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## DE-DOLLARIZATION: THE GLOBAL PAYMENT INFRASTRUCTURE AND WHOLESALE CENTRAL BANK DIGITAL CURRENCIES

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### ABSTRACT

Traditional trust-related de-dollarization motives have gained additional impetus from the declining share of the United States in global output, recent upheaval in dollar bond markets, geopolitical tensions, and a “weaponization” of the dollar. Several institutional innovations by China and the BRICS demonstrate the demand for de-dollarization but do not offer credible alternatives to the dollar’s value characteristics. By contrast, new financial technology, including distributed ledger technology (DLT), and related changes in cross-border payment infrastructure could reduce the network effects that have sustained dollar dominance. By allowing for leaner cross-border payment infrastructures and an easier, cheaper, and more transparent use of non-dollar currencies in cross-border payment and settlement, DLT-based wholesale central bank digital currency (wCBDC) platforms with a foreign-exchange conversion layer may indicate a direction of travel. Pilots of multicurrency wCBDC-platforms indicate how to enable interoperability and reduce exposure to foreign-exchange risk. Regarding institutional (legal, regulatory, and supervisory) frameworks required to fully benefit from infrastructural changes, interlinking common multicurrency wCBDC-platforms among limited numbers of like-minded central banks to form an interoperable hub-and-spoke global wCBDC-system could minimize fragmentation risks while accommodating diverging governance preferences, e.g., concerning data protection and developmental aspirations. By augmenting macroeconomic autonomy and reducing the need for costly dollar reserves, de-dollarization promises greater benefits for countries with non-dominant currencies. These countries should sit at the table when outstanding questions on interoperability and related economic, technical, legal and governance questions regarding multicurrency wCBDCs platforms are answered.

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## De-dollarization: the global payment infrastructure and wholesale central bank digital currencies

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### Abstract

Traditional trust-related de-dollarization motives have gained additional impetus from the declining share of the United States in global output, recent upheaval in dollar bond markets, geopolitical tensions, and a “weaponization” of the dollar. Several institutional innovations by China and the BRICS demonstrate the demand for de-dollarization but do not offer credible alternatives to the dollar’s value characteristics. By contrast, new financial technology, including distributed ledger technology (DLT), and related changes in cross-border payment infrastructure could reduce the network effects that have sustained dollar dominance. By allowing for leaner cross-border payment infrastructures and an easier, cheaper, and more transparent use of non-dollar currencies in cross-border payment and settlement, DLT-based wholesale central bank digital currency (wCBDC) platforms with a foreign-exchange conversion layer may indicate a direction of travel. Pilots of multicurrency wCBDC-platforms indicate how to enable interoperability and reduce exposure to foreign-exchange risk. Regarding institutional (legal, regulatory, and supervisory) frameworks required to fully benefit from infrastructural changes, interlinking common multicurrency wCBDC-platforms among limited numbers of like-minded central banks to form an interoperable hub-and-spoke global wCBDC-system could minimize fragmentation risks while accommodating diverging governance preferences, e.g., concerning data protection and developmental aspirations. By augmenting macroeconomic autonomy and reducing the need for costly dollar reserves, de-dollarization promises greater benefits for countries with non-dominant currencies. These countries should sit at the table when outstanding questions on interoperability and related economic, technical, legal and governance questions regarding multicurrency wCBDCs platforms are answered.

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## 1. Introduction

The United States dollar has been the dominant international currency for over 70 years. It maintains this role – characterized by its globally predominant use in trade invoicing, payment settlement, debt issuance, exchange-rate anchor, and reserve currency – despite the collapse of the Bretton Woods system in the 1970s, the emergence of potential alternatives – the Special Drawing Right (SDR) in the 1970s and the euro and Renminbi (RMB) over the past two decades – and the growing attention paid to multipolarity in global governance.<sup>1</sup> The latter stems from a reassessment of dollar supremacy following the global financial crisis of 2008–2009, which started in the United States financial system, and from the increased weight of developing countries in global output and trade. Greater interest in multipolarity has been amplified by recent geopolitical events and by new financial technologies, which weaken the network effects that have bolstered dollar supremacy. These developments combined have revived the decade-long debate on the potential benefits of de-dollarization, i.e., a move away from the dollar as the single most important international currency.

Part of this debate prioritizes reforms of the status quo. Bolstering the global financial safety net (GFSN) through broader, faster, and easier access to dollar liquidity in situations of balance-of-payments crises would reduce risk exposure to adverse spillovers of United States monetary policy and ensuing global financial cycles, thereby diminishing precautionary motives for holding costly foreign-exchange reserves, mostly denominated in dollars (Miranda-Agrippino and Rey, 2020). Associated measures include a series of new facilities at the International Monetary Fund (IMF), as well as the Federal Reserve’s bilateral swap agreements and regional monetary agreements – such as the Chiang Mai Initiative Multilateralization and the BRICS Contingent Reserve Arrangement (CRA)<sup>2</sup> – which provide (often limited) rapid access to dollar liquidity without associated IMF-conditionality. While these measures may imply some de-dollarization in terms of lower dollar reserves, they remain closely associated with the existing dollar-based global monetary and financial architecture (GMFA).

Another part of this debate addresses potential moves of the existing architecture towards a coherent alternative. This debate focuses on the value characteristics of the dollar in terms of value stability and deep and liquid financial markets. It highlights the requirements for the euro and the RMB to assume key currency status (e.g., Eichengreen et al., 2018) or for a GMFA to be built around SDRs (United Nations General Assembly, 2009; Ocampo, 2017). This debate generally concludes that none of these alternatives is credible and that the network effects of dollar use perpetuate its dominance (e.g., Gopinath and Stein, 2021).

This paper takes a different perspective. It emphasizes alternatives to the current dollar-based global payment infrastructure, which includes messaging through the Society for Worldwide Interbank Financial Telecommunication (SWIFT) and settling payments through the Clearing House Interbank Payments System (CHIPS). It argues that wholesale central bank digital currency (wCBDC) platforms, based on distributed ledger technology (DLT) and augmented by a foreign-exchange conversion layer, could provide an alternative and more efficient cross-border payment infrastructure, and that this new infrastructure could facilitate an increased use of non-dollar currencies in cross-border payments and settlement.

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<sup>1</sup> This paper refers to multipolarity as a greater assertiveness of a range of countries with potential different alliances across different areas (e.g., Ash et al, 2023; Peters, 2023). It does not examine the rise of China and associated geopolitical tension between the United States and China, or a related potential bipolar world.

<sup>2</sup> CRA makes 100bn of pooled dollar reserves available to members for liquidity support in times of a modest-sized balance-of-payment crisis (BRICS, 2013). As such, CRA provides members with the first line of dollar liquidity before seeking conditional help from the IMF.

Presuming a positive correlation between infrastructure-based payment efficiency and a currency's international use receives support from Kim et al. (2024) who show that a one unit increase in the number of a currency's direct payment corridors results in an increase in the currency's shares for trade and financial transactions by 4 to 9 per cent. Moreover, Gopinath and Stein (2021), Weiss (2022) and Jeanne (2024) indicate a positive correlation between a currency's use for trade invoicing and payment and its use as a reserve asset.

Kim et al. (2024) emphasize that heightened geopolitical tension and technological innovations could be disruptive forces with infrastructure-related efficiency gains sufficiently large to overcome the strong inertial forces that drive dollar dominance. Related incentives could build on two recent developments. First, geopolitical tensions and what some observers have called "the weaponization of the dollar" (McDowell, 2023). Ongoing initiatives in this area garnered global attention following United States sanctions against the Russian Federation in 2022 but would probably get sizeable impetus from potential sanctions on China, e.g., in the case of Chinese military action against Taiwan.<sup>3</sup> Should such a situation arise, alternatives to the dollar-based system could allow countries to maintain financial relations with both the United States and China and avoid forcing them to choose between connecting with the dollar system or China. Some countries could also act as connectors between a dollar-based and alternative payment infrastructures.

Second, technological developments – such as DLT, including blockchain which is an auditable and cryptographically secured ledger – allow for cross-border payments without intermediaries. Ensuing cheaper, faster, and more transparent payments provide economic incentives for the building of alternative payment infrastructures. Their use for cryptocurrencies, which are not linked to any fiat currency, could enable the de-dollarization of international payments in an entirely novel way. However, cryptocurrencies have scaling issues, and their volatility makes them unsuitable as units of accounts or assets. The closed-loop characteristics of stablecoins, i.e., cryptocurrencies designed for price stability, risk fragmentation of payment systems, and the frequent deviation of relative exchange values of dollar-based stablecoins from par (even if very small) violate the principle of the singleness of money. Moreover, both cryptocurrencies and stablecoins imply significant risks for financial stability and currency substitution, with related macroeconomic destabilization, as well as a threat to monetary sovereignty. By contrast, a growing role of blockchain technology in the interoperability of wCBDCs could have far-reaching consequences for the GMFA and cross-border payments (Bindseil and Pantelopoulos, 2022; UNCTAD, 2023).<sup>4</sup>

Against this background, the paper highlights the potential of wCBDCs-platforms with a foreign-exchange conversion layer for a non-dollar-based international payment infrastructure and its utilization for a larger role of non-dollar currencies in cross-border payment and settlement. Realizing this potential could imply greater financial, fiscal, and geopolitical autonomy for countries with non-dominant currencies. The required international collaboration on technical, legal, and regulatory standards would need to accommodate diverging cross-country benefits and wCBDC-objectives, including in terms of de-dollarization, and may be easier to obtain by interlinking smaller wCBDC-platforms than by aiming at a common global platform. Many questions regarding the design and

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<sup>3</sup> However, sanctions against China would probably imply considerable economic costs for the United States itself, given continuous close trade ties between the two countries (Hogan and Hufbauer, 2023).

<sup>4</sup> Blockchain technology could also boost the efficiency of cross-border payments by interlinking fast retail payments systems (FRPSs). However, such systems rely on commercial bank money, while wCBDCs are central bank money and provide related advantages in terms of financial stability and counterparty risk. Moreover, payment providers with access to wCBDCs can offer retail services that build on wCBDCs, such as cross-border transfers of non-CBDC money. Besides, FRPSs concern low-value high-volume transactions mainly between individuals and therefore are less pertinent for de-dollarization issues.

interoperability of wCBDC-platforms remain open. However, the potential of wCBDCs indicates a direction of travel and to avoid fragmentation of the GMFA, it is crucial that a broader diversity of countries sit at the table when these questions are answered.

The paper contributes to three strands of literature. First, it expands the literature on de-dollarization by shifting the focus from the dollar's value characteristics (Eichengreen et al., 2018) to the impact of the global payment infrastructure on dollar dominance. Some authors (e.g., Demertzis and Martins, 2023; Li, 2023) mention this relationship but leave it unexplored.

Second, in evaluating the impact of an alternative global payment infrastructure, the paper follows the "trade view". This view bases dollar dominance on trade invoicing and explores the complementarity between a currency's use for trade invoicing and as a store of value (Farhi and Maggiori, 2019; Gopinath and Stein, 2021). The "trade view" differs from the "safe asset view", which is closer to the literature on the dollar's value characteristics and attributes dollar dominance to its safe asset properties and the growing demand for such assets (Eichengreen et al., 2018).<sup>5</sup> Trade is also a key element of "geoeconomics" (Clayton et al., 2024), which argues that powerful countries can use existing financial and trade relationships to achieve geopolitical and economic goals. And recent examinations of what may advance RMB internationalization (Eichengreen et al., 2022; Amighini and Garcia-Herrero, 2023) highlight China's expanding trade links with developing countries.

Third, the paper adds to the literature on the implications of digital money and assets (DM) for the GMFA and cross-border payments. Existing literature emphasizes (i) stablecoins (Brunnermeier et al., 2019);(ii) the macro-financial implications of cross-border DM-transactions with an only indirect look at the GMFA (IMF, 2023; UNCTAD, 2023); and (iii) an internationally coordinated roadmap with a wide range of cross-border payment modalities addressing the long-standing challenges of cross-border payments, including high costs, low speed, limited access, and insufficient transparency (Bindseil and Pantelopoulos, 2022). This roadmap emanates from the G20 and has been developed by the Financial Stability Board (FSB) in coordination with other international organizations and standard setters (FSB, 2023). Building block 19 of this roadmap considers different options for access to and interoperability of CBDC systems to facilitate cross-border payments.<sup>6</sup> However, it emphasizes retail payments and inclusiveness. Where it relates to wholesale payments, it pays little attention to cross-country differences in terms of needs and objectives and attendant implications for the GMFA. The paper complements this literature by focusing on the direct implications for cross-border payments and the GMFA of a publicly issued type of DM, i.e., wCBDCs.

The remainder of this paper is organized as follows. The next section discusses de-dollarization motivates. Section 3 examines the recent evolution of dollar dominance. Section 4 highlights recent institutional changes designed to de-dollarize international payments, emphasizing initiatives by China and the BRICS. Section 5 analyses the role that blockchain technology and wCBDCs may play for cross-border payment infrastructures and cross-currency payments. This role relates neither to the dollar nor the RMB but emphasizes a new global payment infrastructure that could reduce dollar

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<sup>5</sup> These two strands are not mutually exclusive, with Brunnermeier et al. (2019) arguing that the use of DLT may imply an unbundling of the different roles of money.

<sup>6</sup> Improving the SWIFT system is part of these options. The full migration of SWIFT towards ISO 20022 messaging standards, envisaged by 2025, stands to provide a common language for financial institutions globally and contribute to a more harmonized and interconnected global payment infrastructure. However, an improved SWIFT system would need to "communicate and settle between thousands of banks all over the world, find a way to transfer traditional commercial bank money as well as money on a blockchain, and do it all before a network of regional systems springs up to challenge its effectiveness and increase the fragmentation of money and finance" (Lipsky and Kumar, 2023: 2).

dominance in trade invoicing, payment, and settlement, and eventually perhaps also in reserves. The final section discusses policy implications, emphasizing the potential gains of countries with non-dominant currencies. It also underlines that the measures discussed here may imply regional complements to, rather than a comprehensive substitute of the dollar-based system, and that ongoing shifts towards a multipolar world must be supported by effective multilateral collaboration to avoid fragmentation.

## 2. De-dollarization motives

The traditional de-dollarization literature emphasizes risks related to the dollar's value characteristics. It emphasizes the "Triffin dilemma" (Triffin, 1960), i.e., the tension between the need of the country issuing the dominant international currency to supply international liquidity that is sufficient for economic agents in a growing global economy to satisfy their needs for a means of payment and a store of value, on the one hand, and the trust by these agents that the value of the dominant currency is guaranteed and that they can easily access their holdings and exchange them at all times, on the other. In the gold-dollar standard of the Bretton Wood system, this dilemma reflected the United States' confrontation with a growing foreign demand for reserve assets and its ensuing tendency to overissue dollar assets, which would undermine confidence in its ability to convert dollar assets into gold at the prefixed price.

More recently, trust in the dollar and the United States may have suffered for three reasons. First, the share of the United States economy in global output is shrinking as emerging economies rise. This implies a decline in the share that the United States can provide as safe international assets through its official debt instruments, meaning that the United States cannot indefinitely remain the sole supplier of safe assets to the world – a phenomenon dubbed "new Triffin dilemma" (Gourinchas et al., 2019).

One reflection of the new Triffin dilemma may be the repeated faltering of the market for United States treasury securities since 2008. Menand and Younger (2023) highlight the rising importance in placing United States treasury bonds through capital markets (rather than the banking system), with some dealers much more thinly capitalized than commercial banks and lacking access to central bank backstopping. They note that this monetary system design has caused several instances<sup>7</sup> when sellers of Treasuries could not find buyers cheaply and easily. They argue that this did not only raise the cost of public finance and impair the ability of the private sector to price risk and allocate capital, but more generally reduced the global appeal of the dollar as a means of payment and store of value.<sup>8</sup>

Second, in the wake of the terrorist attacks on 11 September 2001, the United States changed the nature of sanctions from targeting countries to excluding strategic industries and powerful individuals from cross-border dollar payment channels (represented by SWIFT and CHIPS) – a phenomenon sometimes called "weaponization of the dollar" (e.g., McDowell, 2023). The most powerful "weapon" is the imposition of secondary sanctions on correspondent banks. This means that in addition to forbidding United States institutions to act as correspondent banks with those in a sanctioned country, any other bank still transacting with those banks risks exclusion from the United States

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<sup>7</sup> These instances run counter to the argument by Lysandrou and Nesvetailova (2022) that the new structural presence of asset managers as buyers of Treasuries creates network effects that perpetuate dollar dominance.

<sup>8</sup> These trust issues may have been reinforced by the historic losses on Treasury bonds between March 2020 and October 2023. See Toby Nangle, "You've never had it so bad ... if you've been a government bond holder", Financial Times, 22 December 2023, <https://www.ft.com/content/0b4cfb84-b5ff-4739-b6d9-5c8509706dd2>.

financial system or very high fines. These changes provide incentives to search for an alternative, non-dollar-based global payment infrastructure (Cipriani et al., 2023).

Third, the freezing of nearly half of the Russian central bank's reserves, following the invasion of Ukraine by the Russian Federation in April 2022, could mark a turning point for the dollar's dominance as a reserve asset. Central banks of countries that are not geopolitically aligned with the United States may now need to prepare for the possibility of seeing their assets captured and frozen. This poses a "geopolitical Triffin dilemma" where the expectation of future restrictions on the use of reserves could trigger a move away from dollar, and possibly euro, assets (Panetta, 2024).

A second group of de-dollarization motives relates to the asymmetric structure of the GMFA<sup>9</sup> that allows the United States to enjoy an "exorbitant privilege" (e.g., Gopinath and Stein, 2021). One form of the exorbitant privilege is that dollar dominance reduces other countries' macroeconomic autonomy by making them more exposed to changes in United States monetary policy and the global financial cycle (Miranda-Agrippino and Rey, 2022), while also reducing their fiscal autonomy in crisis situations. Subacchi and van den Noord (2023) show that the United States can run expansionary fiscal policies to stabilize the economy when a negative shock occurs without triggering an adverse reaction of foreign lenders, in particular higher interest rates imposed by global capital markets. They also show that this privilege has become stronger over time, supported by the global build-up of dollar reserves. This reserve accumulation by countries with a non-dominant currency has mostly followed precautionary demand, aimed at self-insuring against a sudden capital-flow reversal or mitigating its adverse effects. Large stocks of reserves also signal financial strength, facilitating access to foreign-exchange markets and deterring currency speculation, as well as ensuring a higher grading by rating agencies, thereby reducing the risk premium on a country's external liabilities. The latter reduces the premium that countries with a non-dominant currency must pay on their external liabilities relative to what they earn on their reserves.<sup>10</sup>

A second form of the exorbitant privilege is that dollar use in trade invoicing and settlement reduces other countries' autonomy in using monetary policy and the exchange rate to stimulate economic activity. Gopinath and Itskhoki (2022) show that with trade prices fixed in dollars, monetary policy outside the United States is unable to influence the relation between export and import prices and thus loses an important channel of transmission to overall economic activity. They also show that for many countries, including developing countries, exchange-rate depreciations are not followed, in the near term, by a significant increase in exports. As a result, there is reduced policy space for stimulating economic activity in countries with non-dollar currencies.

Third, trust in the dollar may have suffered from the development of DLT, including blockchain. As argued in section 5, this new technology enables a cross-border payment infrastructure that does not need the key elements of the dollar-based payment infrastructure, namely SWIFT and CHIPS, and therefore offers a new path towards de-dollarization.

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<sup>9</sup> This asymmetric structure has been described as "currency hierarchy" (e.g., Andrade and Prates, 2013), which implies that a country with a non-dominant currency must compensate for its weaker position and improve its external balance sheet by changes in interest rates, changes in exchange rates and/or the accumulation of international reserves.

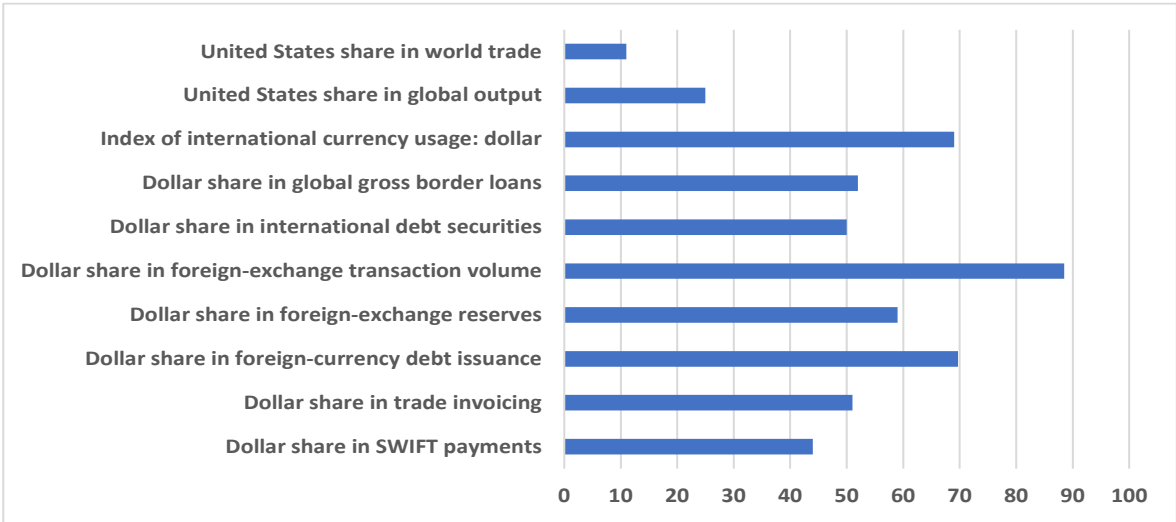
<sup>10</sup> Estimates suggest that this yield differential combined with adverse exchange-rate changes in crisis periods led to an average annual resource transfer from developing economies, mainly to the United States, of about \$800 billion over the period 2010–2019, equivalent to roughly 3.3 per cent of developing countries' combined GDP (Mayer, 2021).

3. Recent evolution of dollar dominance

The dominance of the dollar is generally attributed to its value characteristics (i.e., trust in its future stability and widespread acceptance, the depth and liquidity of dollar financial markets, and an enduring confidence in the legal system and institutions of the United States), as well as the size of the United States economy, network effects from the existing cross-border payment infrastructure, and the absence of a credible alternative (e.g., Eichengreen et al., 2018).

Dollar dominance is reflected by its intensive use in a range of functions (figure 1).<sup>11</sup> Despite the gradual decline of the dollar’s importance in foreign-exchange reserves from 71 per cent in 1999 to slightly below 60 per cent since 2021, its share remains by far the largest. The gradual decline has been mirrored in the rising shares of non-traditional currencies (especially the RMB), whereas the shares of traditional alternative reserve currencies (euro, yen, and pound Sterling) have changed little. The dollar also continues to play a central role in foreign-exchange transactions, and it maintains the largest share in international debt securities and loans, cross-border payments, and trade invoicing, with these shares far exceeding the weight of the United States in global output and trade.

Figure 1: The economic weight of the United States and the share of the dollar in various international uses, per cent



Sources: Author’s calculations based on Bertaut et al. (2023), Statista (<https://www.statista.com/statistics/1189498/share-of-global-payments-by-currency/#statisticContainer>), and IMF (<https://data.imf.org/regular.aspx?key=41175>).

Notes: The numbers refer to the latest data available. The sum of currency shares in foreign-exchange transactions is 200 per cent because each transaction involves two currencies. Index is a weighted average of each currency’s share of globally disclosed foreign-exchange reserves (25 percent weight), foreign-exchange-transaction volume (25 percent), foreign-currency debt issuance (25 percent), foreign-currency and international banking claims (12.5 percent), and foreign-currency and international banking liabilities (12.5 percent).

An important recent change in global reserve holdings is the increased share of gold. This shift may reflect the “weaponization of the dollar” and the “geopolitical Triffin dilemma”, mentioned above. Arslanap et al. (2023: 17) indicate that especially in emerging markets “both the volume and value of

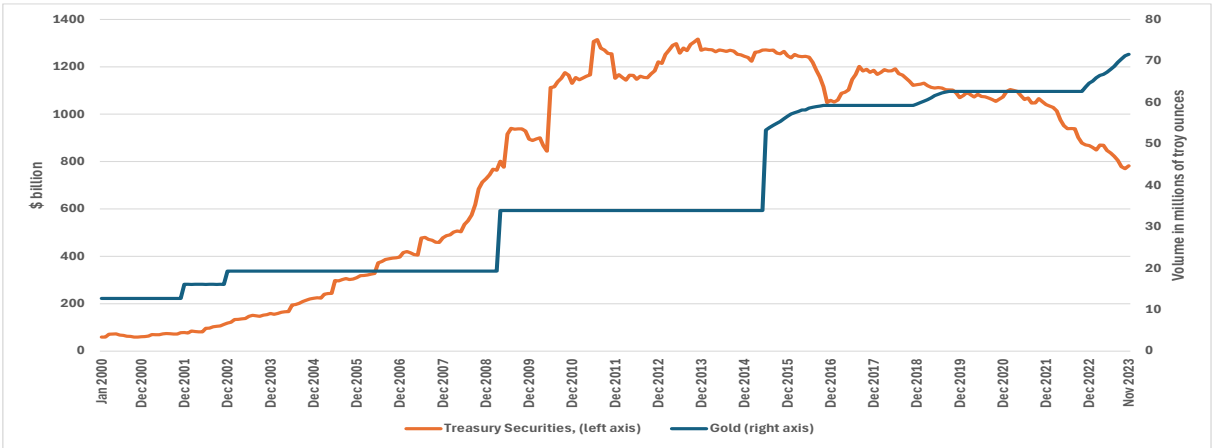
<sup>11</sup> For detailed numerical evidence on the euro, and partly the RMB, see European Central Bank (2023a). Pettis (2022) argues that policymakers in China and the Euro Area may not be promoting their currencies to assume greater importance because of a supposed exorbitant burden for a country issuing a key currency.



gold reserves increases with the imposition of sanctions from the U.S., UK, Euro Area, and Japan in the current or immediately preceding years.”

The shifts in China’s gold reserves are particularly noteworthy since they have coincided with opposite shifts in officially reported Chinese holdings of United States Treasury securities (figure 2).<sup>12</sup> According to United States Treasury statistics for China’s official depository holdings (which probably understate the level of China’s overall treasury holdings), China stopped adding to its treasuries in 2014, after the first United States sanctions on the Russian Federation were imposed in reaction to the takeover of the Crimea, and its holdings started to drop sizeably in March 2022 following the invasion of Ukraine by the Russian Federation and the imposition of additional sanctions by the United States.

Figure 2: China’s reserve holdings: gold and United States treasuries, 2000–2023



Source: Author’s calculations based on International Monetary Fund, International Financial Statistics database and United States Treasury database ([https://ticdata.treasury.gov/resource-center/data-chart-center/tic/Documents/slt\\_table5.txt](https://ticdata.treasury.gov/resource-center/data-chart-center/tic/Documents/slt_table5.txt)).

To see how geopolitical tensions might affect the share of dollar reserves in the future, Weiss (2022) calculates, on confidential country-specific data, that more than half of dollar reserves are held by countries with strong diplomatic ties with the United States.<sup>13</sup> He notes that these countries are unlikely to diversify away from the dollar, arguing that currencies had traditionally been held as reserve assets in return for security guarantees or to signal support for the political aims of the issuing country. While most of these diplomatic allies are developed countries, Weiss (2022) considers that developing countries in South-East and East Asia also have strong diplomatic ties with the United States, including because of sizeable military support from the United States.

To assess the implications of diversification by countries that are less aligned diplomatically with the United States, Weiss (2022) simulates a decline in the incentives to hold foreign-exchange reserves denominated in dollar. He assumes that these countries (see Weiss, 2022: Appendix 1) reduce the dollar share in trade invoicing and that this reduction translates into reserve holdings. Trade invoicing patterns have traditionally been considered “sticky” but, historically, there has been a close

<sup>12</sup> China’s holdings of United States financial assets as a share of its gross domestic product are back down to where they were when the country joined the World Trade Organization in 2001 ([https://twitter.com/Brad\\_Setser/status/1777038408998658098](https://twitter.com/Brad_Setser/status/1777038408998658098)).

<sup>13</sup> This group comprises member countries of multilateral mutual defence partnerships with the United States and countries designated by the United States as major non-NATO allies (for a complete list, see Weiss, 2022: Appendix 1).

connection between a currency's use for trade and as an asset (Farhi and Maggiori, 2019; Gopinath and Stein, 2021). Arslanalp et al. (2022) and Ito and McCauley (2020) find a one percentage point fall in the dollar's invoicing share of a country's exports to be associated with a 0.2–0.5 percentage point fall in the dollar's share of that country's foreign-exchange reserves. Hence, non-dollar currencies that are increasing their role in trade invoicing and settlement may erode dollar dominance. Weiss (2022) assumes a one percentage point fall in the dollar's invoicing share of countries that do not have strong diplomatic ties with the United States to be associated with a 0.5 percentage point fall in the dollar share of these countries' foreign-exchange reserves. The resulting move away from the dollar as a reserve currency equals 10 percentage points when China and Hongkong China SAR are also included among the diversifying countries.

In a second simulation, Weiss (2022) considers potential non-linear diversification dynamics. This setting is informed by the co-evolution of the dollar share in foreign-exchange reserves and export invoicing for Bulgaria, Croatia, Latvia, Lithuania, North Macedonia, and Romania following the introduction of the euro, when for most of these countries the dollar shares in their foreign-exchange reserves fell by more than the dollar shares in export invoicing (Boz et al., 2022). Weiss (2022) assumes a one percentage point decline in the share of dollar reserves for each percentage point decline in the dollar share of export invoicing for countries with "non-Western" export and import shares greater than 40 per cent, while maintaining the assumption of a 0.5 percentage point decline for the other countries that do not have close diplomatic ties with the United States. This setting makes the share of dollar reserves to decline by almost 12 percentage points, with the decline amounting to 17 percentage points assuming China to reduce its share of dollar reserves by 10 percentage points and Hongkong China SAR to use the RMB for invoicing "non-Western" trade.<sup>14</sup>

These scenarios indicate that geopolitical tensions alone are unlikely to undermine dollar dominance, but that moving away from the dollar in trade invoicing and settlement could provide the required economic incentives and be a mechanism for de-dollarization. Weiss (2022) assumes a policy decision as the main rationale for such a move, without explaining the underlying economic motives. The next session looks at recent institutional changes in the GMFA to see whether such policy decisions have occurred.

#### 4. Recent institutional changes

Policymakers around the world are making significant efforts to reform the dollar based GMFA. Many such efforts aim to ensure easier and faster access to dollar liquidity, as noted in the introduction. Other measures target a meaningful increase in the international use of non-dollar currencies. Among these are bilateral RMB swap lines that the People's Bank of China (PBoC) has created starting in 2009, allowing other central banks to exchange local currency for RMB with the PBoC. The initial

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<sup>14</sup> Jeanne (2024) undertakes similar simulations, with data on the composition of foreign-exchange reserves from Ito and McCauley (2020), but with two main differences: (i) noting that Asia accounts for two-thirds of outstanding dollar reserves, he focuses on reserve diversification in this region; and (ii) instead of simulating reserve diversification based on changes in trade invoicing, he assumes that China, India, Japan, the Republic of Korea and Taiwan collectively increase the share of the euro and gold in their reserves by 20 percentage points, while other Asian nations raise the share of the RMB by 20 percentage points, with both shifts occurring at the expense of the dollar. This scenario causes a decline of the dollar share in global reserves to below 50 per cent.

intention of these swap lines was to facilitate local currency usage in trade, but they have mainly been used to address shortages in foreign-exchange reserves in times of crisis (McDowell, 2023).<sup>15</sup>

Expanding the use of non-dollar currencies in trade and finance is also an explicit objective of the Strategy for the BRICS Economic Partnership 2025, adopted in 2020 (BRICS, 2020). In the run up to the BRICS-Summit in August 2023, some observers argued that the creation of a BRICS currency could upend dollar dominance (e.g., Sullivan, 2023). There is no detailed proposal as to what a BRICS currency could look like. It could result from monetary union among the BRICS-countries, like the euro zone, or be a basket currency, like the SDR, called the “R5”. Nogueira Batista (2023) discusses steps that could be taken towards an R5. He suggests starting by using the R5 to denominate government transactions and official accounting records. For the R5 to eventually experience wide acceptance as a means of payment and store of value, trust in its value characteristics would result from financial backing provided by the BRICS, such as by making it freely convertible into bonds issued by the BRICS-members. These steps combined would aim to rival the value characteristics of the dollar. They may evolve similarly to the so far limited internationalization of the euro and the RMB.

Perhaps recognizing these challenges to the creation of a BRICS-currency, the declaration of the BRICS summit in August 2023 was less ambitious. Its paragraph 44 states: “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. We also encourage strengthening of correspondent banking networks between the BRICS countries and enabling settlements in the local currencies.”<sup>16</sup>

Strengthening correspondent banking networks between the BRICS-countries could build on China’s Cross-Border Interbank Payment System (CIPS), launched in 2015 to internationalise the RMB. It allows global banks to clear cross-border RMB transactions directly onshore, instead of through clearing banks in offshore RMB hubs. CIPS is comparable to CHIPS but uses the RMB. As of January 2024, CIPS has an average daily volume of transactions of RMB 666.8 bn and 1’492 participants, with 139 as Direct Participants (most of which probably overseas Chinese banks) and 1’353 as Indirect Participants, where two-thirds of Indirect Participants are from Asia (including 564 from Mainland China).<sup>17</sup> According to Greene (2023), average daily CIPS transactions increased by 50 percent in 2022 after Russia invaded Ukraine, and they increased by about another 50 percent between the first quarter of 2023 and February 2024, reaching about 32’500 transactions.<sup>18</sup>

Given that CIPS Indirect Participants generally use SWIFT to send payment instructions to the system’s Direct Participants, CIPS largely relies on SWIFT for cross-border financial messaging. Once Participants will have installed the necessary translators for Chinese characters, CIPS may eventually operate its own direct communication lines. This would incentivise financial agents excluded from SWIFT to use CIPS and facilitate cross-border payments in RMB. A similar effect could occur if sanctioned foreign banks were permitted to join CIPS as Direct Participants that do not need to use

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<sup>15</sup> Bahaj and Reis (2022) provide a rationale for how swap lines can jumpstart an international currency and show for the period 2009–2018 that a country’s bilateral swap line with China raises the share of the RMB in the country’s payments by 1.3 percentage points and the probability that the country would use RMB at all by 14 per cent.

<sup>16</sup> Available at [https://www.gov.za/sites/default/files/speech\\_docs/Jhb%20II%20Declaration%2024%20August%202023.pdf](https://www.gov.za/sites/default/files/speech_docs/Jhb%20II%20Declaration%2024%20August%202023.pdf).

<sup>17</sup> See the CIPS homepage <https://www.cips.com.cn/en/index/index.html>.

<sup>18</sup> The Russian Federation introduced the System for Transfer of Financial Messages (SPFS) as an alternative to SWIFT. However, given its lack of interoperability with other messaging systems, it gained traction mainly for domestic financial operations.

SWIFT for cross-border payments (Greene, 2023). However, this may eliminate one element of the PBoC's strategy to ringfence spillovers from the international use of the RMB to the domestic financial sector.

More generally, widely diverging economic structures and little trade among BRICS-economies other than China cause significant trade imbalances that confront bilateral trade settlement with two problems. First, to finance trade deficits of its BRICS-partners, China has provided liquidity support through bank lending and bilateral swap agreements although, in addition to the Russian Federation and the invited BRICS-member Argentina, such swap agreements have been activated mainly with non-BRICS-economies, including Pakistan and Turkey. To encourage the use of local currencies in trade settlements, these swap agreements need to be rolled over and enlarged, though China cannot count other BRICS-currencies as reserves in the current IMF-definition. Second, regarding imbalanced trade between members other than China, the surpluses from bilaterally settled trade imbalances need to be converted into a commonly accepted currency, most likely the RMB.<sup>19</sup> To provide a reserve facility to deposit these surplus funds in RMB, China would need to allow other countries to freely use the RMB as an asset. This would require further RMB internationalization that may undermine financial and exchange-rate stability and enhance spillovers of foreign economic shocks on China's domestic economy (Pettis, 2022). A further factor limiting BRICS local currency use is that most of the global commodity trade is priced and settled in dollars. This inherently bolsters dollar dominance in commodity-dependent economies, such as the current or invited BRICS-member states Argentina, Brazil, Ethiopia, Russian Federation, Saudi Arabia, and the United Arab Emirates.

To circumvent these problems, BRICS has been exploring the use of blockchain technology to create a BRICS digital currency for payment settlements among members. According to Preksin (2019), a New Silk Road BRICS (NSRB) token in the form of a stablecoin (1 NSRB=100USD) would be used to convert one national fiat currency, or potential national wCBDC, into another. Accordingly, this system would still use the dollar, but do so only as a unit of account and not as a vehicle currency.

Beyond the BRICS, China is signing an increasing number of bilateral and regional trade agreements (most notably the Regional Comprehensive Economic Partnership (RCEP)), which will further pivot the country's trade towards developing countries that has already been spurred by its ties through the Belt and Road Initiative (BRI). Especially the BRI has been identified as the main driver of the increased cross-border of the RMB (Amighini and Garcia-Herrero, 2023). Using the RMB for trade invoicing and settlement, combined with China's bilateral swap lines and offshore renminbi markets could support further internationalization of the RMB even without full liberalization of China's capital account. However, the de-dollarization effect of this way of RMB-internationalization is unclear, as China will need to hold dollar reserves to ensure that countries holding RMB reserves can convert their assets on offshore markets at predictable and stable prices (Eichengreen et al., 2022).<sup>20</sup>

Taken together, the institutional innovations discussed in this section provide only limited potential as alternatives to the dollar as a dominant currency.

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<sup>19</sup> The conversion into RMB of the Indian rupees accumulated from oil exports by the Russian Federation illustrates this problem. See, e.g., <https://www.reuters.com/world/india/india-cenbank-give-banks-guidance-resolve-rupee-trade-issues-official-2023-07-14/>.

<sup>20</sup> For detailed discussion of institutional arrangements that China is building as part of its RMB-internationalization strategy, see Amighini and Garcia-Herrero (2023) and Berthou and Ponsot (2024).

## 5. The potential role of wholesale CBDCs

Section 3 has shown that dollar dominance has not significantly declined, despite some erosion in the trust of holders that they can always easily access their dollar assets, as well as some diversification towards non-dollar reserves, whereas section 4 points to multiple institutional changes that indicate a strong demand for alternatives to dollar dominance. This section emphasizes the cross-border payment infrastructure as a basis for dollar dominance. It argues that (i) the geopolitical Triffin dilemma and new technology challenge this quality; (ii) an alternative global payment infrastructure can build on the search for improvements on the existing slow, expensive, non-inclusive, and complex system, envisaged by the G20; and (iii) a gradual increase in the use of an alternative infrastructure for trade and cross-border payments could ignite network effects and erode dollar dominance.

The sizable inroads to dollar use in cross-border payments by blockchain-based instruments like cryptocurrencies and stablecoins show that the technology for an improved cross-border payment infrastructure is available. These instruments themselves represent no credible alternative payment system because of their inherent limited scalability, their private issuance and related creation of multiple risks regarding financial stability, monetary sovereignty, and consumer protection, and their facilitation of illicit activities (e.g., UNCTAD, 2023). Instead, wCBDCs provide a public solution to the use of blockchain technology to underpin a faster, cheaper, and more transparent infrastructure, thereby reducing dollar network effects. Moreover, wCBDCs avoid the mentioned risks inherent in cryptocurrencies and stablecoins.<sup>21</sup>

No wCBDC has yet been launched.<sup>22</sup> However, several countries examine their potential, often in addition to retail CBDCs.<sup>23</sup> A wCBDC is not a substitute for a rCBDC. While the latter are accessible to the general public and not necessarily based on DLT, wCBDCs are in a DLT-environment and, being a form of central bank money, accessible only to economic agents (such as commercial banks) with access to central bank money, with which wCBDCs are perfectly fungible (e.g., UNCTAD, 2023). Hence, unlike rCBDCs, wCBDCs do not need to be created from scratch. They simply are an application of blockchain technology to operate wholesale transactions that so far have been done through central bank reserves. And contrary to DLT-based settlement that does not use central bank money (such as for stablecoins), wCBDCs do not require pre-funding to reduce credit risk (Hebert et al, 2023). Moreover, through tokenization, i.e., converting the rights of tangible assets (e.g., real estate, art, precious metals, etc.) into digital tokens through a blockchain, wCBDCs can open new use cases in the financial system that would provide improved tradability and liquidity in the emerging digital economy and virtual environments (BIS, 2023a).

Yet, the greatest potential of wCBDCs may be in cross-border payment infrastructure. By removing intermediaries, they circumvent SWIFT and CHIPS and streamline payment processes, thereby improving transparency and addressing the high cost and low speed of the existing correspondent

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<sup>21</sup> The often-mentioned high energy requirements of blockchain mainly concern permissionless DLT, as used for Bitcoin, where transactions are validated by solving cryptographic algorithms without the intervention of a central agent. Permissioned DLTs, as used for wCBDCs, are less energy-intensive, as well as faster and scalable.

<sup>22</sup> Among the major economies, the United States have not yet decided whether it will pursue a CBDC, but policy objectives and outlined design choices emphasize a rCBDC (The White House, 2022). The European Central Bank is investigating a digital euro for retail use (ECB, 2023b). China launched the digital yuan (eCNY) as a rCBDC in 2019, mainly as a domestic response to the increasing use of cryptocurrencies and payment facilities developed by Alibaba and Tencent (Xu, 2022). Its impact on the internalization of the RMB remains unclear, including because of issues concerning convertibility restrictions, data privacy, and the rule of law.

<sup>23</sup> See Kosse and Mattei (2022) and the Atlantic Council CBDC-tracker at <https://www.atlanticcouncil.org/cbdctracker/>.

banking system. Where they include a foreign-exchange conversion layer, they also allow for a broader range of traded currency pairs. Such broadening would improve inclusiveness and counter the pairing back by correspondent banks of their networks, which is often related to risks to financial integrity and a lack of profitability due to a low volume to cost compliance ratio of transactions. These factors are causing a form of country financial exclusion from first-tier access to the global financial system (Rice et al., 2020).

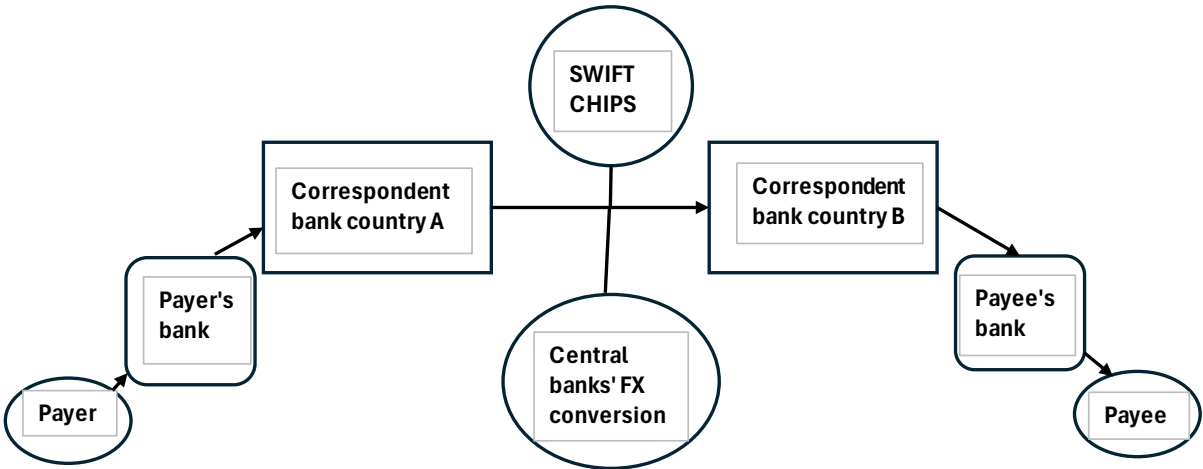
Moreover, wCBDCs provide programmability, which reduces counterparty risk and increases scalability and interoperability. Linking wCBDCs to smart contracts can also minimize the risks of money laundering or of currency substitution related to commercial banks having accounts in foreign currency with the domestic central bank or accounts in domestic currency with a foreign central bank. These contracts can be programmed not to execute payment orders when certain conditions are met, such as specified in capital controls, financial integrity rules (know-your-customer (KYC), or anti-money laundering and countering the financing of terrorism (AML/CFT) regulation) (UNCTAD, 2023).

The remainder of this section discusses various features of wCBDCs-based payments systems, emphasizing infrastructure, foreign-exchange conversion, liquidity, and interoperability.

(i) Infrastructure

The existing global cross-border payment infrastructure does not provide interoperability between national payment systems. Communication needs to go through secure messaging via SWIFT and correspondence banking intermediates the process between the sender and the recipient of the payment. Correspondent banks in one country hold deposits owned by correspondent banks in other countries and these intermediaries conduct the payment via automated clearing houses, where the dollar-based CHIPS (going through New York and United States banks) is the most important clearance and settlement engine for large value transfers. In the case of illiquid currency pairs, correspondent banks use a vehicle currency, mostly the dollar, via their central banks to facilitate indirect foreign-exchange conversion (figure 3). Trading is constrained to overlapping opening hours of correspondent banks.

Figure 3: The dollar-based cross-border payment infrastructure



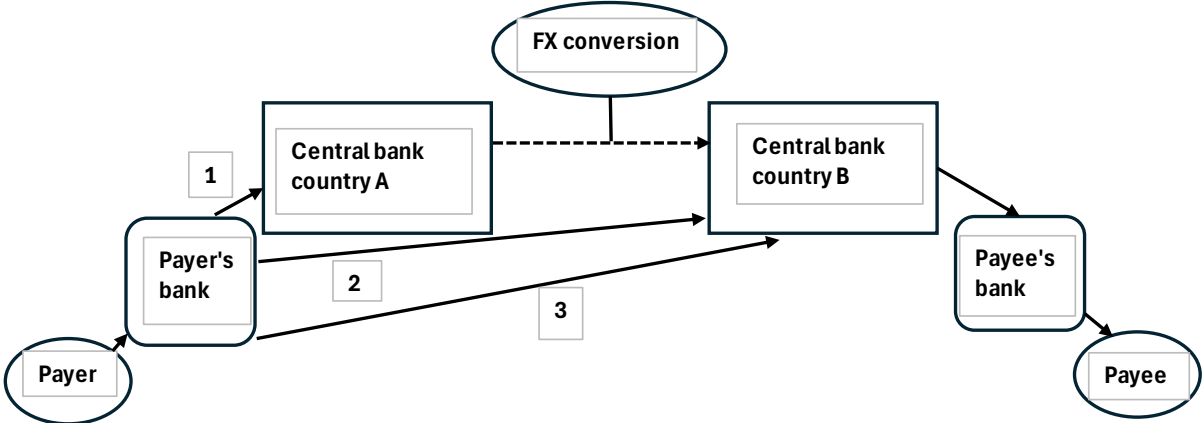
Source: Author’s elaboration based on BIS (2022a).

Assuming a two-country setting, a wCBDC-based cross-border payment infrastructure would replace correspondent banks and CHIPS-settlement by dedicated corridors between the two central banks that would transact and settle payments directly between themselves on a 24/7 basis. This would reduce cost and happen with near instant finality, which reduces settlement, counterparty, and credit risks. Both the payer’s and the payee’s banks would have accounts directly at central banks that would communicate between themselves.

Relating these more direct relationships between parties to DLT would record and organize an audit trail of financial transactions on a digital ledger. This would remove the need to use SWIFT for messaging, as well as de-risk the transactions. DLT-based smart contracts can be used to link transactions and trusted messaging instantaneously, and encryption allows for the selective disclosure of relevant information to selected counterparties.

Payments in such a wCBDC-based infrastructure could be made in three ways (BIS, 2022a; Demertzis and Martins, 2023) (figure 4). First, closest to the current system would be the payer’s bank holding a domestic-currency account in the domestic central bank, with the transaction taking place between the two central banks in one of the two countries’ domestic currency or in a vehicle currency (payment trail 1). Second, the payer’s bank would have a domestic-currency account at the foreign central bank and pay in domestic currency (payment trail 2). Third, involving the fewest steps would be when the payer’s bank has a foreign-currency account at the foreign central bank and pays in foreign currency (payment trail 3).

Figure 4: A wCBDC-based cross-border payment infrastructure: two-country case

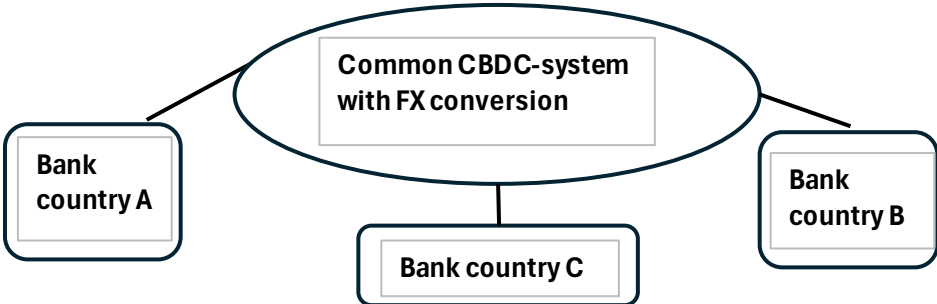


Source: Author’s elaboration based on BIS (2022a) and Demertzis and Martins (2023).

Three broad models can be used to expand wCBDC-platforms to multiple central banks and make them interoperable (BIS, 2022b). First, the compatible model would connect separate CBDC-systems, where common standards would make payment processing more efficient. A reform of the current system by moving to ISO 20022 standards may approximate this model. Second, the single system model uses a single common technical infrastructure to achieve interoperability between different wCBDC-systems (Figure 5a). It also establishes common participation requirements. Third, the interlinked model is an intermediate solution. It interlinks wCBDC-systems and allows participants to transact without the need to become direct participants in each of the systems or to establish bilateral arrangements with an intermediary for each of them. Interlinking can be achieved bilaterally, where individual wCBDC-systems are linked directly, and participants can transact directly across the linked systems. Interlinking can also be achieved through a hub and spoke solution, which includes common functionalities (Figure 5b). Project Nexus (BIS, 2023d) is an example of a hub-and-spoke

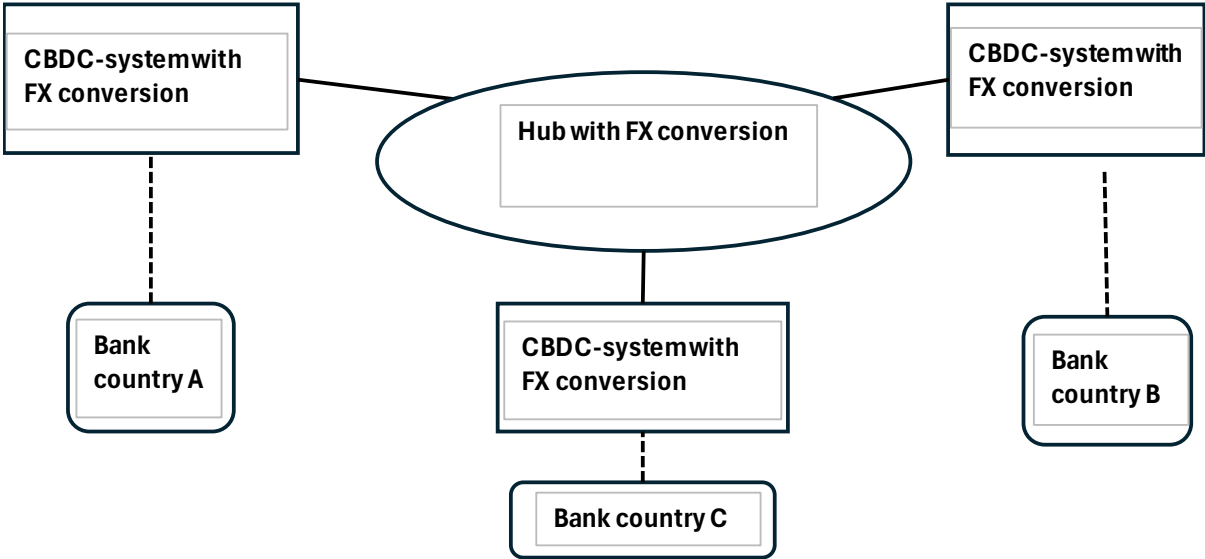
interlinked model. It uses a scheme rulebook and management rules to standardize the way domestic payment systems communicate through gateways with a multiple payment system. Although it applies to fast retail payment systems, its vision for the interoperability of multiple payment systems might be used as a blueprint for the interconnection of multiple wCBDC-platforms.

Figure 5a: Interoperability and interlinking CBDC systems: single common system



Source: Author’s elaboration based on BIS (2022b).

Figure 5b: Interoperability and interlinking CBDC systems: hub-and-spoke system



Source: Author’s elaboration based on BIS (2022b).

Several projects indicate the technological feasibility and advantages of a wCBDC-based payment infrastructure. In a setting as in figure 4, Project Cedar I of the Federal Reserve Bank of New York demonstrated the viability of DLT to enable instant and atomic settlement (i.e., payment-versus-payment settlement in which both legs of the transaction are settled simultaneously) in a simulated foreign-exchange spot transaction between a hypothetical dollar-wCBDC and a hypothetical foreign wCBDC across separate, homogeneous ledgers.<sup>24</sup>

A joint project of the Federal Reserve Bank of New York and the Monetary Authority of Singapore – Project Cedar II – expanded the setting to multiple currencies. It used time-bound smart contracts as

<sup>24</sup> For further discussion of both the Project’s Phase I and Phase II, see <https://www.newyorkfed.org/aboutthefed/nyic/project-cedar>.



bridges between ledgers based on distinct technologies, allowing for atomic settlement of digital assets that are maintained on different ledgers and/or are operated by distinct parties. To facilitate atomic settlement for illiquid currency corridors, commercial banks with accounts with multiple central banks acted as intermediaries by using vehicle currencies.

Project mBridge (BIS 2022a and 2023b) was coordinated by the Bank for International Settlements Innovation Hub and brought together four central banks (the Hong Kong Monetary Authority, the central bank of the United Arab Emirates, the PBoC, and the Bank of Thailand) and five commercial banks from each jurisdiction. It examined the setting with multiple currencies on a common platform, using the same technology stack in representing different currencies and actors, as illustrated in figure 5a. Exchange rates were determined off-bridge before foreign-exchange payment-versus-payment transactions took place on the platform. The Project intentionally omitted cross-border transactions using a currency which is foreign to both counterparties to avoid concerns about currency substitution. It relied on a permissioned custom-built DLT that supports instant peer-to-peer and atomic cross-border payments. The DLT platform accepts or rejects a proposed transaction to the ledger through a consensus mechanism, thereby avoiding the need for messaging via SWIFT.

In the Project, multiple central banks could issue and exchange their respective wCBDC, and central banks and commercial participants could directly hold and transact in wCBDCs across jurisdictions. The Project allowed for direct, bilateral cross-border connectivity between a payee's and a payer's domestic banks. It focused on the use of local currencies in international trade payments. Final settlement of transactions took place directly on the platform in central bank money, as opposed to settlement on the domestic payment systems in commercial bank money, as is the case in the correspondent banking system. The setting was guided by the potential of single multi-currency wCBDC-platforms to shorten the time of cross-border wholesale payment transfers by 80% and halve their costs (BIS, 2021).<sup>25</sup> Overall, Project mBridge showed that a common multicurrency wCBDC-platform can conduct peer-to-peer payments directly in the safety of central bank money across multiple jurisdictions, thereby improving cross-border payment speed and efficiency, reducing settlement risks, and supporting the use of local currencies in international payments, while taking into careful consideration any potential policy, macroeconomic, regulatory, and legal implications (BIS, 2022a: 36).

However, for cross-border wCBDCs-projects to fully achieve the potential of reducing costs, increasing speed, and improving transparency that DLT offers, they need to facilitate foreign-exchange conversions and be scalable. These issues are addressed next.

## (ii) Foreign-exchange conversion and liquidity

Foreign-exchange conversion and settlement is an important consideration for cross-border wCBDC projects. In the current correspondent banking system, cross-border transactions are settled in a handful of currencies and foreign-exchange trading involving non-dominant currency pairs remains limited. This exposes economies with non-dominant currencies to spillover effects from the monetary policies in dominant-currency countries, with attendant financial stability risks and exposure to financial cycles (BIS, 2022a).

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<sup>25</sup> This setting could also improve trade finance whose unavailability or high cost constrains developing country trade. While general financing concerns solvency and liquidity, external trade finance addresses trade-specific short-term risks, such as counterparty risk and currency fluctuations. By including central banks, rather than commercial banks, the setting eliminates counterparty risk, while the AMM mitigates currency fluctuations.

The projects discussed above provide different solutions to foreign-exchange conversion and settlement. Project Cedar relies on commercial banks with accounts with multiple central banks to act as intermediaries for illiquid currency corridors by using vehicle currencies. Project mBridge relies on off-platform exchange-rate determination and foreign-exchange transaction. This contrasts with Project Mariana which includes an automated foreign-exchange transaction mechanism that can facilitate the pricing and settlement of otherwise little traded currency pairs.

Project Mariana is coordinated by the BIS Innovation Hub and brings together the central banks of France, Singapore, and Switzerland, each of which is assumed to issue a wCBDC (BIS, 2023c). The Project combines the three domestic DLT-based wCBDC platforms with a transnational network, which uses a uniform technical DLT-standard for the seamless cross-border trading and settlement of the three hypothetical wCBDCs. The network serves as an interbank foreign-exchange market where automated market makers (AMMs) enable spot foreign-exchange transactions to be priced and executed automatically and settled immediately on the network, thereby eliminating intermediaries.

In the AMM, commercial banks can instantly trade and settle one wCBDC for another. Use of the AMM requires pre-funding from a liquidity pool of wCBDCs, which is alimented by commercial banks that generate revenue by contributing liquidity in exchange for liquidity pool tokens, i.e., claims on a share of the liquidity pool. This share determines the compensation for their contribution through transaction fees, where the size of the compensation is inversely related to the fees associated with currency trading. Accordingly, higher fees disincentivise trade but increase income from liquidity provision and therefore incentivise the provision of liquidity. Hence, the higher the level of liquidity in a specific wCBDC, the lower the cost of its use in foreign-exchange trading, and hence the larger the cost saving with respect to the existing correspondent banking system.

The AMM acts as a counterparty with commercial banks for liquidity-taking foreign-exchange transactions. Exchange rates are set through a predefined algorithm which is calibrated with the objective of replicating observed exchange-rate movements from historical market data. As such, an AMM does not, in and of itself, solve underlying market or funding liquidity issues that might exist in a currency pair. Still, the Project demonstrates the technical feasibility of using AMMs to integrate an interoperable foreign-exchange interbank market into a wCBDC-based cross-border financial market infrastructure. This enables trading against an AMM and collapses trading and settlement into one step, while improving settlement efficiency and lowering global settlement risks.

Scaling the AMM to cover more currencies requires exploring how the amount of liquidity available to the pool, as well as how the parameterisation of the pre-defined algorithm, affect market liquidity (i.e., the ease with which wCBDCs can be traded for one another). Providing deep liquidity pools may be challenging for most non-dollar currencies. One way of increasing liquidity could be through incremental design changes. For example, allowing the use of liquidity pool tokens as tokenized deposits in payments and repo agreements with the central bank, or as a form of vehicle currency, could incentivize trading of otherwise less liquid currency pairs. The same could be achieved through borrowing and lending arrangements between central banks in which they could obtain liquidity pool tokens from another central bank and use those to provide liquidity in its wCBDC, or by central banks creating swap lines that the AMM could activate automatically should there be insufficient liquidity for foreign-exchange transactions in specific currency pairs. Another way would be to enhance actual use in cross-border payments of so far less traded currencies, as discussed next.

(iii) Enhanced use of less-liquid currencies to facilitate foreign-exchange transactions

Figure 1 above shows that the dollar is used in about 88 per cent of foreign-exchange transactions, i.e. far more than the global weight of the United States economy. Somogyi (2023) indicates that about one-third of the volume of foreign-exchange transactions that involve dollar pairs relate to vehicle currency use. Market participants choose this indirect use of the dollar whenever its cost is expected to be smaller than the cost of direct transactions between non-dollar currency pairs. Somogyi (2023) argues that this cost depends on exchange-rate volatility and the volatility of fundamental trading demands, where he assumes the latter to be determined by the temporary unavailability of currency-pair transactions due to non-overlapping public holidays.

The AMM of Project Mariana would tend to smoothen both these volatilities. The algorithm's use of historical data provides greater exchange-rate stability, and its operation on a 24/7 basis ensures a larger average and a more stable number of non-dollar fundamental trading demands. As a result, dollar use in foreign-exchange transactions would decline because of changed economic incentives.

Perez-Saiz et al. (2023) also examine the drivers of a currency's use in cross-border payments, covering the exchange of goods and services and the settlement of financial contracts. Based on highly granular annual SWIFT data for the period 2010–2021, the study finds a significant degree of inertia in currency usage for cross-border payments, reflecting the strong network effects and switching costs, as well as a positive impact on currency use from close diplomatic ties (proxied by voting patterns in the United Nations General Assembly) along with the currency's legal tender status in the sender or receiving country. Interpreting the result of simulations, the study argues that the introduction of CBDCs could facilitate rapid changes in currency configurations by reducing switching costs, and that abrupt geopolitical changes could accelerate the fragmentation of the payment system and give rise to new currency blocs.

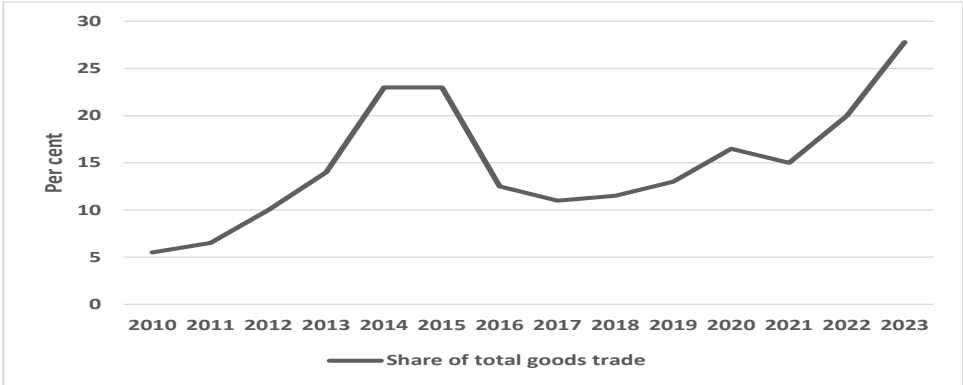
The war in Ukraine and the ensuing sanctions may represent such an abrupt geopolitical change. It may have caused the change in China's pattern of reserve accumulation, shown in figure 2. Another reflection could be the increased sensitivity of international trade to geopolitical distance (measured by voting in the United Nations General Assembly). Blanga-Gubbay and Rubina (2023) show for the period January 2016–May 2023 that merchandise trade between hypothetical geopolitical blocs<sup>26</sup> grew 4-6 per cent more slowly than trade within these blocs.

While the same study does not find a statistically significant increase in intraregional merchandise trade for this period, others argue that geopolitical tensions, rising demand and new industrial capabilities in developing countries, environmental concerns, and vulnerabilities exposed by the Covid-19 pandemic all have the potential to contribute to an increase in trade regionalization (Dahlman and Lovely, 2023). This has been expressed, for example, by RCEP where countries integrate through trade with China. This form of trade integration, which also encompasses ties through the BRI, may explain at least part of the sizable increase in RMB-invoicing over the past two years (figure 6). Another factor may be rising domestic demand across Asian countries and a resulting increase in imports as a destination market in Asia. This has been shown as leading to an increase in the usage of Asian currencies for trade invoicing, with a significant effect for both the RMB and the Thai Bhat (Ito et al., 2021).

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<sup>26</sup> For a list of countries belonging to hypothetical "East" and "West" blocs, see Blanga-Gubbay and Rubina, 2023: 17–18). Kempf et al. (2023) indicate that financial flows, such as bank and portfolio flows, could fragment along similar geopolitical fault lines.

Figure 6: China: goods trade settled in RMB, 2010–2023, per cent



Source: Author’s calculations based on China General Administration of Customs: Exports and Imports (<http://english.customs.gov.cn/Statics/17f80d2c-77c8-44bc-a347-4edfa456f2b3.html>) and People’s Bank of China, Cross-border RMB Settlement: Trade, Goods (<https://www.ceicdata.com/en/china/crossborder-rmb-settlement/crossborder-rmb-settlement-odi>).

This evidence indicates that ongoing trade fragmentation could shift export-related foreign-currency demand from the global economy (or developed country markets) towards a greater importance of regional and/or geopolitically close partners. This shift could spur the use of non-dollar currencies for trade invoicing and payment and the ensuing increase in the liquidity for foreign-exchange conversion of non-dollar currency pairs. Such a shift will be influenced by whether and how the United States will continue to impose financial sanctions. But any such shift will receive further momentum from the significant expected cost reduction and speed acceleration from common multicurrency wCBDC-platforms, as mentioned above for Project mBridge. This cost reduction could at least partly compensate for the expected economic cost of friendshoring value chains (Javorcik et al., 2024), related to de-risking and geopolitics, and result in a decisive reduction of switching costs for a broad range of currencies. Specifying numerical evidence for these mechanisms is difficult without the availability of data required for empirical testing.

(iv) Scalability and governance issues related to linking multicurrency wCBDC-platforms

The scaling of multicurrency wCBDC-platforms, i.e., achieving interoperability that involves multiple central banks, can be accomplished through the interlinking of systems via dedicated corridors (as in Project Mariana) or through a common multiple CBDC-platform (as in Project mBridge).

The technical setup of a single multicurrency platform – as outlined by Adrian et al. (2022), Adrian et al. (2023), BIS (2023a) and Carstens (2023) – is a grand vision of a new financial system based on DLT and comprising multi-currency cross-border transactions between financial and non-financial entities with access to central bank money. While this vision itself is not based on CBDCs, its technical features resemble those of mBridge and could provide benchmarks against which any reform step may be assessed.<sup>27</sup>

Realizing such a grand vision requires international cooperation to an extent that becomes increasingly difficult. Hasting towards such a solution may cause fragmentation between the inclusion of better prepared central banks and more liquid currency pairs on the common digital marketplace,

<sup>27</sup> Adrian et al. (2022) outline a multi-currency platform based on “certificates of escrow”, which are assets that are issued one-to-one against central bank reserves.

with the other currencies remaining traded on more conventional foreign-exchange markets with possibly increased fees to compensate market participants for the loss of trading activity in the more liquid, and probably more profitable, currency pairs.

Moreover, there are questions as to who would build and operate such a marketplace and how the governing rules, e.g., regarding access to transaction data, would be agreed. Different countries may well have diverging objectives for reforming the cross-border payment infrastructure, and any such reform will be implemented only where the advantages outweigh the multiple implementation challenges. This means that the governance structure of a single common global platform could be determined by early movers that shape a common rulebook according to their own narrow needs. Singh (2022), for example, advocates the rapid development of a CBDC in the United States to ensure continued dollar dominance and traceability of cross-border payments, such as in the current system, and avoid CBDC-systems be shaped by other influential countries according to their interests. It would seem difficult to reconcile these objectives with ensuring that infrastructure design – and related common rules, governance, and standards– align with the manifest desire to de-dollarize the GMFA with a view to increasing macroeconomic policy space, decreasing risks of currency substitution, and addressing the geopolitical Triffin dilemma, as discussed in section 3 above.

By contrast, moving towards an infrastructure that combines single common platforms among a limited number of countries (as in figure 5a) with a hub-and-spoke model that interlinks these platforms in a global common infrastructure (as in figure 5b), each augmented by a foreign-exchange conversion layer, could be easier to achieve. Such a more incremental process could start from collaboration among a few like-minded central banks, each with their own wCBDC such as in Project mBridge, augmented by an AMM, such as in Project Mariana. In the current setting of mBridge, new participants need to adopt the same technical standards and provide infrastructure that matches those of existing participants, as well as agree to the binding mBridge platform terms and the rules that govern access to and use of the platform. Keeping such common platforms to a more limited number of countries, and perhaps on a regional basis, and interlinking such smaller platforms through corridors in a hub-and-spoke manner would increase efficiency to a similar extent as a single common system. It could also facilitate interoperability between digital platforms and traditional domestic payment infrastructures, which diverge across countries and are likely to persist during a transition period. Other benefits could include expediting agreement on how to harmonize current variations in laws around privacy and data protection, updating adherence to financial integrity rules, and adopting other measures to address cyber threats and safeguard financial stability. To avoid that this leads to the emergence of unconnected digital islands, design features could draw on lessons from Project Nexus (BIS, 2023d) with certain participants acting as “connector” countries that bridge between individual platforms similar to emerging features in current trade fragmentation (Gopinath et al., 2024), as well as keeping sight of the grand vision mentioned above. The dollar could well remain the dominant currency in the perhaps largest of such individual platforms, supported by a new vision of a dollar-based monetary and financial architecture that is more responsive to the developmental aspirations of countries with non-dominant currencies.

## 6. Conclusions

Traditional trust-related de-dollarization motives have gained additional impetus from the “new” and the “geopolitical” Triffin dilemmas and from new financial technology. While dollar dominance has changed little, several institutional innovations initiated by China and the BRICS demonstrate the

demand for de-dollarization. However, they are unlikely to offer practical alternatives because they address the dollar's value characteristics, for which no credible comprehensive alternative exists.

By contrast, de-dollarization desires coincide with attempts to make cross-border payment systems more effective. An alternative cross-border payment infrastructure built on DLT and augmented by a foreign exchange conversion layer could respond to both the demand for de-dollarization and the objective to make cross-border payment flows cheaper, faster, and more transparent. Moreover, by facilitating improved efficiency in cross-border payments and other international transactions, de-dollarization based on such an alternative payment infrastructure would tend to increase the dynamism of the global economy and provide benefits for all countries.

Multicurrency wCBDC-platforms with a foreign-exchange conversion layer hold immense potential for transforming cross-border payments by reducing costs and increasing efficiency. Allowing for leaner payment infrastructures, they could facilitate easier and cheaper use of non-dollar currencies in cross-border payment and settlement. Pilots of multicurrency wCBDC platforms indicate how to ensure interoperability and reduce exposure to foreign-exchange risk. Moving towards a single common multicurrency wCBDC-platform could represent an aspirational solution. However, creating a globally integrated payment network is an immense technical and regulatory challenge. More incremental steps that interlink single common multicurrency wCBDC-platforms among like-minded central banks in a hub-and-spoke manner to a global single platform may more easily reconcile cross-country differences in the objectives of wCBDC-development and in the benefits that multicurrency wCBDC-platforms are likely to provide.

By augmenting macroeconomic autonomy and reducing the need for holding costly dollar reserves, de-dollarization holds greater effects for countries with non-dominant currencies. These countries should sit at the table when outstanding questions on the interoperability of multicurrency wCBDC-platforms and related economic, technical, legal and governance questions are answered. Any such decision will be facilitated by dominant-currency countries' granting other countries more space for their own developmental aspirations.

Designing wCBDCs may exceed the current technical capabilities of many central banks. However, wCBDCs will probably be an integral part of a future financial market infrastructure, aimed at making cross-border financial flows faster, cheaper, and better accessible and, at the national level, bridging existing gaps between different forms of digital money, such as rCBDCs, tokenized assets, etc.<sup>28</sup> Early engagement in exploring wCBDCs, including the additional technical capabilities and legal and regulatory changes required for their deployment, should therefore be high on the agenda of developing country policymakers to chart their own course towards a new financial infrastructure and potential de-dollarization.

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<sup>28</sup> See BIS Project Agorá launched in April 2024 (<https://www.bis.org/about/bisih/topics/fmis/agora.htm>).

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