G)		
Line 4 of the Cairo Metro	Transport	Japan (G), South Korea (G)		
Tahrir Petrochemical Complex	Industry	USA (G), South Korea (G), Italy (G)		
Benban SPP	Energy	United Kingdom (G)		UAE (G)
Burullus TPP	Energy	Germany (P)		
Beni Suef TPP	Energy	Germany (P)		
Construction of new roads	Transport			Kuwait (G)
City Gate	Town planning			Qatar (G)
Golden Triangle	Other	Australia (P)		Kuwait (G)
Planting palm trees	Other			UAE (P)
The new Assiut Dam	Energy	Japan (G), Germany (G)		
Zaafarana WPP	Energy	Denmark (P), Japan (P), Switzerland (P)		
The city of the 10th of Ramadan	Town planning	Turkey (NS), Italy (P), France (P)	India (P), China (NS)	Saudi Arabia (NS)
Gabal az-Zeit WPP	Energy	United Kingdom (P)		
Suez Canal Economic Zone	Industry	Japan (P), Germany (NS)	Russia (G), China (NS)	Qatar (G), Kuwait (G), UAE (G)
Port of Ain Sokhna	Transport	British Virgin Islands/ Hong Kong (P)		
Cairo Metro Line 6	Transport	South Korea (G)		
Ras al Hekma	Town planning			UAE (G), Qatar (G)

Source: compiled by the authors on the basis of media data.

Appendix 2. Contracting and supply of equipment for Egypt's megaprojects

Project name	Type of project	OECD	BRICS-5	GCC
The new administrative capital	Town planning	Germany (P)	China (G)	Saudi Arabia (G)
Ain Sukhna – Marsa Matrouh railway	Transport	Germany (P)	China (G)	
El Dabaa NPP	Energy	South Korea (G)	Russia (G)	
Line 3 of the Cairo Metro	Transport	South Korea (G)		
Line 4 of the Cairo Metro	Transport	South Korea (G), France (P)		

Project name	Type of project	OECD	BRICS-5	GCC
Tahrir Petrochemical Complex	Industry	South Korea (P), Germany (P)		
New Alamein	Town planning		China (G)	
Monorail to the New Administrative Capital	Transport	United Kingdom (P), Spain (P), Canada (P)	China (G)	
Benban SPP	Energy	Germany (P)		
Burullus TPP	Energy	Germany (P)		
Beni Suef TPP	Energy	Germany (P)		
Golden Triangle	Other	Italy (P)		
The new Assiut Dam	Energy	Japan (P), Austria (P), Germany (P)		
Zaafarana WPP	Energy	Norway (P)		
West Delta gas project	Energy	Italy (P)		
Salamat gas field	Energy	Denmark (P)		UAE (G)
The city of the 10th of Ramadan	Town planning		China (G)	
Cairo Metro Line 6	Transport	France (G), Canada (P)		

Source: compiled by the authors on the basis of media data.

Appendix 3. Development of gas fields in Egypt

Project name	OECD	BRICS-5	GCC
Development of the Zohr gas field	Italy (P), United Kingdom (P)	Russia (G)	UAE (G)
West Delta gas project	United Kingdom (P)		
Salamat gas field	United Kingdom (P)		

Source: compiled by the authors on the basis of media data.

Appendix 4. Other cooperation

Project name	Type of project	OECD	Other countries
The new administrative capital	Town planning	Canada (G)	
Al Galala	Town planning	United States (G)	
Airport expansion	Transport		Singapore (G)

Source: compiled by the authors on the basis of media data.

Appendix 5. Egypt's megaprojects in which the authors were unable to identify the participation of foreign countries

Project name	Type of project
Expansion of the Suez Canal	Transport
Fish farming areas	Other
Medical Capital	Town planning
Rod El Farag Axis Bridge	Transport
Agricultural Reclamation	Other
October Oasis	Town planning
Berenice military base	Other
Cairo airport terminal 4	Transport
Damietta Furniture City	Industry
The Grand Egyptian Museum	Other

Source: compiled by the authors on the basis of media data.

Overview of the Roundtable "Environmental Conservation and Combating Climate Change: What Can BRICS Offer the World?"

On April 18, 2024, as part of the work of the BRICS Expert Council—Russia, the HSE University held a round table "Environmental Conservation and Combating Climate Change: What Can BRICS Offer the World?". During the event, leading Russian experts in environmental economics and sustainable development presented their reports and comments.

* * *

The roundtable was inaugurated by **Igor Makarov**, head of the School of World Economy at the HSE University. He highlighted that collaboration on environmental and climate change matters within the BRICS framework is being actively pursued, yet it cannot be asserted that a unified stance on this matter has been established among the BRICS countries thus far. Russia is interested in providing a new impetus to this area of cooperation. The objective of the event is to propose and discuss potential strategies that could be employed during the Russian BRICS Chairmanship in 2024.

The first presentation was delivered by **Sergey Bobylev**, head of the Environmental Economics Department at the MSU Faculty of Economics. He identified five principal factors that explain why BRICS is an environmental donor to the planet. Firstly, the BRICS countries are home to the largest areas of land undisturbed by economic activity. Secondly, the BRICS countries are also home to the world's largest mass of forests, which has a considerable impact on the Earth's climate system. Thirdly, of even greater significance is the fact that the BRICS countries possess extensive reserves of fresh water, which is undoubtedly one of the most crucial resources of the 21st century. Fourthly, the countries in question possess an extensive biodiversity. Additionally, the countries possess vast areas of wetlands that function as carbon sinks, which is a crucial factor in climate stabilization. Bobylev highlighted the necessity of establishing a unified platform for the harmonization of environmental interests among the BRICS countries. For instance, it would be advantageous to establish a unified set of criteria for evaluating sustainable and green development projects across the countries, as well as to align the development of green and sustainability bond markets. In conclusion, the speaker proposed the introduction of a system of compensation (payments) for ecosystem services in Russia and the unification of the efforts of the BRICS countries to capitalize on their environmental benefits.

Alexander Shestakov, an expert from the Lomonosov Moscow State University Marine Research Center, presented a report on the potential for collaboration between

the BRICS countries in the field of biodiversity. As a permanent participant in biodiversity negotiations, Shestakov concurred with Bobylev's assessment of the significance of ecosystem services, observing that this concept has increasingly come to be understood as "nature's contribution to human well-being." The expert observed that previous BRICS declarations had addressed the issue of biodiversity and that the latest declaration had three paragraphs devoted to this issue. The six BRICS members are megabiodiversity countries, making the issue of biodiversity protection a critical concern for them. The development and exchange of environmental technologies as well as capacity building in biodiversity science represent key areas of interest within the BRICS framework. The BRICS countries could benefit from the experience of the Like-Minded Megadiverse Countries (of which a number of BRICS countries are members, although Russia is not), which are highly active in international negotiations. It would be advantageous for the BRICS countries to establish a system of participation in negotiations with a unified position. To date, there has been only one small statement from the BRICS countries in the environmental sphere, which was made during the most recent United Nations Environment Assembly (UNEA).

In his report, Shestakov outlined the priorities of the BRICS countries' cooperation in the field of biodiversity. The initial objective is to secure a minimum of $200 billion in funding for biodiversity protection from all sources by 2030. It is of critical importance for the BRICS countries to unite in international negotiations. In 2023, a new global biodiversity fund was established, which developing countries (including those belonging to the BRICS group) are relying on. Furthermore, the expert indicated that the BRICS countries are also seeking Russia's support for the fund's activities. Secondly, the question of establishing an international mechanism for the distribution of the benefits derived from the utilization of digital information on genetic sequences, which can be employed to finance biodiversity conservation, remains unresolved. Thirdly, the global objective is to achieve a protected area coverage of 30% of the total land and sea area by 2030. The BRICS countries have expressed interest in the practical aspects of the new concept of "effective area-based conservation measures." The development of biodiversity indicators and the implementation of mandatory reporting may also emerge as priorities for international collaboration, alongside the incremental integration of biodiversity considerations into sectoral plans, financial documents, the Environmental Impact Assessment (EIA) system, and other relevant domains.

The discussion on climate cooperation within the BRICS framework commenced with a presentation by **Sofia Litvinova**, deputy director of the Department of Multilateral Economic Cooperation and Special Projects of the Russian Ministry of Economic Development. She recalled that, as part of its BRICS chairmanship, Russia's objective is to reinforce climate cooperation within the BRICS framework and to elevate it to a standalone area of focus. The proposal to establish a Contact Group on Climate Change and Sustainable Development has been endorsed by all BRICS partners. Litvinova expressed her hope that the work in this direction will continue during the Brazilian chairmanship. It is anticipated that this platform will facilitate the exchange of expertise and best practices pertaining to low-carbon development, the implementation of climate projects, the development of carbon market infrastructure, green finance, and the

utilization of natural ecosystems to address climate challenges. The initiative places considerable emphasis on the development of scientific and expert cooperation with BRICS partners. Furthermore, Russia has put forth the proposal to establish a BRICS climate research platform. Similar initiatives have already been established in the fields of energy and technology. A further proposal from Russia is the establishment of the BRICS Partnership on Open Carbon Markets. The synchronization of the development of this partnership would be beneficial for all BRICS countries. Given the particular importance of climate change adaptation and adaptation planning for the BRICS countries, the partners were presented with an initiative to develop recommendations to stimulate the BRICS adaptation potential and criteria for adaptation projects. To date, an adaptation taxonomy has yet to be developed in Russia. The commencement of BRICS discussions on this topic could facilitate the advancement of Russian domestic regulation in this field.

The next report was presented by the moderator of the event, **Igor Makarov**. He posited that climate cooperation among the BRICS countries should become one of the priorities of the association. All the necessary prerequisites for this are in place. The BRICS countries are the largest emitters of greenhouse gases: taking into account new members, emissions account for more than half of the global total, and the share is constantly growing. The BRICS countries have common views on the global order, including on climate change. The BRICS countries do not possess the readily available straightforward solutions that are often proposed by developed countries (for example, divestment from fossil fuels). On the contrary, the BRICS countries recognize the intricate nature of the issue and acknowledge that efforts to combat climate change may simultaneously address other socio-economic challenges and, conversely, potentially impede the achievement of certain SDGs, such as those pertaining to poverty reduction. In conclusion, the BRICS countries are exporters of carbon-intensive products, thereby exporting emissions in their final products.

Furthermore, Makarov presented a number of potential avenues for collaboration between the BRICS countries. Firstly, a proposal was put forward to create in-house center of expertise (BRICS Climate Research Agency), which would be responsible for developing climate and energy scenarios and expert recommendations for the BRICS countries. At present, such work is conducted by the IEA (International Energy Agency) and the OECD (Organization for Economic Co-operation and Development). However, these studies are based primarily on the experience and interests of Western countries, and the priorities of the BRICS countries remain underrepresented. Secondly, Makarov proposed a transition to a system of emissions accounting that is based on consumption, in addition to the current system based on production. He also suggested that, on a voluntary basis, consumption-based emission targets could be integrated into the BRICS countries' national emission reduction targets. Further steps could include intensifying dialogue among countries on instruments to regulate consumption-based emissions and demanding the inclusion of consumption-based emission reduction targets in future climate agreements under the UN. Thirdly, it is crucial to facilitate collaboration on the development of carbon market infrastructure. The financial outlay required to reduce greenhouse gas emissions is significantly less in BRICS countries than in developed countries. The establishment of a unified carbon market system among the

BRICS countries could serve as an effective catalyst for the implementation of climate change initiatives within their respective territories. Fourthly, it is imperative that the principles of international climate cooperation, as espoused by the BRICS countries, be enshrined in a declaration by the BRICS leaders (or alternatively, in a separate declaration on climate issues). These include the principles of technological neutrality and the neutrality of climate policy instruments, the necessity of addressing the climate crisis without prejudice to other SDGs, the importance of fostering dialogue between exporters and importers of fossil fuels and carbon-intensive goods, the necessity of calculating emissions not only by production but also by consumption, and the imperative of countering protectionism under the pretext of climate policy. It is possible that the principles formulated by the BRICS countries could be incorporated into global documents at some point in the future.

The floor was then given to **Alexandra Khlebnova**, head of the Climate and Ecology of the International and Comparative Law Research Center. She commenced her address by recalling that the subject of climate change within BRICS has been a concern since the inception of the organization's activities. However, until recently, this domain has not been constituted as a discrete entity. This situation is a consequence of the disparate levels of advancement in the implementation of climate policy across the BRICS countries. Khlebnova observed that the principal work on climate change commenced following the COP26 in Glasgow (UN Climate Change Conference 2021). Furthermore, she posited that it is necessary for the BRICS countries to move beyond their historically conservative approach to climate change and to adopt a more proactive position within the association, which could then be disseminated on global platforms. The speaker highlighted the significant issue of mutual ignorance of carbon regulation among the BRICS countries. She expressed the hope that companies from these countries that are able to participate in existing and developing climate initiatives within the group will gain a deeper understanding of the opportunities presented by the BRICS markets. Such collaboration at the expert level within the BRICS framework could prove beneficial in this regard.

Evgeny Khilinsky, vice president – head of the Center for the Implementation of the Principles of Sustainable Development at Gazprombank, observed that some of the aforementioned initiatives and areas of cooperation are currently being discussed within the BRICS Business Council. In particular, he highlighted the importance of the voluntary carbon markets initiative, which aims to reduce barriers to the trade of carbon assets between countries. At present, the market is characterized by a high degree of fragmentation. To address this issue within the BRICS countries, Khilinsky put forth a three-stage approach: firstly, the harmonization of the regulatory framework; secondly, the formation of a pool of mutually recognized verifiers; and thirdly, the creation of a single registry of climate projects. Colleagues from China have indicated general agreement with this approach and are prepared to engage in further elaboration. However, colleagues from India have expressed concern that the BRICS climate project registry may replicate the mechanisms set forth in Article 6.4 of the Paris Agreement. Additionally, the expert indicated that within the BRICS Business Council, the Russian side will propose a unified approach to defining which projects can be considered transitional. It is likely that a unified concept (and potentially a taxonomy) of what

constitutes transitional financing within BRICS will emerge in the future. Once this concept has been approved, the logical subsequent step would be to designate transition finance as climate finance.

Sergey Sementsov, scientific supervisor of the Center for Sustainable Development of the VEB.RF Institute, commenced his presentation with the observation that the subject under discussion is less a matter of scientific inquiry and more an economic issue, given that it concerns the allocation of investments, the utilization of technologies, and the development and creation of new markets. The expert expressed skepticism about the feasibility of developing a unified taxonomy of climate projects in the BRICS countries, citing the existence of disparate national development agendas and unique national characteristics. Additionally, there is a distinction between developing and developed countries, primarily concerning the interpretation of the term "sustainable development" and its fundamental essence. The question thus arises as to whether the objective is to endure suffering or to develop. Sementsov observed that the European approach to sustainable development is characterized by an approach of "suffering," and identified the primary objective as the mitigation of adverse effects associated with the transition to low-carbon development. Conversely, developing countries maintain that the new agenda should facilitate their advancement. In addition to noting this schism, the speaker also underscored that Europe adheres to the assertion that "climate is our everything," whereas developing countries, on the contrary, consider sustainable development in a multifaceted manner, encompassing adaptation, mitigation, environmental, and social considerations. In conclusion, the expert endorsed the BRICS principle of technological neutrality. "It doesn't matter what color the technology is: if it reduces CO_2 emissions, it is good."

The subsequent report was presented by **Dmitry Chernyshev**, the vice president of the Saint Petersburg International Mercantile Exchange. Chernyshev asserted that, at the current juncture, the establishment of global standards and certification within the climate sphere is largely monopolized by developed countries. These standards are primarily oriented toward aligning with their unique circumstances and ideological prerequisites. Furthermore, standards and certifications are frequently employed as a competitive restriction in their respective markets. However, the BRICS countries are significant contributors to the production and distribution of a vast array of essential commodities. In specific markets, such as those for steel and aluminum, the BRICS countries are the dominant players, accounting for more than half of the supply and demand. Nevertheless, even in these markets, the BRICS countries are entirely reliant on standards, certifications, and pricing systems that are developed outside their borders. It is imperative that the BRICS countries enhance their influence on the processes of formulating the rules of international trade, while simultaneously considering their own interests. Presently, the BRICS countries maintain a disparate stance, which makes it simple for developed countries to advance their own agendas. BRICS countries need to act in a more consolidated manner. For example, the BRICS countries could spearhead the proposal of traceable supply chains for green products. It would also be advisable to establish a Green Goods Association, whose principal function would be to develop and approve methodologies for verifying the carbon footprint of products and to accredit

national companies as direct verifiers. Such certificates could become universally recognized documents confirming the carbon footprint of green products in cross-border and national trade.

Vladimir Drebentsov, chief advisor to the general director of the Russian Energy Agency of the Ministry of Energy of the Russian Federation, identified two contentious issues that require consensus within the Russian expert community in the context of climate cooperation within the BRICS framework. The initial inquiry pertains to the necessity of integrating the various "natural" topics, including pollution, biodiversity, water, etc., with climate change? He is inclined to favor the "no" option, given that the primary focus of climate change mitigation is energy. The second question pertains to the necessity of harmonizing regulatory systems and developing common standards. The question thus arises as to whether the objective is to facilitate trade in carbon units within the BRICS framework or to develop a unified BRICS position on this issue in relations with third countries. In contrast to the G7, the BRICS is an artificially created association with no clearly defined economic, trade, or other basis. It is therefore crucial for the BRICS countries to adopt a unified stance and to engage in the negotiating process with this position in place. For instance, with respect to the calculation of emissions based on consumption, the pivotal matters pertain to the apportionment of responsibility for emissions and the associated financing. In order to address these issues, it is important for the BRICS countries to adopt a unified position. Therefore, it would be more advantageous for the BRICS to present a unified front externally than to develop internal relationships. In order to establish a unified position, it would be useful for the BRICS countries to develop common scenarios for energy transition, replacing the individual scenarios currently being developed by each member country. It is necessary to direct the efforts of all platforms created for cooperation within BRICS toward formalizing the converging interests into a common position that can be further promoted in international negotiations.

In his closing remarks, **Igor Makarov** observed that the BRICS countries possess the potential to establish a unified stance on environmental and climate change matters, including the formulation of an alternative proposal to the prevailing climate regime. However, for this to occur, it is imperative that the BRICS countries adopt a more proactive stance on climate and environmental issues. The ideas that emerged from this seminar can be used to build channels of interaction within BRICS in order to create a basis for such proactivity.

The review is written by
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