



Expansion of BRICS: what are the potential consequences for the global economy?

On 1 January 2024, the BRICS group (Brazil, Russia, India, China and South Africa) was expanded to include five new countries. This represents a new phase in the bloc's development and gives it greater economic and demographic weight. However, the heterogeneity of its members and low trade integration between them limit the group's ability to influence world trade and the international monetary system. At this stage, the expansion mainly serves to underline the alliance's attractiveness for emerging and developing countries, which see it as a forum for expression for the "Global South", and helps to establish the enlarged bloc (BRICS+) as a major force in global economic governance.

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JEL codes
F02, F21,
G15

36%

BRICS+'s share of world GDP in 2022
at purchasing power parity

86%

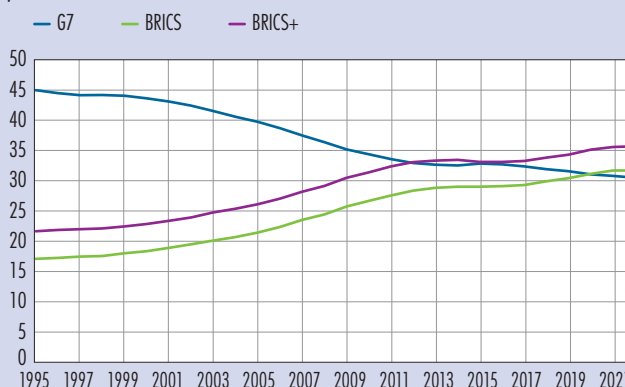
China's share of global production
of heavy rare earth elements in 2021

25%

BRICS+'s share of global exports in 2021

Change in world GDP shares of the G7, BRICS and BRICS+, at purchasing power parity

(%)



Sources: International Monetary Fund; Banque de France calculations.
Note: BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates.



1 From BRICS to BRICS+: an expansion that strengthens cooperation within the group and increases its socioeconomic weight

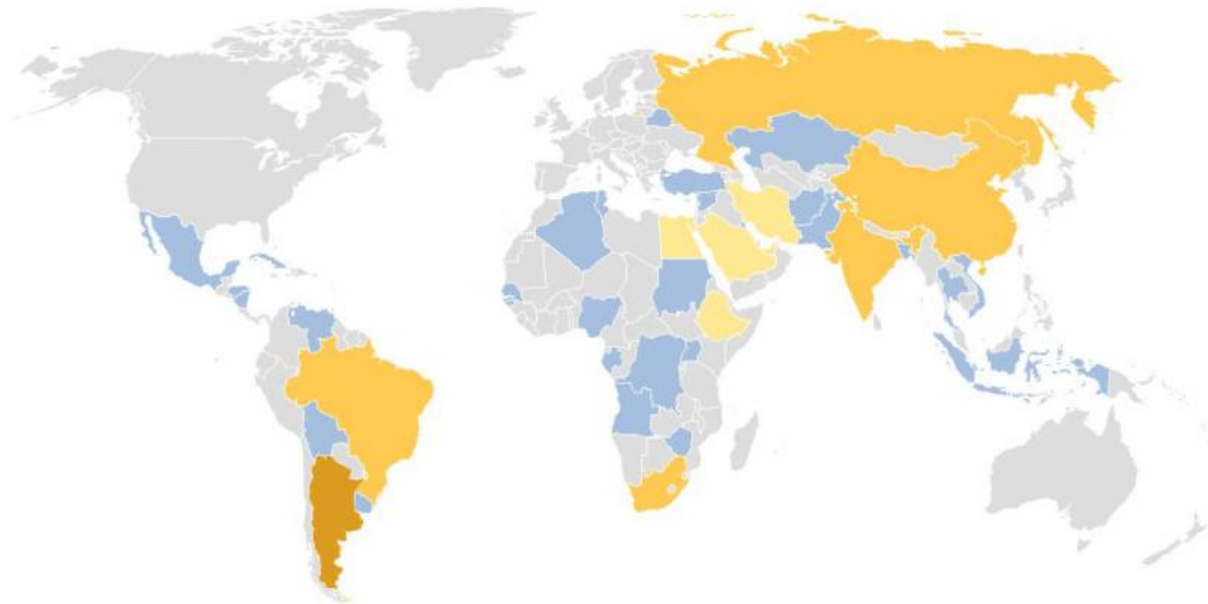
BRICS expansion — a new stage in the assertion of BRICS's position at the centre of the world agenda

The expansion of BRICS on 1 January 2024 to include five new countries marks a new stage in the bloc's emergence as an economic and political force. After starting out as an economic and financial acronym (O'Neill, 2001), BRICS (Brazil, Russia, India, China and South Africa) has gradually evolved into a more formal political grouping. Since 2009, its four founding members, which were subsequently joined

in 2011 by South Africa, have met formally at Summits of Heads of State and Government. At the 15th Summit in Johannesburg (22-24 August 2023), the group reached a new milestone by inviting six further emerging and developing countries (Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates) to join, with effect from 1 January 2024 (see map), although Argentina subsequently declined following Javier Milei's victory in the December 2023 presidential elections.¹ With the expansion, the new "BRICS+" has increased its global economic and political weight and, according to the Johannesburg Declaration (15th BRICS Summit, 2023), will promote collaboration, solidarity and strategic partnerships in the "Global South"² in a spirit of commitment to inclusive multilateralism.

BRICS expansion on 1 January 2024

■ BRICS ■ New members (BRICS+) ■ Candidate countries ■ Invited countries that refused to join



Source: Le Grand Continent (compilation by the *Groupe d'études géopolitiques*).

Note: "Candidate countries" refers to potential candidates, i.e. countries that had submitted a request to join or expressed an interest in joining by August 2023.

¹ "BRICS: Javier Milei ferme la porte à l'adhésion de l'Argentine", *Le Monde*, 29 December 2023.

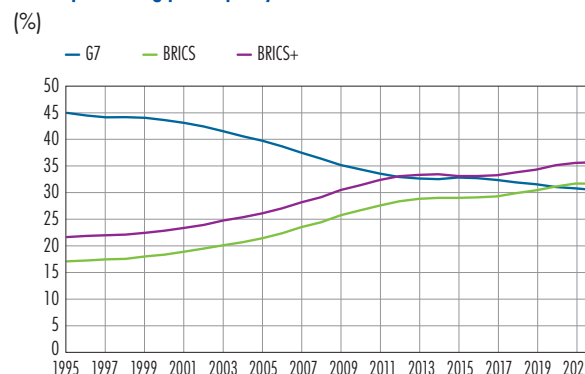
² Popularised in the 2000s, the expression "Global South" is a geopolitical concept referring to countries that are not aligned with the West, and mainly covering emerging and developing countries. It has attracted criticism, however, as it may mask significant disparities between individual countries' situations.



The enlargement gives BRICS+ greater economic and demographic weight

BRICS+ carries significant demographic and economic weight, accounting for nearly half the world's population (46%, up from 41% for BRICS) compared with just under 10% for the Group of Seven (G7): United States, Canada, Japan, United Kingdom, Germany, France and Italy. BRICS already accounted for a larger share of world GDP than the G7 (31.6% at purchasing power parity (PPP) in 2022; see Chart 1), and the expansion has increased this share to over a third (35.6% in 2022). China still holds the dominant position within the group, however, accounting for 52% of its total GDP (at PPP), which is similar to the United States' weight within the G7. The gap between BRICS+ and the G7 is set to widen further thanks to robust economic growth in emerging countries: according to forecasts by the International Monetary Fund (IMF), BRICS+ will account for 37.6% of world GDP at PPP in 2027, compared with 28.2% for the G7.

C1 Change in the world GDP shares of the G7, BRICS and BRICS+, at purchasing power parity



Sources: International Monetary Fund; Banque de France calculations.

Note: BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates.

The inclusion of five new countries also considerably increases the group's share of energy commodity exports (gas, crude and refined oil; see Table 1).

T1 BRICS+'s share of global exports of a selection of goods in 2021

(% of global exports; percentage point change)

		Share of global exports (%)				BRICS+/BRICS change (pp)	Main BRICS+ exporters
		G7	G7+EU	BRICS	BRICS+		
Oil and coal	Crude oil	18	19	15	36	21	Saudi Arabia, Russia, UAE
	Petroleum gas	23	30	9	13	4	Russia
	Refined oil	20	38	23	34	11	Russia, India, UAE, Saudi Arabia
	Coal briquettes	12	14	19	19	0	Russia, South Africa
Food	Corn	41	52	13	13	0	Brazil
	Soybeans	39	40	50	51	0	Brazil
	Soybean oil	10	22	16	19	2	Brazil
	Soybean flour	19	27	32	33	0	Brazil
	Wheat	35	53	18	18	0	Russia
	Rice	10	14	41	42	0	India
Metal ore	Gold	21	23	11	19	8	UAE, South Africa
	Diamonds	14	26	35	47	12	India, UAE, South Africa
	Iron ore	5	7	29	29	0	Brazil
	Copper ore	7	9	5	6	1	ns
Critical materials	Cobalt	3	18	1	1	0	ns
	Magnesium	13	34	50	51	1	China
	Nickel	9	16	15	15	0	Russia, Brazil
	Lithium	5	11	7	7	0	China
	Graphite	24	30	52	53	0	China, Brazil

Sources: Observatory of Economic Complexity (OEC); Banque de France calculations.

Notes: The G7 comprises the following countries: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates.

EU, European Union; UAE, United Arab Emirates.

ns – not significant: when an exporting country that is part of BRICS+ accounts for less than 5% of global exports.



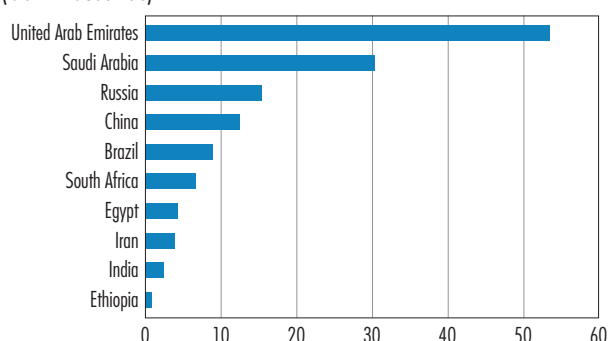
Nonetheless, BRICS+ is a heterogeneous group with limited trade integration

The group remains very heterogeneous, both in terms of GDP per capita (see Chart 2) and net lending and borrowing (see Table 2). The oil exporting countries (Russia and Saudi Arabia) and China have current account surpluses – in other words a net lending position – while the bloc's other countries all run current account deficits. With regard to their net international investment positions,

Egypt, Brazil and India are net debtors vis-à-vis the rest of the world, while the other BRICS+ countries are net creditors. Lastly, in terms of external debt, China is a major lender to some of the other countries in the group, holding a large share of Ethiopia's external debt and smaller but still significant shares of South Africa and Egypt's debt. However, this is not necessarily a barrier to cooperation (European countries were significantly in debt to the United States after the Second World War).

C2 Nominal GDP per capita, at purchasing power parity, in 2022

(USD thousands)



Sources: World Bank; Banque de France calculations.

Note: 2021 data for Ethiopia.

T2 BRICS+ countries' net lending/borrowing positions in 2022

(% of GDP)

Country	Current account balance	Net international investment position	External debt
Saudi Arabia	13.6	63.80	24.90
Russia	10.5	26.40	20.60
China	2.2	14.20	13.90
South Africa	-0.5	18.90	43.10
Egypt	-3.5	-52.20	40.90
India	-2.0	-11.80	16.40
Brazil	-2.8	-41.50	32.00
Ethiopia	-4.3	na	18.20

Sources: International Monetary Fund (*World Economic Outlook*, October 2023), World Bank; authors' calculations.

Notes: External debt corresponds to private and public debt.

Russia's net international investment position is for 2021.

BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates.

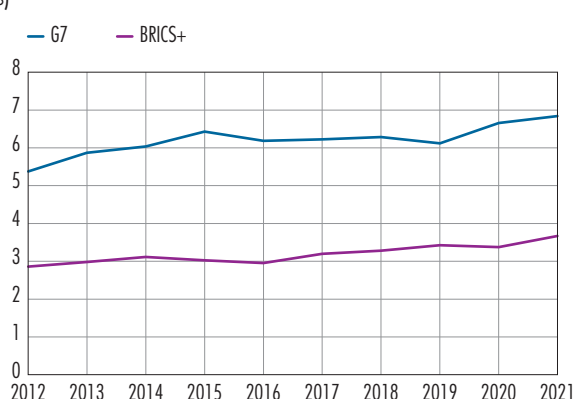
na – not available.

Trade integration between BRICS+ nations also remains limited.

Only 11 country pairs of the 45 possible combinations (24%) are linked via regional trade agreements (see Appendix 2). Moreover, intra-BRICS+ trading partners generally have a much lower weight than partners in the G7. For example, Russia is China's leading trading partner within the BRICS+ bloc, but is only its 10th largest partner in the world, notably ranking below three of the G7 countries.³ So while BRICS+ accounts for around 25% of global exports, only 15% of those exports are to other BRICS+ members. Trade between BRICS+ members accounted for only 3.7% of global trade in 2021 (compared with 2.9% in 2021), of which 3.2 percentage points was between the founding BRICS countries (see Table 3 and Chart 3).

C3 Change in the weight of BRICS+ exports to G7 and BRICS+ countries (share of global exports)

(%)



Sources: Trade Data Monitor and United Nations Comtrade for the United Arab Emirates.

Notes: BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates. The G7 comprises the following countries: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

3 United States (1st), Japan (3rd) and Germany (7th).



T3 Breakdown of exports by destination in 2021

(% of total)

Exporting countries	Breakdown by destination			Share of global exports			
	BRICS+	G7	Rest of the world	BRICS+	G7	Rest of the world	Total
BRICS+	14.8	27.6	57.7	3.7	6.8	14.3	24.8
Brazil	37.0	20.0	43.0	0.5	0.3	0.6	1.3
Russia	19.3	22.4	58.4	0.4	0.5	1.4	2.3
India	19.6	28.9	51.5	0.4	0.5	1.0	1.9
China	10.2	32.3	57.5	1.6	5.1	9.2	15.9
South Africa	17.7	34.3	48.0	0.1	0.2	0.3	0.6
Egypt	20.6	23.0	56.4	0.0	0.0	0.1	0.2
Ethiopia	20.6	26.1	53.4	0.0	0.0	0.0	0.0
Iran	44.8	1.2	54.0	0.1	0.0	0.1	0.2
Saudi Arabia	40.1	9.2	50.7	0.1	0.0	0.2	0.3
United Arab Emirates	17.9	4.3	77.8	0.3	0.1	1.5	1.9
World	16.9	33.9	49.1	16.9	33.9	49.1	100.0

Sources: Trade Data Monitor and United Nations Comtrade of the United Arab Emirates.

Interpretation: 14.8% of BRICS+ exports are to BRICS+ countries and 27.6% to G7 countries. BRICS+ exports account for 24.8% of world exports.

Note: BRICS comprises the following countries: Brazil, Russia, India, China and South Africa. BRICS+ also comprises Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates. The G7 comprises the following countries: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

In terms of monetary and exchange rate policies, BRICS+ is far more heterogeneous than the G7. G7 countries have all adopted a floating exchange rate regime, with no capital controls and an inflation target of around 2%. In contrast,

the majority of BRICS+ countries have more or less managed exchange rate regimes, and only a few use inflation targeting (Brazil, India, Russia and South Africa), although with higher and more disparate target rates than the G7.

BOX 1

A key role in the transition to a low carbon economy and the preservation of biodiversity

In 2021, BRICS+ accounted for around 50% of global annual greenhouse gas emissions and the carbon intensity of its GDP was above the global average (Global Carbon Project, 2022). Fifteen of the world's 36 biodiversity hotspots¹ are located partially or entirely in BRICS+ countries, and four of these are linked to the group's new members. In comparison, nine of the hotspots are partially or entirely in G7 countries (mainly in the United States and France).

BRICS+ countries also contribute, in some cases considerably, to the extraction and transformation of the 30 critical raw materials identified by the European Commission in 2002² (see Table 1). That said, the expansion of BRICS only marginally changes the bloc's share of critical raw materials production, as none of the new members are major producers. The world's main raw material dependencies include, in descending order, niobium (Brazil, 92% of global production), magnesium (China, 89%), heavy rare earths (China, 86%), bismuth (China, 85%) and platinum metals (South Africa, 84%).

1 A "biodiversity hotspot" (Myers et al., 2000) is a vast land or marine biogeographical region that contains at least 1,500 vascular plants as endemics and has lost 70% of its primary vegetation.

2 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 3 September 2020: *Critical Raw Materials Resilience: Charting a Path Towards Greater Security and Sustainability*.



2 BRICS+ in global economic governance

BRICS+ comprises countries that are geopolitically distant

The geopolitical unity of BRICS+ appears fragile. We measured this using a geopolitical distance index (see Box 2). Our results confirm that the geopolitical distance between individual BRICS members and the United States or the European Union (EU) varies significantly (see Chart 4), highlighting the heterogeneity of their geopolitical positions. The enlargement of BRICS has also increased the group's average geopolitical distance from the United States or the EU. This is due to the inclusion of Iran, which is the most geopolitically distant BRICS+ country from the United States or the EU, and more broadly to the inclusion of all the new members, whose geopolitical distance from the United States or the EU tends to be high compared to the initial BRICS.

Moreover, some BRICS+ members may be deeply divided over certain issues, especially countries whose geographical proximity can lead to regional rivalries.

BOX 2

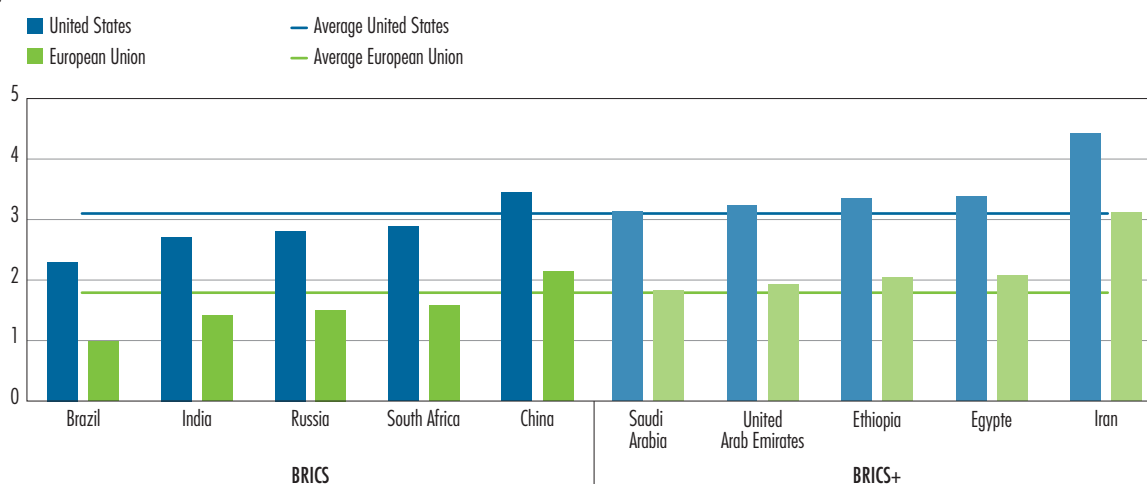
Construction of a geopolitical distance indicator

To quantify the geopolitical distances between members, we use a database of United Nations General Assembly votes (Voeten et al., 2023), and apply a unidimensional spatial econometric model with an "ideal point", proposed by Bailey et al. (2017). Our indicator is therefore based on votes in a particular forum and with a specific logic over a given period (in this case 2022). It is thus more of a proxy than a precise quantification of the geopolitical distance between states. It is nonetheless referred to in several recent studies of geoeconomic fragmentation.¹ The higher the coefficient associated with a pair of states, the greater their geopolitical distance.

¹ See IMF (2023a), IMF (2023b), Bolhuis et al. (2023) and Javorcik (B. S.) et al. (2023).

C4 Geopolitical distance of BRICS+ countries from the United States and the European Union

(score)



Sources: Voeten et al., 2023; Banque de France calculations.

Interpretation: The greater a country's geopolitical distance from the United States or European Union, the higher its score. For example, Saudi Arabia has a score of nearly 3 for the United States and 2 for the European Union, which means it is further away from both regions than Brazil, which has respective scores of 2 and 1.

Note: The period under consideration is 2022 to take account of the geopolitical shock linked to Russia's invasion of Ukraine.



Like the G7, BRICS+ could be a forum for cooperation aimed at playing a greater role in global economic governance by presenting itself as a mouthpiece for the “Global South”

The enlargement of BRICS could strengthen dialogue between emerging countries on global economic governance, particularly between the six countries that are also members of the G20. While continuing to assert the G20’s role as the premier multilateral forum for economic and financial cooperation, the Johannesburg Declaration clearly states that BRICS+’s goal is to amplify the voice of the “Global South” (see paragraph 30). Accordingly, and with the possible support of Saudi Arabia, as well as that of Egypt and the United Arab Emirates (which the Brazilian G20 presidency has invited to participate in 2024), BRICS+ could become a sort of “antechamber” to the G20 (Arthur et al., 2023). It would allow member countries to align their positions on specific topics, such as infrastructure development (support for an unconditional approach based on the Belt and Road Initiative model) or economic and climate policies, and offer a different perspective on the economic impacts of sanctions against Russia. The inclusion of new members has given BRICS+ greater legitimacy and could also increase its standing within the G20, despite the limited economic integration between its members, their divergent economic interests and lack of geopolitical unity.

The expansion, combined with a favourable momentum for BRICS+ at the G20, increases, to an extent, the bloc’s ability to push forward the “Global South’s” agenda. The three successive holders of the G20 presidency for the period 2023-25 (the troika) are BRICS+ countries (India in 2023, Brazil in 2024 and South Africa in 2025), giving the group substantial sway over the G20’s agenda. Brazil has held the presidency since 1 December 2023, and its three priorities (fighting hunger and inequality, financing the fight against climate change, reform of international governance) echo the demands of the developing world and of the BRICS+ countries themselves. On international

governance in particular (third priority for the Brazilian presidency), one of BRICS+’s shared priorities is to reform the Bretton Woods institutions and give emerging and developing countries a greater role (see paragraph 10 of the Johannesburg Declaration). For the time being, however, the transition from BRICS to BRICS+ has very little impact on the distribution of voting rights within the International Monetary Fund (IMF), with BRICS+ now holding 18.61% instead of 14.80% previously, compared with 43.36% for the G7. That said, BRICS+ could still form a blocking minority⁴ on the IMF Executive Board.

3 BRICS+ countries have a clear ambition to increase their weight in the international monetary system (IMS), but their influence is limited in the short term

The bloc is pushing for a reconfiguration of the international monetary system

BRICS+’s plan for a common currency, cited as one possible option being considered ahead of the Johannesburg summit, does not appear to be supported by a majority of founding countries. It would also face obstacles, such as the limited trade integration between member nations and their economic heterogeneity.

Rather than creating a common currency, BRICS+ wants to reduce its dependence on the US dollar by increasing the use of local currencies in trade invoicing and financial flows. The Johannesburg Declaration reiterates this goal (paragraph 44, “We stress the importance of encouraging the use of local currencies in international trade and financial transactions between BRICS as well as their trading partners.”). Depending on its scale, this shift could affect the configuration of the IMS and especially the dominance of the US dollar in global trade.

However, so far, not all new BRICS members have signed up to the financial structures historically attached to the group – and tasked with helping to reconfigure the IMS.

⁴ The threshold for a blocking minority is set at 15% of voting rights.



Of the five countries that have joined BRICS, only two have subscribed to the capital of the New Development Bank (NDB; see Box 3), which is theoretically open to all members of the United Nations: Egypt has taken a 2.27% stake, and the United Arab Emirates 1.06%. Moreover, the Contingent Reserve Arrangement (CRA)

still only has the five BRICS founding countries as members. The mechanism, which pools some of BRICS's foreign exchange reserves to provide emergency liquidity to heavily indebted countries, currently contains USD 100 billion, which is modest in comparison with the Global Financial Safety Net (GFSN).

BOX 3

The New Development Bank (NDB) or "BRICS bank"

Created in July 2015 at the 7th BRICS summit by China, Brazil, Russia, India and South Africa, the NDB subsequently admitted Bangladesh and the United Arab Emirates as members in 2021, followed by Egypt in 2023. Uruguay is also set to join in the near future.

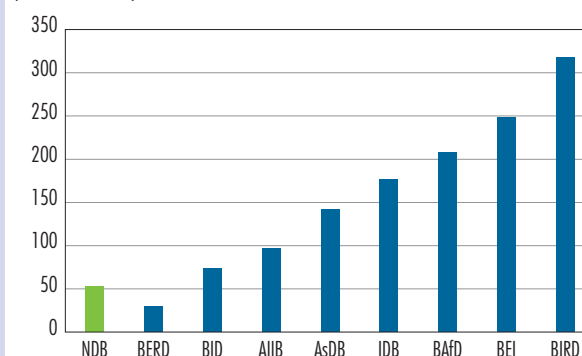
The bank had a capital of USD 52.7 billion at the end of 2022, which is **relatively modest compared with the other multilateral development banks**¹ (see chart). Its articles of agreement stipulate that it can have total authorised capital of up to USD 100 billion, but at least 55% of its voting rights must be held by its founding members. **The NDB also differs from the other multilateral development banks (MDBs) in that its annual lending has remained relatively modest** so far (averaging around USD 5 billion per year between the start of its operations in 2016 and 2021, compared with between USD 14 billion and USD 25 billion for the more established MDBs).

Despite its limited size, the NDB has become a fully-fledged member of the group of MDBs, and shares several of their features: its mandate is to support infrastructure and sustainable development, its credit rating is AA (Fitch) or AA+ (Standard & Poor's), which is higher than those of its individual shareholders, although slightly below those of the other MDBs, and it adheres to the MDBs' common principle of aligning their operations with the Paris Agreement.

However, the NDB's functioning is relatively opaque, which is at odds with its ambition to work in a more innovative way than the traditional MDBs. In particular, only a minority of its financing is granted in the beneficiary countries' local currency. At the end of December 2021, 23% of its cumulative financing was in local currencies (of which 80% was in renminbi and 19% in South African rand).

Subscribed bank capital

(USD billions)



NDB	New Development Bank	IDB	Inter-American Development Bank
EBRD	European Bank for Reconstruction and Development	AfDB	African Development Bank
IsDB	Islamic Development Bank	EIB	European Investment Bank
AIIB	Asian Infrastructure Investment Bank	IBRD	International Bank for Reconstruction and Development
AsDB	Asian Development Bank		

Sources: Annual reports of the multilateral development banks cited (most recent data, i.e. 2023 for the NDB and IBRD; 2022 for the EBRD, IsDB, AIIB, AsDB, IDB, AfDB and EIB).

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¹ List of MDBs used for comparison purposes: International Bank for Reconstruction and Development (IBRD), Asian Development Bank (AsDB), African Development Bank (AfDB), Inter-American Development Bank (IDB), Islamic Development Bank (IsDB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Asian Infrastructure Investment Bank (AIIB).



The expansion of BRICS raises the question of what role the NDB could play in shifting the centre of gravity of the monetary and financial system. **The admission of new countries such as Saudi Arabia into the NDB could give it greater financial firepower, although at this stage the bank mainly seems to work for the benefit of its founding members, both in terms of representation and financing volumes.**

The NDB's ability to rival the other MDBs in the Global Financial Safety Net (GFSN) remains limited due to the instruments at its disposal and its shareholder structure. It has chosen mainly to finance investment projects, and not to provide fiscal support linked to public policy reforms or conditionalities. The loans are typically disbursed over several years which limits the bank's ability to intervene rapidly and provide major funding in the event of a crisis. Its lending capacity is also highly dependent on its ability to issue bonds in international markets at reasonable spreads. Due to its shareholder structure, its financial clout also appears particularly vulnerable to geopolitical risks.

BRICS+'s influence over the global monetary order is likely to be moderate

Given BRICS+'s limited trade integration, the dedollarisation of trade flows between members would have little impact on the dominance of the US dollar in global trade invoicing. However, data on the invoicing currencies used by BRICS+ countries remains very limited, and estimates of the effect of a dedollarisation of their trade flows need to be viewed with caution. Based on

the assumptions that (i) 55.6% of global trade is invoiced in US dollars (Boz et al., 2022), and (ii) trade between BRICS+ countries is currently conducted entirely in US dollars, the dedollarisation of all intra-BRICS+ trade would reduce the dollar's weight in global trade by nearly 4 percentage points, to 51.9% (see upper scenario in Table 4). Under a more nuanced scenario (our baseline scenario), where use of the US dollar and the euro in intra-BRICS+ trade is estimated at 62.8% and 20.7% respectively, a switch to local currencies for all trade within

T4 Impact of dedollarisation on trade between BRICS+ countries

(USD billions, % share and percentage point impact)

		Amount of exports		Upper scenario (US dollars)	Baseline scenario (US dollars)	(euro)
Before dedollarisation	World	21,093	Amount	11,726	11,726	6,961
			Share	55.6	55.6	33.0
	Between BRICS+ countries	817.6	Amount	774	486	160
			Share	100.0	62.8	20.7
After dedollarisation	World	21,093	Amount	10,952	11,241	6,801
			Share	51.9	53.3	32.2
Impact on weight of currencies				-3.7	-2.3	-0.8

Sources: Trade Data Monitor, United Nations Comtrade (database), Boz et al. (2022), People's Bank of China and National Bureau of Statistics of China; Banque de France calculations.

Notes: The table shows two scenarios for the impact of the dedollarisation of intra-BRICS+ exports on the weight of the US dollar in total world exports. Data on export amounts is for 2021. Data on trade invoicing in different currencies is the average of the last two years available in Boz et al. (2022). Where data were not available (Ethiopia and Iran), we used the global average from Boz et al. (2022). For China, we based our figures on data from the People's Bank of China and the National Bureau of Statistics of China.

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the bloc would lower the weight of the dollar and the euro by 2.3 percentage points and 0.8 percentage point respectively (see baseline scenario in Table 4).

It would be worth studying the effect of BRICS enlargement on the other global functions of the US dollar, in addition to its role in world trade. Regarding its function as a reserve currency, it is hard to see one of the BRICS+ currencies,

and specifically the renminbi, posing a serious challenge to the dollar's leading position (or to the euro's second place). The expansion of BRICS will do little to eliminate the barriers preventing international investors from buying renminbi-denominated assets – namely the capital controls imposed by Chinese authorities, the financial risk, the opacity of Chinese economic agents and the limited availability of risk-free bonds.



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Appendix 1

Share of BRICS+ in global production (extraction and transformation) of critical raw materials, especially for the ecological transition, in 2020

Raw materials	Main global producers	Share of global output (%)	Selected uses
Antimony	China Tajikistan Russia	74 8 4	Flame retardants Defence applications Lead-acid batteries
Baryte	China India Morocco	38 12 10	Medical applications Radiation protection Chemical applications
Bauxite	Australia China Brazil	28 20 13	Aluminium production
Beryllium	United States China Madagascar	88 8 2	Electronic and communications equipment Automotive, aerospace and defence components
Bismuth	China Laos Mexico	85 7 4	Pharmaceutical and animal feed industries Medical applications Low melting-point alloys
Borate	Türkiye United States Chile	42 24 11	High-performance glass Fertilisers Permanent magnets
Cobalt	Democratic Republic of the Congo China Canada	59 7 5	Batteries Super alloys Catalysts Magnets
Coking coal	China Australia Russia	55 16 7	Coke for steel Carbon fibres Battery electrodes
Fluorspar	China Mexico Mongolia	65 15 5	Steel and iron making Refrigeration and air-conditioning Aluminium making and other metallurgy
Gallium	China Germany Ukraine	80 8 5	Semiconductors Photovoltaic cells
Germanium	China Finland Russia	80 10 5	Optical fibres and infrared optics Satellite solar cells Polymerisation catalysts
Hafnium	France United States Russia	49 44 3	Super alloys Nuclear control rods Refractory ceramics
Indium	China Republic of Korea Japan	48 21 8	Flat panel displays Photovoltaic cells and photonics Solders
Lithium	Chile China Argentina	44 39 13	Batteries Glass and ceramics Steel and aluminium metallurgy
Magnesium	China United States	89 4	Lightweight alloys for automotive, electronics, packaging or construction Desulphurisation agent in steelmaking

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Raw materials	Main global producers	Share of global output (%)	Selected uses
Natural graphite	China India Brazil	69 12 8	Refractories for steelmaking
Natural rubber	Thailand Indonesia Vietnam	33 24 7	Tyres Rubber components for machinery and household goods
Niobium	Brazil Canada	92 8	High-strength steel and super alloys for transportation and infrastructure High-tech applications (capacitors, superconducting magnets, etc.)
Phosphate rock	China Morocco United States	48 11 10	Mineral fertiliser Phosphorous compounds
Phosphorous	China Kazakhstan Vietnam	74 9 9	Chemical applications Defence applications
Scandium	China Russia Ukraine	66 26 7	Solid oxide fuel cells Lightweight alloys
Silicon metal	China United States Norway France	66 8 6 4	Semiconductors Photovoltaics Electronic components Silicon metal
Strontium	Spain Islamic Republic of Iran China	31 30 19	Ceramic magnets Aluminium alloys Medical applications Pyrotechnics
Tantalum	Democratic Republic of the Congo Rwanda Brazil	33 28 9	Capacitors for electronic devices Super alloys
Titanium ^{a)}	China Russia Japan	45 22 22	Lightweight high-strength alloys for e.g. aeronautics, space and defence Medical applications
Tungsten ^{b)}	China Vietnam United States Austria Germany	69 7 6 1 1	Alloys e.g. for aeronautics, space, defence, electrical technology Mill, cutting and mining tools
Vanadium ^{c)}	China South Africa Russia	55 22 19	High-strength-low-alloys for e.g. aeronautics, space, nuclear reactors Chemical catalysts
Platinum group metals ^{d)}	South Africa – iridium, platinum, rhodium, ruthenium Russia – palladium	84 40	Chemical and automotive catalysts Fuel cells Electronic applications
Heavy rare earth elements ^{e)}	China Australia United States	86 6 2	Permanent magnets for electric motors and electricity generators Lighting phosphors Catalysts Batteries Glass and ceramics

a) For Titanium metal sponge there are no trade codes available for the European Union (EU).

b) The distribution of tungsten smelters and refiners has been used as a proxy of the production concentration. Trade data are not completely available for commercial confidentiality reasons.

c) The EU's import reliance cannot be calculated for vanadium as there is no production and trade of vanadium ores and concentrates in the EU.

d) The trade data include metal from all sources, both primary and secondary. It was not possible to identify the source and the relative contributions of primary and secondary materials.

e) Global production refers to rare earth oxides concentrates for both light and heavy rare earth elements.



Appendix 2

Regional trade agreements between BRICS+ countries

Agreement	Date of application	Type of agreement	Country pairs
Protocol on Trade Negotiations (PTN)	1973	PSA	Brazil/Egypt
Global System of Trade Preferences (GTSP) among developing countries ^{a)}	1989	PSA	Brazil/Egypt Brazil/India
Greater Arab Free Trade Area	1998	FTA	Egypt/Saudi Arabia Egypt/UAE Saudi Arabia/UAE
Common Market for Eastern and Southern Africa – admission of Egypt	1999	CU	Egypt/Ethiopia
Asia-Pacific Trade Agreement (APTA) – admission of China	2002	PSA	China/India
Gulf Cooperation Council	2003	FTA and EIA	Saudi Arabia/UAE
Mercosur – India	2009	PSA	Brazil/India
Mercosur – Southern African Customs Union	2016	FTA and EIA	Brazil/South Africa
Mercosur – Egypt	2017	FTA	Brazil/Egypt
Eurasian Economic Union (EAEU) – Iran	2019	FTA	Russia/Iran
India – United Arab Emirates	2022	FTA and EIA	India/UAE

Source: World Trade Organization, database on RTAs.

Note: PSA, Partial Scope Agreement; CU, Customs Union; EIA, Economic Integration Agreement; FTA, Free Trade Agreement; UAE, United Arab Emirates.

a) The pairs shown only include signatories of the third round of GTSP negotiations (the São Paulo protocol), which is the most advanced phase of the regional trade agreement (RTA).

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