EUROPEAN CENTRAL BANK

EUROSYSTEM

The international role of the euro

June 2025

Contents

Foreword

The international role of the euro remained broadly stable in 2024. The share of the euro across various indicators of international currency use has been largely unchanged, at around 19%, since Russia's invasion of Ukraine. The euro continued to hold its position as the second most important currency globally.

This stability was noteworthy in a year that saw the ECB begin lowering policy rates, following further declines in inflation and continuing geopolitical tensions. The accumulation of gold by central banks continued at a record pace and some countries have been actively exploring alternatives to traditional cross-border payment systems. There is evidence of a link between shifts in invoicing currency patterns in global trade and geopolitical alignments, particularly since the invasion of Ukraine. New challenges to the euro's international role have also emerged, including initiatives promoting the global use of cryptocurrencies.

At the time of writing, further shifts may be underway in the landscape of international currencies. The tariffs imposed by the US Administration have led to highly unusual cross-asset correlations. This could strengthen the global role of the euro and underscores the importance for European policymakers of creating the necessary conditions for this to occur. The number one priority must be advancing the savings and investment union to fully leverage European financial markets. Eliminating barriers within the EU is essential to enhancing the depth and liquidity of euro funding markets, which is a precondition for a wider use of the euro. The planned issuance of bonds at the EU level – as Europe takes charge of its own defence – could make an important contribution to achieving these objectives.

The ECB will play its role. In a more volatile geopolitical environment, accelerating progress on a digital euro is crucial for bolstering European sovereignty. Improving cross-border payment systems between the euro and other currencies will also increase resilience. And offering solutions for settling wholesale financial transactions recorded on distributed ledger technology platforms in central bank money will increase the efficiency of European financial markets and the global appeal of the euro. In addition, our euro liquidity lines to non-euro area central banks, which signal the ECB's willingness to provide a backstop in stressed market conditions, foster the use of the euro in global financial and commercial transactions.

Finally, the global appeal of the euro is underpinned by sound policies in the euro area and strong, rules-based institutions. Upholding the rule of law remains essential for maintaining, and potentially increasing, global trust in the euro.

The ECB will continue to monitor developments and publish information on the international role of the euro on a regular basis.

Christine Lagarde
President

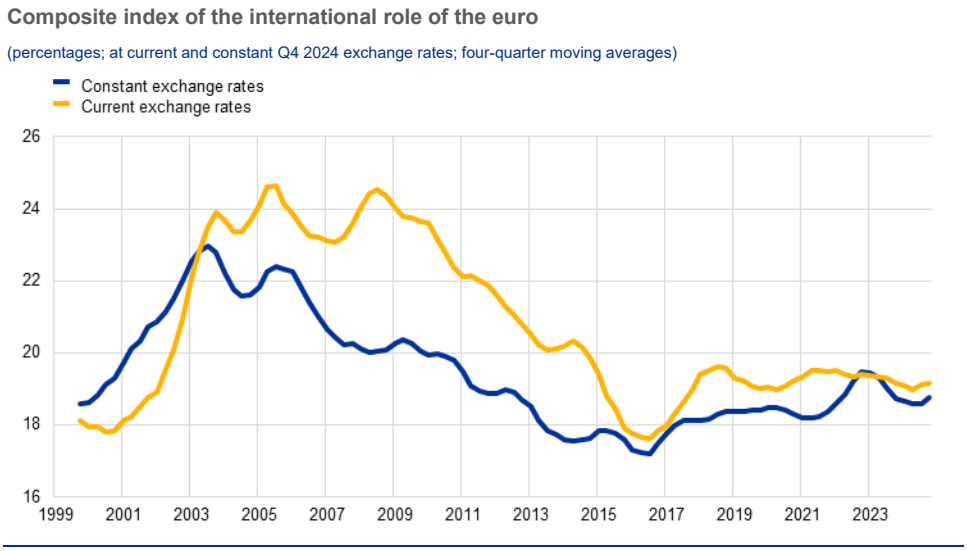
1 Main developments

This 24th annual review of the international role of the euro presents an overview of developments in the use of the euro by non-euro area residents in 2024. This was a year that saw continuing geopolitical tensions, decreases in policy interest rates and further declines in inflation in the major advanced economies.

On balance, the international role of the euro remained broadly stable in 2024. A composite index of the international role of the euro – computed as a simple arithmetic average of the share of the euro across a broad range of indicators – remained broadly stable at both constant and current exchange rates, standing at around 19% (**Chart 1**). The euro also remained firmly established as the second most important currency in the international monetary system (**Chart 2**).

Chart 1

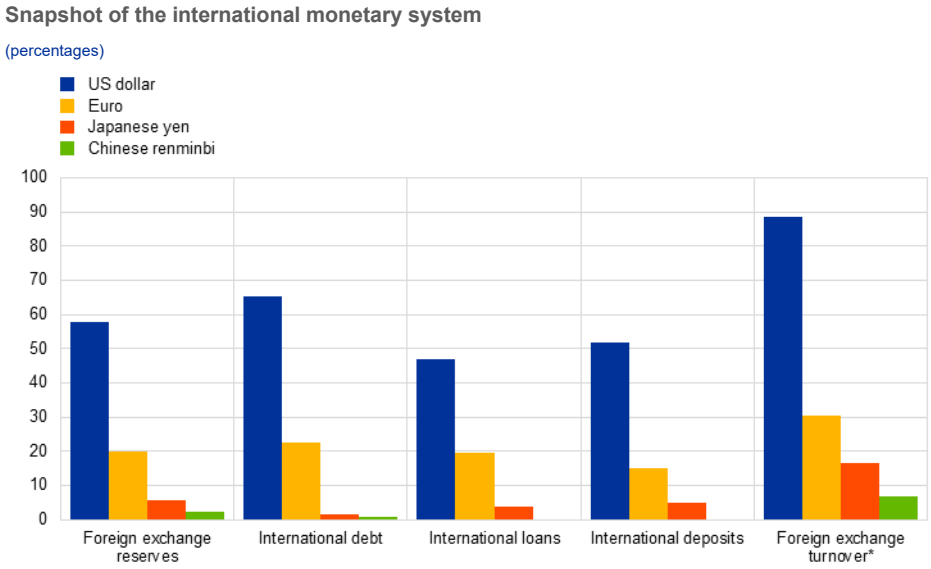
The international role of the euro remained broadly stable in 2024



Sources: Bank for International Settlements (BIS), International Monetary Fund (IMF), CLS Bank International, Ilzetzki, Reinhart and Rogoff (2019) and ECB staff calculations.
Notes: Arithmetic average of the shares of the euro at constant (current) exchange rates in stocks of international bonds, loans by banks outside the euro area to borrowers outside the euro area, deposits with banks outside the euro area from creditors outside the euro area, global foreign exchange settlements, global foreign exchange reserves and global exchange rate regimes. Since 2010, estimates of the share of the euro in global exchange rate regimes are based on IMF data; pre-2010 shares are estimated using data from Ilzetzki, E., Reinhart, C. and Rogoff, K., "Exchange Arrangements Entering the Twenty-First Century: Which Anchor will Hold?", *The Quarterly Journal of Economics*, Vol. 134, Issue 2, May 2019, pp. 599-646. The latest observation is for the fourth quarter of 2024.

Chart 2

The euro remained the second most important currency in the international monetary system



Sources: BIS, IMF, CLS Bank International, Ilzetzki, Reinhart and Rogoff (2019) and ECB staff calculations.
Notes: The latest data on foreign exchange reserves, international debt, international loans and international deposits are for the fourth quarter of 2024. Foreign exchange turnover data are as of April 2022 (the latest available data as they come from a triennial survey).
*Since transactions in foreign exchange markets always involve two currencies, foreign exchange turnover shares add up to 200%.

Accordingly, the share of the euro in global official holdings of foreign exchange reserves remained stable, at 20%, broadly unchanged since the start of Russia's full-scale invasion of Ukraine. Special feature A shows that holdings of euro area government debt securities by official foreign investors have remained generally resilient since Russia's invasion, reaching almost €1 trillion (or more than one-third of foreign holdings of euro area government debt securities) at the end of 2024. The decline in holdings by countries not geopolitically aligned with the West – around 5% compared with pre-invasion levels – has so far been contained, highlighting the importance of upholding the rule of law. Meanwhile, the share of the US dollar in global official holdings of foreign exchange reserves declined by 2.0 percentage points at constant exchange rates, to 57.8% (**Section 1.1**). The share of the renminbi stood at 2.2%, 0.4 percentage points below its 2022 peak. Surveys of official managers point to China's deteriorating economic outlook as one factor that has weighed on the renminbi's appeal as a reserve currency. Diversification into non-traditional reserve currencies such as the Australian dollar and the Canadian dollar continued, with their combined share rising to 9.6% – an increase of 2.4 percentage points compared with the levels seen before Russia's invasion.

Issuance of international loans and bonds denominated in euro was particularly dynamic in 2024, increasing by over 40% to nearly USD 900 billion. This was its highest level since the global financial crisis of 2007-09 (**Section 1.2**). Bonds made up two-thirds of this issuance, with US firms alone issuing nearly USD 95 billion in bonds, commonly referred to as "Reverse Yankees", compared with about USD 60 billion in 2023. **Box 2** shows that the primary driver of the increased issuance of these bonds was the shift in expectations for policy rates on both sides

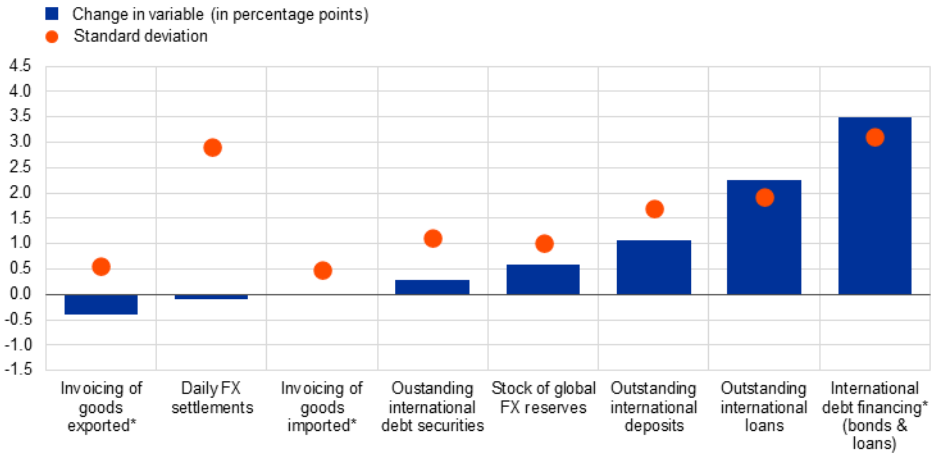
of the Atlantic. By contrast, relative credit spreads and deviations from covered interest parity played a more limited role.

Other indicators of the international role of the euro remained broadly stable or point to some increases in the position of the euro during the review period (Chart 3 and Table 1). These indicators include global foreign exchange settlements (broadly stable), the outstanding stock of international debt securities (+0.3 percentage points), the outstanding stock of international deposits (+1.1 percentage points) and the outstanding stock of international loans (+2.2 percentage points). An IMF-ECB staff survey of more than 100 countries presented in **Special feature B** indicates that the share of the euro as a currency of invoicing for global goods exports has remained close to pre-pandemic levels, at more than 40%.

Chart 3

Changes in the share of the euro in various market segments in 2024

(percentage point changes at constant Q4 2024 exchange rates over the review period, unless otherwise indicated)



Sources: BIS, CLS Bank International, Dealogic, IMF, national sources and ECB staff calculations.
Notes: * Indicates percentage point change at current exchange rates. "Standard deviation" refers to the standard deviation of the annual changes in percentage points since 1999. Loans included under "International debt financing" refer to syndicated loans obtained from Dealogic, while "Outstanding international loans" include all cross-border loans granted by banks outside the euro area to borrowers outside the euro area issued in euro.

Although current data indicate no significant changes in the international use of the euro, it is important to remain vigilant. For instance, geopolitical concerns remained high for reserve managers and continued to weigh on their investment decisions. Surveys suggest that 80% of official reserve managers continued to consider geopolitics as a major factor affecting their portfolios for the next five to ten years (**Section 1.1**).

Box 1 shows that central banks continued to accumulate gold at a record pace. Central banks purchased more than 1,000 tonnes of gold in 2024, which is double the average annual amount seen in the previous decade. Global holdings of gold by central banks now stand at 36,000 tonnes, close to the all-time high of 38,000 tonnes reached in 1965 during the Bretton Woods era. With the price of gold reaching new highs, the share of gold in global foreign reserves at market prices, at 20%, surpassed the share of the euro (16%). Survey data suggest that two-thirds of

central banks invested in gold for purposes of diversification, while two-fifths did so as protection against geopolitical risk.

Moreover, some countries further explored alternatives to traditional cross-border payment systems (Section 1.3). At the summit of BRICS+ nations, held by Russia in Kazan in October 2024, the leaders of Brazil, Russia, India, China, South Africa and other nations welcomed the increased use of local currencies in global financial transactions and discussed establishing a new cross-border settlement and depository infrastructure: BRICS Clear. In March 2025 Hong Kong announced plans to develop an Asian international settlement house with a view to reducing dependence on traditional financial infrastructure and boosting the global use of the renminbi. In addition, the Chinese Cross-Border Interbank Payment System (CIPS) continued to grow rapidly in 2024, with the value of transactions increasing by 22% to around USD 6 trillion in the fourth quarter of the year. **Box 3** finds that geopolitical factors have a significantly greater impact on the likelihood of interlinking fast payment systems between two countries than economic factors such as bilateral trade and geographic distance.

Special feature B similarly provides some evidence of a relationship between shifts in invoicing currency patterns and geopolitical alignment, especially since Russia's full-scale invasion of Ukraine. The evidence is most marked in certain countries that have distanced themselves geopolitically from the West, such as Russia, Belarus, Kyrgyzstan and Uzbekistan, where the share of exports invoiced in US dollars and euro was between 10 and 50 percentage points lower in 2023 than over the period 2015-19.

New challenges for the international role of the euro have emerged more recently. The new US Administration has recently taken initiatives to support the global use of cryptocurrencies. These initiatives include the creation of a “strategic bitcoin reserve”, using USD 17 billion in bitcoin seized by the US Treasury in forfeiture proceedings, while other crypto-assets owned by the US government would be pooled to make a “digital assets stockpile”. In addition, some initiatives aim to boost innovation and facilitate the issuance and use of US dollar-based stablecoins, which accounted for around 99% of the capitalisation of the stablecoin market of approximately USD 190 billion at the end of 2024. These developments may have implications for capital flows if they lead to shifts in demand for international reserve assets, and for global financial stability more broadly. US dollar-based stablecoin issuers already hold nearly USD 150 billion in US government debt securities, which is comparable with the holdings of residents in countries such as Saudi Arabia, Korea, Mexico and Germany.

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planned issuance of bonds at the EU level – as Europe takes charge of its own defence – could make an important contribution to achieving these objectives.

The ECB will play its role. In a more volatile geopolitical environment, accelerating progress on a digital euro is crucial for bolstering European sovereignty. Improving cross-border payment systems between the euro and other currencies will also increase resilience. And offering solutions for settling wholesale financial transactions recorded on distributed ledger technology platforms in central bank money will increase the efficiency of European financial markets and the global appeal of the euro. In addition, our euro liquidity lines to non-euro area central banks, which signal the ECB's willingness to provide a backstop in stressed market conditions, foster the use of the euro in global financial and commercial transactions.

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Table 1

The international role of the euro from different perspectives

Summary of data in this report

	Share of the euro (percentages at constant exchange rates, unless otherwise indicated)			Total outstanding amounts (at current exchange rates)			
Indicator	Latest	Comparison period	Difference (p.p.)	Latest	Comparison period	Unit	Difference (%)
Stock of global foreign exchange reserves with known currency composition	19.8 (Q4 2024)	19.2 (Q4 2023)	0.6	12,364 (Q4 2024)	12,343 (Q4 2023)	USD billions	0.2
Outstanding international debt securities: narrow measure, i.e. excluding home currency issuance	22.5 (Q4 2024)	22.2 (Q4 2023)	0.3	19,269 (Q4 2024)	18,450 (Q4 2023)	USD billions	4.4
Outstanding international loans: by banks outside the euro area to borrowers outside the euro area	19.5 (Q4 2024)	17.3 (Q4 2023)	2.2	2,893 (Q4 2024)	2,795 (Q4 2023)	USD billions	3.5
Outstanding international deposits: with banks outside the euro area from creditors outside the euro area	15.2 (Q4 2024)	14.1 (Q4 2023)	1.1	3,241 (Q4 2024)	3,160 (Q4 2023)	USD billions	2.6
Foreign currency-denominated bond issuance, at current exchange rates	25.6 (2024)	22.6 (2023)	3.0	2,209 (2024)	1,784 (2023)	USD billions	23.8
Euro nominal effective exchange rate (broad measure against 41 trading partners)	122.6 (31 Dec. 2024)	123.9 (29 Dec. 2023)	-1.3				
Daily foreign exchange trading (settled by CLS), as a percentage of foreign exchange settlement	33.6 (Q4 2024)	33.7 (Q4 2023)	-0.1				
Invoicing of goods exported from the euro area to non-euro area countries, at current exchange rates	59.0 (2024)	59.4 (2023)	-0.4				
Invoicing of goods imported into the euro area from non-euro area countries, at current exchange rates	51.8 (2024)	51.8 (2023)	0.0				
Cumulative net shipments of euro banknotes to destinations outside the euro area (seasonally adjusted)				80.0 (Dec. 2024)	105.7 (Dec. 2023)	EUR billions	-25.3

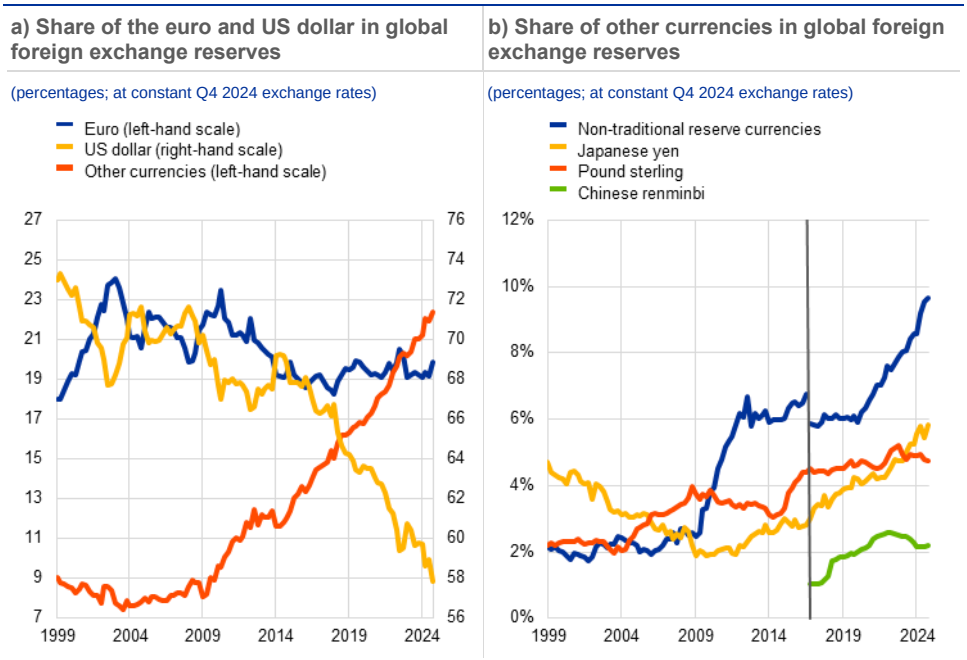
Sources: BIS, CLS Bank International, Dealogic, IMF, national sources and ECB calculations.
Notes: An increase in the euro nominal effective exchange rate indicates an appreciation of the euro. For foreign exchange trading, currency shares add up to 200% because transactions always involve two currencies.

1.1 Use of the euro as an international reserve currency

In 2024 the share of the euro in global official foreign exchange reserves remained broadly stable at constant exchange rates, hovering at around 20% (Chart 4, panel a). Conversely, the share of the US dollar declined by 2.0 percentage points at constant exchange rates, to 57.8%.[1] These developments align with long-term trends that started in the last decade, when the share of the euro was broadly stable, while the share of the US dollar, net of exchange rate valuation effects, declined by 11 percentage points.

Chart 4

Stable euro share in global foreign exchange reserves and declining US dollar share to the benefit of non-traditional reserve currencies



Sources: IMF and ECB staff calculations.
Notes: In panel b), the vertical line is for 1 October 2016, i.e. when the Chinese renminbi was first identified as a reporting currency in IMF data. Previously, its share was included under the remaining currencies, denoted as non-traditional reserve currencies in the chart. These currencies include, among others, the Canadian dollar, the Australian dollar, the Korean won, the Singapore dollar, the Swedish krona, the Norwegian krone, the Danish krone and the Swiss franc in decreasing order of estimated importance; see Arslanalp, S., Eichengreen, B. and Simpson-Bell, C., "The stealth erosion of dollar dominance and the rise of nontraditional reserve currencies", *Journal of International Economics*, Vol. 138, 2022. The latest observation is for the fourth quarter of 2024.

By the end of 2024 the share of currencies other than the US dollar and the euro had risen to 22.4%, driven by strong gains in non-traditional reserve currencies (Chart 4, panel b). This group, which includes the Canadian dollar and the Australian dollar, among others, saw its combined share grow by 1.1 percentage points in 2024, to 9.6%. The share of non-traditional reserve currencies started to increase noticeably at the time of the outbreak of the COVID-19 pandemic in 2020 and has continued to rise ever since, underscoring the appeal of these currencies for reserve managers seeking diversification opportunities. The strong economic fundamentals of the countries issuing non-traditional reserve currencies further

[1] At current exchange rates, the decline was milder, at 0.6 percentage points.

enhance their attractiveness. For instance, their sovereigns accounted for almost 60% of the global supply of AAA-rated government bonds in 2024.[2]

Developments in other reserve currencies were mixed. The share of the Japanese yen continued to increase in 2024 as domestic government bond yields moved into positive territory. By contrast, the share of the pound sterling remained stable, while that of the Chinese renminbi continued to decline**.** The share of the renminbi has decreased from its peak of 2.6% in 2022. A survey of official reserve managers indicates that transparency issues, geopolitical concerns and a deteriorating economic outlook have weighed on the role of the renminbi as an international store of value.[3]

After accounting for valuation effects, euro-denominated reserve holdings increased in 2024. While yields on the highest-rated euro area government bonds with a medium-term maturity remained lower than yields on government bonds in other reserve currencies, they were higher than in the past decade (**Chart 5, panel a**). A survey conducted among official reserve managers showed interest in increasing their exposures to the euro, with some respondents citing higher interest rates as a positive factor.[4] Reflecting this, estimates of net purchases of euro assets turned positive. Reserve managers were net buyers of such assets, contributing a positive 0.9 percentage points to the overall change. However, the overall change was close to zero, owing to an offsetting exchange rate effect (see the green and yellow bars in **Chart 5, panel b**). Similarly, official reserve managers were net purchasers of assets denominated in Japanese yen and Canadian dollars, but net sellers of assets denominated in US dollars and, to a much lesser extent, Chinese renminbi.

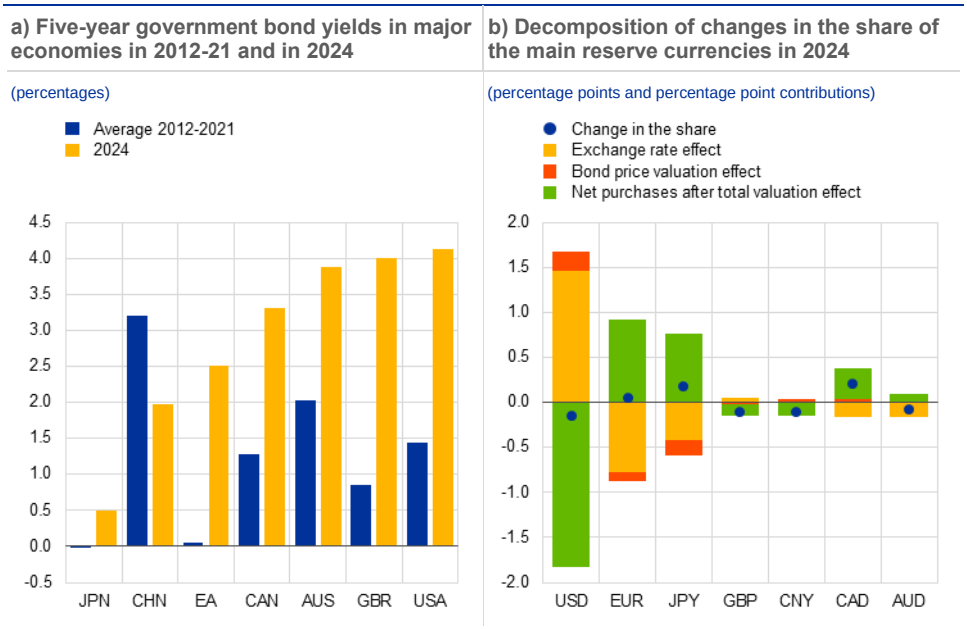
2 Based on ECB staff calculations drawing from publicly available data from S&P.

3 See OMFIF, Global Public Investor 2024.

4 A survey of 73 central banks conducted by OMFIF between March and May 2024 indicated that 17% of respondents planned to increase their euro exposure within the next two years, while 10% of respondents planned to decrease their exposure over the same horizon. See OMFIF, Global Public Investor 2024.

Chart 5

Bond yields in the euro area remain below those in several other jurisdictions, but net purchases have picked up



Sources: LSEG Datastream, BIS, S&P Global, IMF and ECB staff calculations.
Notes: In panel a), the five-year government bond yield for the euro area is calculated as a debt-weighted average of five-year euro area yields of sovereign bonds with a Standard & Poor's (S&P) credit rating of at least AA. In panel b), the valuation effect for currency i between period t and $t-1$ can be expressed as: $V_t = \frac{R_{i,t-1}}{FX_{i,t}}\left(1 + k_{i,t-1}, g_{i,t}\right) - \frac{R_{i,t-1}}{FX_{i,t-1}}$ where R is reserve assets held, FX is the bilateral exchange rate against the US dollar, k is the share of reserves held as securities and g is the average total return on the security portfolio between periods $t-1$ and t. Subtracting this value from the actual change in the level of reserve assets gives the approximate net purchases in period t.

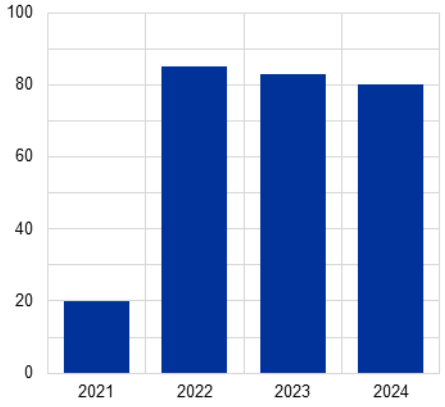
In 2024 geopolitical concerns remained high for reserve managers and continued to weigh on their investment decisions. Surveys suggest that central banks continued to point to geopolitics as a key factor influencing their medium-term investment decisions (**Chart 6, panel a**). By contrast, at the time the surveys were conducted, these concerns were less palpable in the short term. For instance, in mid-2024, nearly 90% of the central banks surveyed replied that sanctions had not impacted their reserve management decisions (**Chart 6, panel b**). **Special feature A** shows that holdings of official foreign investors of euro area government debt have remained generally resilient since Russia's invasion of Ukraine. The decline in holdings of countries not geopolitically aligned with the West have been limited to 5% of pre-invasion levels, highlighting the importance of upholding the rule of law.

Chart 6

Geopolitical risks remain a key factor to monitor for official reserve managers

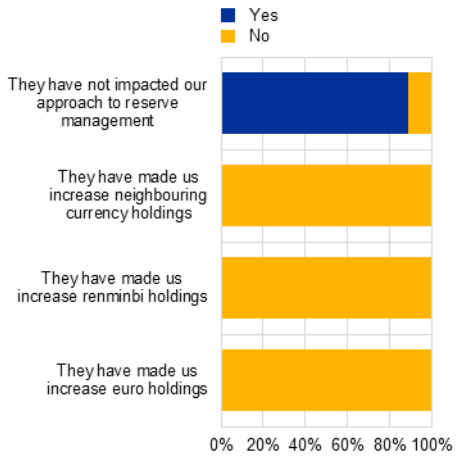
a) Central banks considering geopolitics as a major factor for reserve management in the next five to ten years

(percentages)



b) How have sanctions on Russia and China influenced your approach to reserve management (thus far)?

(percentages)



Sources: OMFIF Global Public Investor and Central Banking.
Notes: In panel a), responses for 2024 were collected through a survey conducted between March and May 2024 among 73 central banks worldwide. In panel b), data for 2024 were collected between April and May 2024 through a survey of 56 central banks.

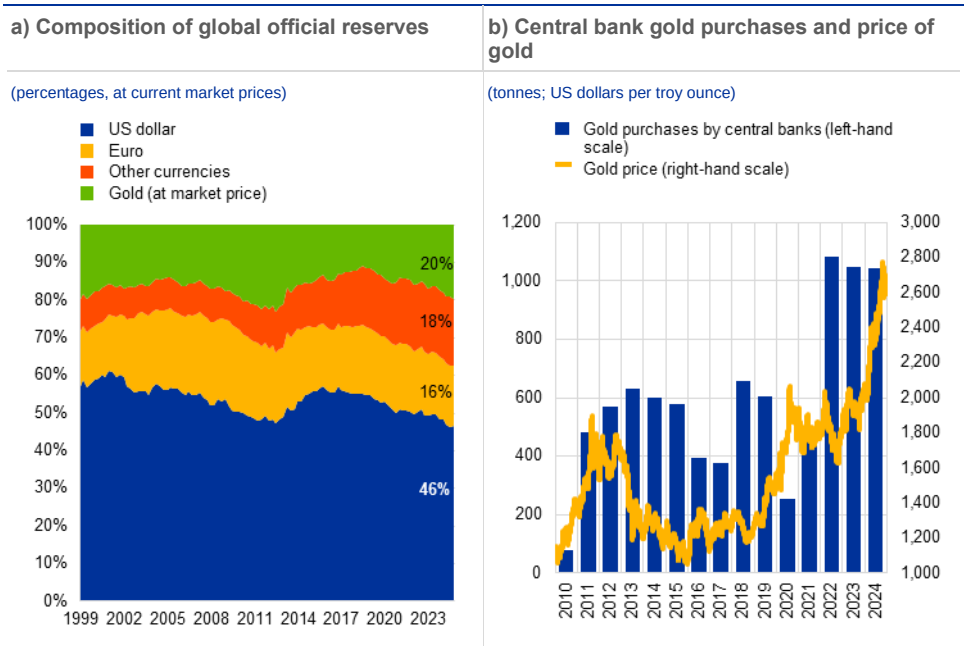
The share of gold in total official foreign reserves – comprising foreign exchange and gold holdings – increased to 20% at the end of 2024, surpassing that of euro, on the back of historically high gold prices and purchases (Chart 7). Central banks increased their stock by more than 1,000 tonnes of gold in 2024 – double the level seen in the previous decade – while the price of gold surged by about 30% in nominal terms. At market valuations, the share of gold in total foreign reserve holdings (20%) surpassed the share of the euro (16%). Surveys suggest that hedging motivated by economic and geopolitical factors played a role in these historically large purchases of gold, notably in emerging and developing economies.[5] **Box 1** shows that countries that are geopolitically distant from the West have been active diversifiers into gold. Central banks worldwide now hold almost as much gold as they did in 1965 during the Bretton Woods era.[6]

5 Based on data from the World Gold Council's 2024 Central Bank Gold Reserves Survey.

6 See OMFIF, "Gold and the New World Disorder", 2024.

Chart 7

Higher share of gold in global foreign reserves driven by both record-high purchases and rising prices



Sources: IMF, World Gold Council and ECB staff calculations.
Notes: In panel a), the latest observation is for the fourth quarter of 2024. Gold reserves and the currency composition of official foreign exchange reserves have different country coverage. In panel b), the latest observation is for the end of 2024. One troy ounce equals approximately 31.10 grams.

Box 1

Gold demand: the role of the official sector and geopolitics

Prepared by Anja Brüggen, Maurizio Michael Habib, Roger Gomis and Alessandro Vallin

In 2024 gold prices reached historical highs, while holdings of gold reserves by central banks stood at levels close to those last seen in the Bretton Woods era. Adjusted for inflation, real gold prices in 2024 surpassed their previous peak seen during the 1979 oil crisis. Meanwhile, gold reserves held by central banks stand at levels close to those last seen in the Bretton Woods era, although they now account for a far smaller share of total gold supply (**Chart A, panel a**).[7] This stockpile, together with high prices, made gold the second largest global reserve asset at market prices in 2024 – after the US dollar (**Chart 7 of the main report**).

The demand for gold by central banks remained at record highs in 2024, accounting for more than 20% of global demand, in contrast to around one-tenth on average in the 2010s.[8] Gold demand for monetary reserves surged sharply in the wake of Russia's full-scale invasion of Ukraine in 2022 and has remained high. However, gold purchases for jewellery consumption and investment continued to account for the bulk of global gold demand. In 2024 the decline in demand for jewellery consumption, particularly in China, was offset by higher demand for investment. The

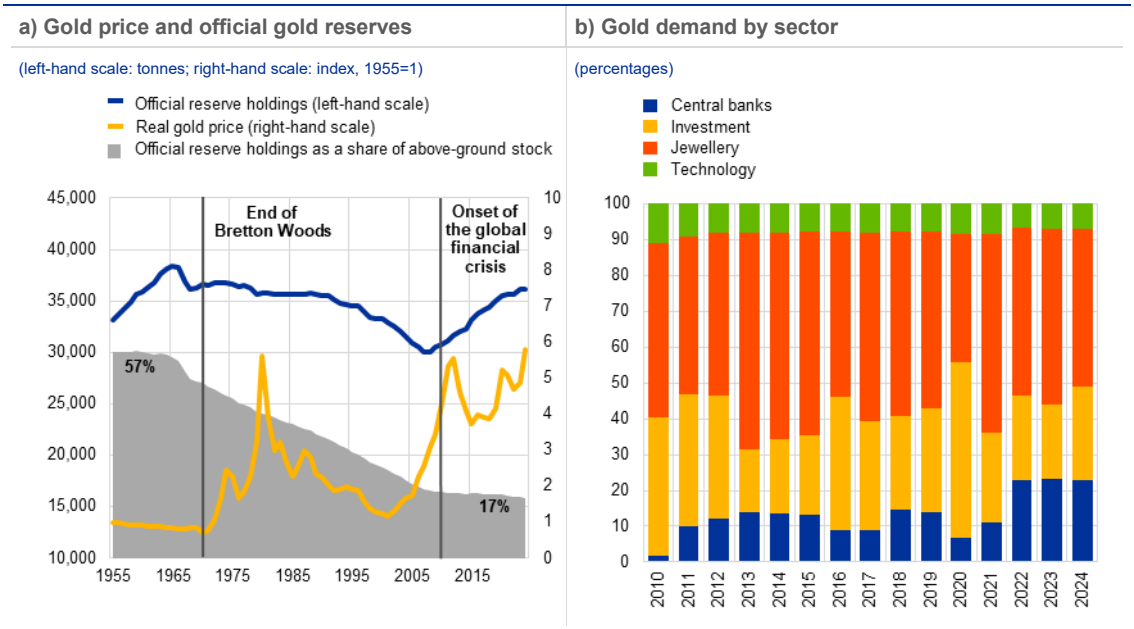
7 See OMFIF, "Gold and the New World Disorder", 2024.

8 IMF data indicate a much slower increase since 2021. The difference can be explained by "unreported purchases" by central banks estimated by the World Gold Council. See the June 2023 edition of the International Role of the Euro for further details.

combined share of both categories remained at 70% of the global demand for gold **(Chart A, panel b)**.

Chart A

Historically high gold prices, with central banks accounting for more than one-fifth of global gold demand



Sources: OMFIF, World Gold Council, Haver and ECB staff calculations.
Notes: In panel a), the latest observations are for 31 December 2024. The nominal gold price is deflated using the US consumer price index. The vertical lines indicate the end of the Bretton Woods system in 1971, when convertibility of the US dollar into gold was suspended, and the onset of the global financial crisis in 2007. In panel b), "jewellery" denotes gold purchases driven by consumption for making gold jewellery. "Investment" refers to purchases of gold bars, coins and exchange-traded funds (ETFs). "Technology" denotes gold used in industrial applications. "Central banks" denotes net purchases by central banks and selected international financial institutions such as the IMF or the BIS (for further details see the guidance note published by the World Gold Council in 2018).

Survey data suggest that gold is held by central banks primarily for diversification purposes but also to hedge against geopolitical risk (Chart B). A survey of almost 60 central banks conducted by the World Gold Council between February and April 2024 identified the following three key drivers of central banks' gold holdings: (i) a long-term store of value and an inflation hedge, (ii) (good) performance during times of crisis, and (iii) an effective portfolio diversifier. Additionally, respondents pointed to default risks, geopolitical diversification and political risk as factors influencing their holdings. Overall, the responses indicate that gold is valued by reserve managers primarily as a portfolio diversifier to hedge against economic risks, including inflation, cyclical downturns and defaults, and secondly as a hedge against geopolitical risk.[9]

Moreover, concerns related to sanctions and the possible erosion of the role of major currencies were cited by some central banks in emerging and developing economies. One out of four such central banks referred to "concerns about sanctions" or the "anticipation of changes in the international monetary system" as determinants of their investment exposure to gold. The recent accumulation of gold reserves by official institutions tends to be concentrated in very few

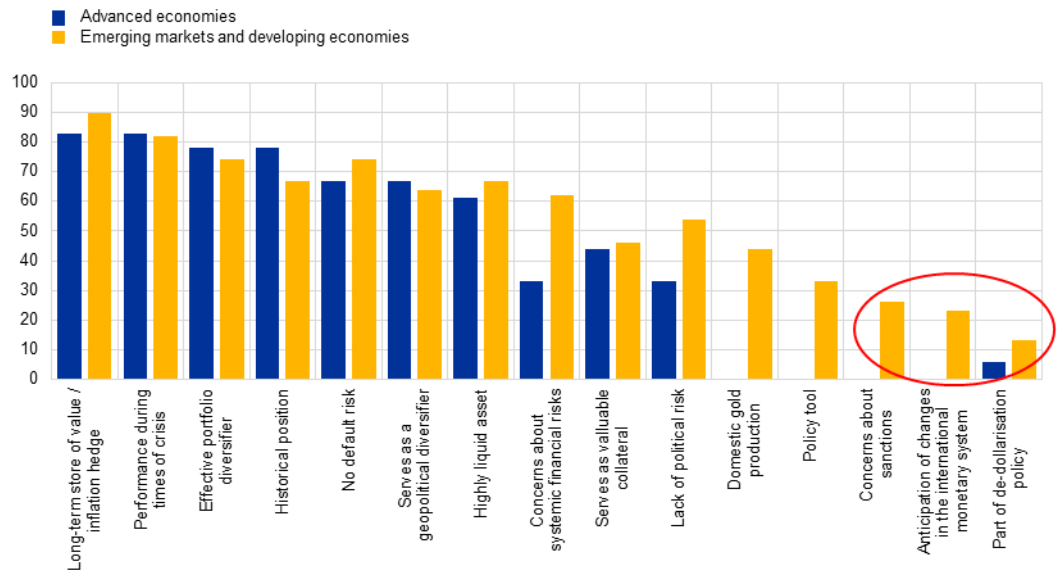
[9] In a different survey of 73 central banks conducted by OMFIF between March and May 2024, respondents listed their primary purposes for holding gold as diversification (68%) and as a hedge against geopolitical risk (40%). See OMFIF, "Global Public Investor 2024", 2024.

countries.[10] Türkiye, India and China, for instance, top the list of the largest purchasers, jointly accumulating more than 600 tonnes of gold since the end of 2021.[11]

Chart B

Survey evidence on factors influencing the decision of central banks to hold gold

(percentages)



Sources: World Gold Council and ECB staff calculations.
Note: This survey includes all 57 central banks holding gold in 2024, of which 18 are located in advanced economies and 39 in emerging and developing economies.

There are further signs that geopolitical considerations influence decisions by central banks to invest in gold. Between 2008 and early 2022, gold prices were negatively correlated with real yields, providing a hedge against low nominal interest rates and/or high inflation. This correlation broke down after Russia's full-scale invasion of Ukraine, suggesting that gold prices have been influenced by other factors, such as geopolitical risk **(Chart C, panel a).**[12] Recent research indicates that imposing financial sanctions is associated with increases in the share of central bank reserves held in gold. Notably, in five of the ten largest annual increases in the share of gold in foreign reserves since 1999, the countries involved faced sanctions in the same year or the previous year.[13] **Chart C, panel b)** also points to geopolitical considerations as a motive for diversification into gold since the onset of Russia's full-scale invasion of Ukraine. Countries that are

10 See Arslanalp, S., Eichengreen, B. and Simpson-Bell, C., "Gold as international reserves: A barbarous relic no more?", *Journal of International Economics*, November 2023, for documentation of the key role of emerging markets in gold accumulation between the global financial crisis and 2021. In relation to this trend, gold has played an important role in the de-dollarisation policy implemented by Russia following its invasion of Crimea in 2014 and the application of western sanctions. More than half of the increase in official gold reserves has been accumulated by the central bank of Russia since 2014. For further information see: Kennedy, J., Grossfeld, E., Wolford, Z. and Kenchington, T., "Gold rush: How Russia is using gold in war time", RAND Europe, 9 September 2024.

11 Based on data from the IMF, World Gold Council and ECB staff calculations.

12 In the chart, the nominal gold price is compared to the US real yield to capture the positive relationship with inflation (inflation hedge) and the negative relationship with the nominal interest rate (cost of holding unremunerated asset). These two factors have been commonly identified in the literature as drivers of gold prices. For a comprehensive review, see O'Connor, F., Lucey, B., Batten, J. and Baur, D., "The financial economics of gold — A survey", *International Review of Financial Analysis*, 2015.

13 See Arslanalp, S., Eichengreen, B. and Simpson-Bell, C. (2023), ibid.

geopolitically close to China and Russia have seen more marked increases in the share of gold in their official foreign reserves since the last quarter of 2021.[14]

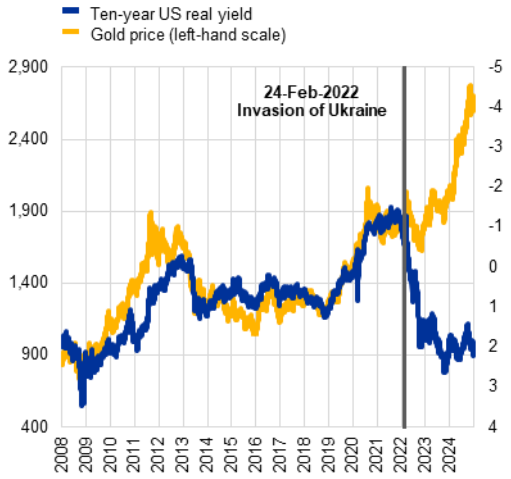
The future impact of persisting geopolitical tensions and the demand effect, driven by central banks, on gold prices is likely to depend on the stickiness of gold supply. It has been argued that gold supply has responded elastically to increases in demand in past decades, including through strong growth in above-ground stocks.[15] Therefore, if history is any guide, further increases in the official demand for gold reserves may also support further growth in global gold supply.

Chart C

Additional evidence of the importance of geopolitics in official gold demand

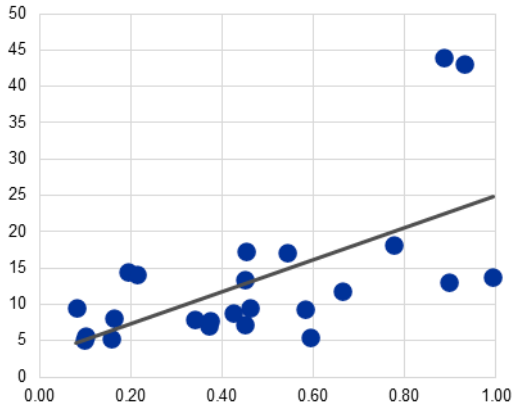
a) Shift in the correlation between gold prices and real long-term US interest rates

(left-hand scale: US dollar/troy ounce; right-hand scale, inverted: percentage)



b) Correlation between geopolitical alignment and countries actively diversifying into gold since 2021

(x-axis: index of geopolitical alignment; y-axis: percentage point change in the share of gold between Q4 2021 and Q4 2024)



Sources: World Gold Council, FRED, Federal Reserve Bank of St. Louis, Global Sanctions Database, SIPRI Arms Transfers Database, United Nations, IMF and ECB staff calculations.
Notes: In panel a), "Ten-year US real yield" indicates the market yield on inflation-indexed US Treasury securities with a ten-year constant maturity. The latest observations are for 31 December 2024. In panel b), active gold diversifiers are identified as countries that increased the share of gold in their official foreign reserves by more than the cross-country average change. The geopolitical index used in the chart measures the distance in 2022 of a country from China-Russia compared with the United States. A higher value indicates that a country is geopolitically closer to China-Russia than to the United States. See Special feature A, "Geopolitical fragmentation risks and international currencies", in the 2023 edition of this report.

[14] See Douglass, P., Goldberg, L.S. and Hannaoui, O.Z., "Taking Stock: Dollar Assets, Gold, and Official Foreign Exchange Reserves", May 2024, for a similar study pointing to the same conclusion.

[15] See OMFIF, "Gold and the New World Disorder", 2024.

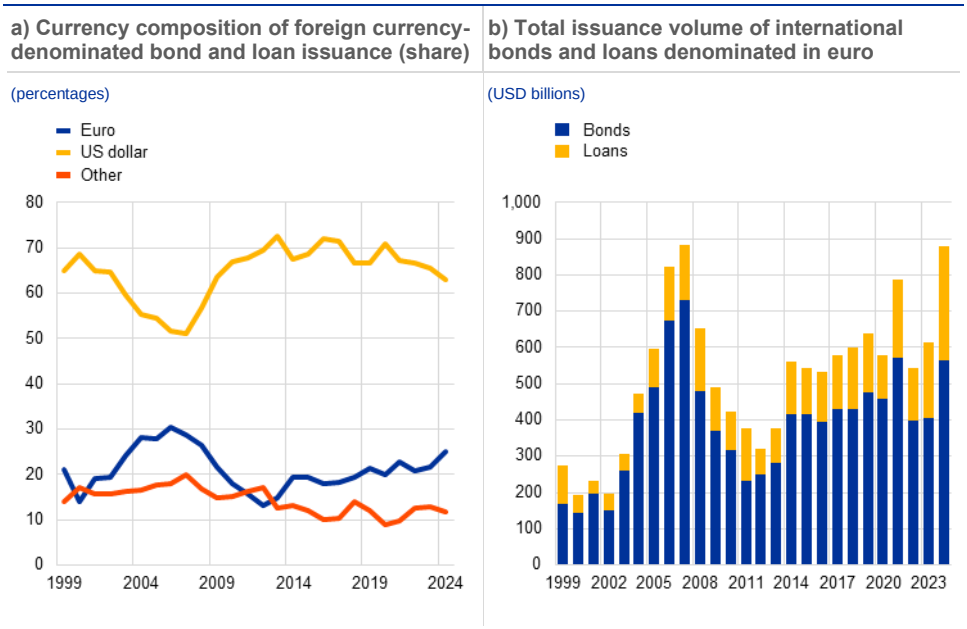
1.2 Use of the euro in international finance

The use of the euro as a currency of issuance for foreign currency-denominated debt grew noticeably in 2024. In particular, the share of the euro in foreign currency-denominated debt (bonds and loans) financing grew by more than 3 percentage points, to around 25% (**Chart 3**). This growth occurred on the back of a slight decline in the share of the US dollar, while the share of other currencies remained stable (**Chart 8, panel a**).

The increase in the share of the euro in foreign currency-denominated debt issued was driven by robust growth in both euro-denominated loans and bonds. Issuance of loans and bonds grew by more than 40% in 2024, reaching the highest combined level since the global financial crisis of 2007-09 (**Chart 8, panel b**). Bonds continued to account for the largest portion of this issuance, with a share of about two-thirds. **Box 2** zooms in on euro-denominated "Reverse Yankee" bonds issued by US firms and shows that the recent increase in the issuance of such bonds has been driven to a large extent by a decrease in euro area risk-free rates, which lowered the total borrowing costs of issuing bonds in euro by non-euro area residents. Specifically, in 2024, the risk-free rate differential between the euro area and the United States (as measured by the difference in ten-year overnight index swap rates) declined by almost 60 basis points. In parallel, US investment-grade companies issued euro-denominated bonds worth USD 90 billion, compared with around USD 60 billion in 2023.

Chart 8

The share of the euro in issuance of foreign currency-denominated bonds and loans increased in 2024, with debt issuance back at pre-global financial crisis levels



Sources: Dealogic and ECB staff calculations.
Notes: Loans include syndicated cross-border loans issued in euro to borrowers outside the euro area. The latest observation is for the end of 2024.

Most issuers of euro-denominated bonds and loans were based in advanced economies (Chart 9). Among the main jurisdictions, issuers based in the United Kingdom accounted for around 30% of both loan and bond issuance in euro in 2024. One-third of euro-denominated loans and 17% of euro-denominated bonds were issued in non-euro area EU countries. US firms accounted for almost one-fifth of bond issuance in euro but only a negligible share of loan issuance in euro. Differences in preferences for loans relative to bonds across jurisdictions might reflect structural factors, for instance, the fact that non-euro area EU firms have stronger trade, financial and institutional linkages with the euro area and its banking system as well as greater reliance on bank intermediation than US firms. Meanwhile, US firms tend to rely more heavily on market-based financing. Issuance by emerging market economies was limited, accounting for 5% and 15% of bonds and loans respectively. This stands in contrast to the international issuance of bonds in US dollars, where emerging market borrowers typically issue a considerably larger proportion of these instruments.

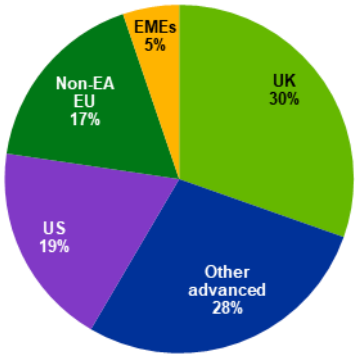
The sectoral breakdown of bond and loan issuers further highlights differences between bank and market-based financing (Chart 10). Financial services companies dominate international euro-denominated bond issuance, accounting for more than 60% of the total, likely owing to their extensive experience with regular capital market activities. By contrast, euro-denominated loan volumes are more tilted towards non-financial corporate entities, as these entities often rely on relationships with banks. Overall, the financial sector, the trade and transportation sectors and the construction and manufacturing sectors each account for approximately one-third of the loan volumes. Accordingly, the top three issuers of bonds in euro in 2024 – with deals in excess of €5 billion – were TD Bank Group and Morgan Stanley, a Canadian bank and a US bank, respectively, along with the Romanian government (**Table 2**). The two largest loans – with deals of around €8 billion and €15 billion respectively – were extended to DSV A/S and SwissCom AG, Danish and Swiss companies in the trade and transportation sectors (**Table 3**).

Chart 9

International euro-denominated loans were mostly issued by entities from countries geographically close to the euro area, while the nationality of bond issuers was more global

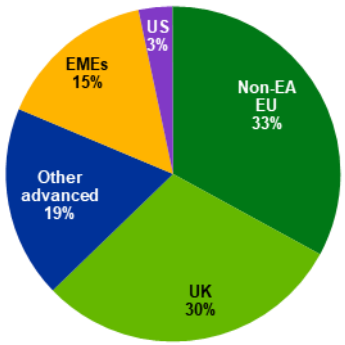
a) Geographical breakdown of issuers of euro-denominated international bonds

(percentages)



b) Geographical breakdown of issuers of euro-denominated international loans

(percentages)



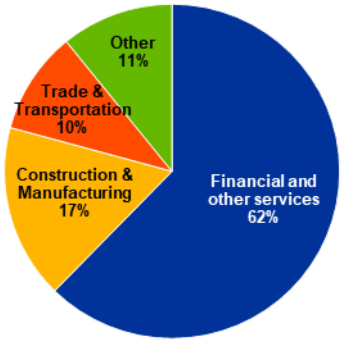
Sources: Dealogic and ECB staff calculations.
Notes: The charts include bonds and loans issued in 2024. "Other advanced" includes all advanced economies as classified by the IMF, excluding the United States, the United Kingdom and European Union countries. "EMEs" refer to emerging market economies. In panel b), loans include syndicated cross-border loans issued in euro to borrowers outside the euro area.

Chart 10

Financial and other services firms play a more prominent role in the international issuance of euro-denominated bonds, while loans are more prevalent in the real economy

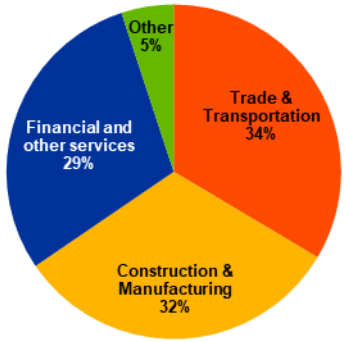
a) Sector breakdown of issuers of euro-denominated international bonds

(percentages)



b) Sector breakdown of issuers of euro-denominated international loans

(percentages)



Sources: Dealogic and ECB staff calculations.
Notes: The charts include bonds and loans issued in 2024. In panel b), loans include syndicated cross-border loans issued in euro to borrowers outside the euro area.

Table 2

Top ten euro-denominated international bonds issued in 2024

Pricing date	Issuer	Deal nationality	Deal value (USD mn)	Tranche	Tranche value (USD mn)	Sector	Type	Maturity
04-Mar-24	TD Bank Group	Canada	5,962	1/3	2,168	Financial and other services	Covered bond	16-Feb-27
				2/3	2,710			16-Feb-29
				3/3	1,084			16-Feb-34
18-Mar-24	Morgan Stanley	USA	5,444	1/3	2,178	Financial and other services	Corporate bond-IG	21-Mar-35
				2/3	1,633			19-Mar-27
				3/3	1,633			21-Mar-30
19-Sep-24	Romania	Romania	5,438	1/2	834	Public administration	Sovereign, Local authority	24-Sep-44
				2/2	2,503			24-Sep-31
30-Oct-24	DSV Finance BV	Denmark	5,403	1/6	647	Trade & Transportation	Corporate bond-IG	06-Nov-26
				2/6	811			06-Nov-34
				3/6	1,081			06-Nov-28
				4/6	703			06-Nov-26
				5/6	1,351			06-Nov-30
				6/6	811			06-Nov-32
15-May-24	Novo Nordisk	Denmark	5,023	1/4	1,080	Construction & Manufacturing	Corporate bond-IG	21-Jan-29
				2/4	1,404			21-May-26
				3/4	1,080			21-Jan-31
				4/4	1,458			21-May-34
28-Aug-24	Bulgaria	Bulgaria	4,851	1/2	1,955	Public administration	Sovereign, Local authority	05-Sep-32
				2/2	1,396			05-Sep-44
28-Aug-24	TD Bank Group	Canada	4,748	1/3	1,955	Financial and other services	Covered bond	03-Sep-27
				2/3	1,676			15-Apr-31
				3/3	1,117			03-Sep-27
22-May-24	Swisscom AG	Switzerland	4,343	1/5	1,357	Trade & Transportation	Corporate bond-IG	29-Nov-31
				2/5	1,086			29-Nov-36
				3/5	543			29-Aug-28
				4/5	543			29-May-26
				5/5	814			29-May-44
15-Feb-24	Romania	Romania	4,286	1/2	2,143	Public administration	Sovereign, Local authority	22-Feb-36
				2/2	2,143			22-Mar-31
04-Jan-24	Poland	Poland	4,100	1/2	1,367	Public administration	Sovereign, Local authority	11-Jan-44
				2/2	2,733			11-Jan-34

Sources: Dealogic and ECB staff calculations.
Note: The table includes bonds issued in 2024.

Table 3

Top ten euro-denominated international loans issued in 2024

Credit date	Issuer	Deal nationality	Deal value (USD mn)	Tranche	Tranche Value (USD mn)	Sector	Type	Segment	Maturity
20-Sep-24	DSV A/S	Denmark	15,598	1/3	4,457	Trade & Transportation	Bridge facility	IG	20-Jun-25
				2/3	7,799		Bridge facility		20-Sep-25
				3/3	3,342		Term loan		20-Apr-28
24-Apr-24	Swisscom AG	Switzerland	8,650	1/3	5,446	Trade & Transportation	Bridge facility	IG	15-Mar-25
				2/3	1,602		Term loan		24-Apr-27
				3/3	1,602		Term loan		24-Apr-29
21-Feb-24	Axpo Holding	Switzerland	7,556	1/2	3,022	Trade & Transportation	Revolving credit	IG	21-Feb-27
				2/2	4,533		Guarantee facility		21-Feb-27
15-Oct-24	Bank Gospo-darstwa	Poland	7,263	1/1	7,263	Financial and other services	Term loan	IG	15-Oct-40
25-Oct-24	Nestle SA	Switzerland	7,022	1/1	7,022	Construction & Manufacturing	Revolving credit	IG	25-Oct-25
27-Aug-24	Novo Nordisk	Denmark	6,537	1/1	6,537	Construction & Manufacturing	Bridge facility	IG	27-Aug-25
31-Oct-24	Carnival plc	UK	4,630	1/3	1,543	Trade & Transportation	Term loan	IG	31-Oct-41
				2/3	1,543		Term loan		31-Oct-43
				3/3	1,543		Term loan		31-Oct-45
08-Feb-24	Vodafone Group	UK	4,361	1/1	4,361	Trade & Transportation	Revolving credit	IG	08-Feb-29
07-Feb-24	Essity AB	Sweden	4,299	1/1	4,299	Trade & Transportation	Revolving credit	IG	07-Feb-25
24-Apr-24	H2 Green Steel	Sweden	4,220	1/7	1,281	Construction & Manufacturing	Term loan		31-Mar-37
				2/7	1,281		Term loan		31-Mar-37
				3/7	267		Credit facility		31-Mar-37
				4/7	427		Term loan		31-Mar-37
				5/7	320		Revolving credit		31-Mar-37
				6/7	641		Term loan		31-Mar-37
				7/7	214		Term loan		31-Mar-37

Sources: Dealogic and ECB staff calculations.
Note: The table includes loans issued in 2024.

Box 2

Reverse Yankee bonds

Prepared by Mar Domenech Palacios, Martina Jančoková and Toma Tomov

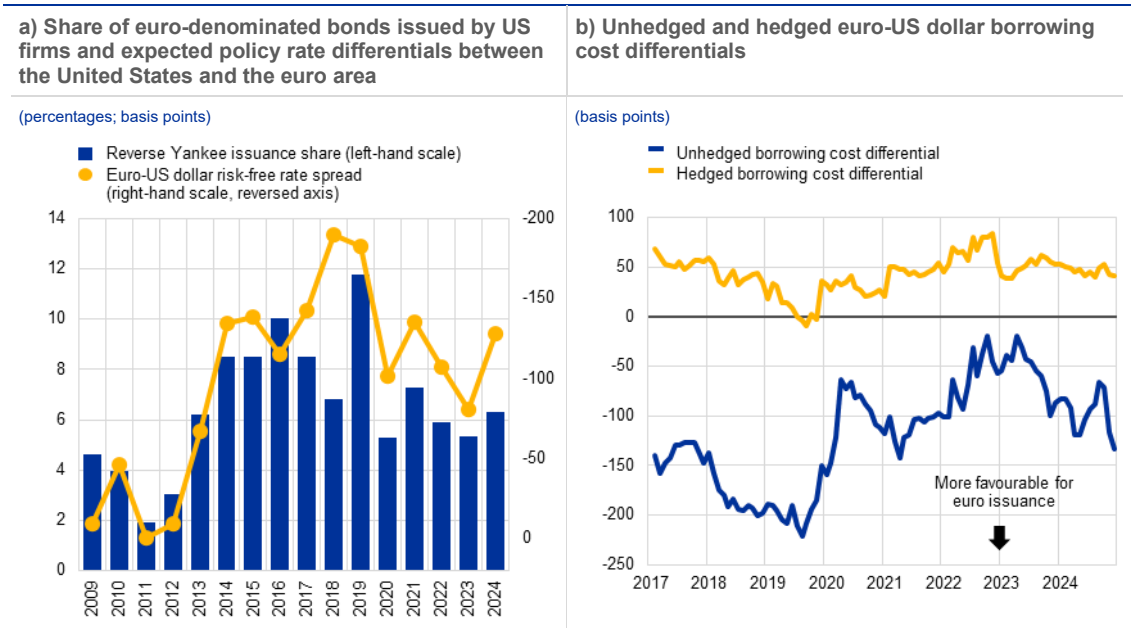
US firms face different borrowing costs depending on whether they issue bonds in US dollars or in euro. Bonds issued by US firms in a foreign currency are known as “Reverse Yankees” in market parlance. Historically, the share of these bonds denominated in euro relative to those denominated in US dollars has been tightly correlated with differences in medium to long-term expectations about US and euro area policy rates, as measured by ten-year overnight index swap (OIS) rates (**Chart A, panel a**). The OIS differential widened in 2024, making the issuance of bonds in euro more attractive relative to US dollars. In turn, euro-denominated Reverse Yankee bonds as a share of total issuance increased.

In addition to risk-free rate differentials, borrowing costs depend on the relative credit spread for bond issuers in the two currencies and on the cost of hedging foreign exchange (FX) risk. The premium paid over risk-free rates by US companies may differ between euro area and US markets owing to differences in the investor base and in the perceived risks between the two markets. Moreover, when firms issue liabilities in a foreign currency, they are exposed to

exchange rate risk. For firms with assets and operations in the corresponding foreign currency, this risk may be more limited. Other firms may hedge their positions using the FX market or the basis swap market. Accordingly, this box follows the methodology developed in recent research and builds two measures of borrowing costs: one with FX risk hedging (yellow line in **Chart A, panel b**) and the other without (blue line).[16,17]

Chart A

Evolution of US corporate bond issuance and cost of issuing bonds in euro for US firms



Sources: Dealogic, Moody's Analytics, Bloomberg and ECB staff calculations.
Notes: In panel a), the "Reverse Yankee issuance share" is calculated as the share of euro-denominated bonds issued by investment-grade US firms divided by their total issuance volume in all currencies; "Euro-US dollar risk-free rates" refers to the respective ten-year overnight index swap rates, which measure market-implied expectations of future policy paths. In panel b), the computation of residual credit spread differentials follows Liao (2020) and Caramichael et al. (2021) and uses data on investment-grade and senior unsecured US dollar and euro-denominated bonds (with outstanding amounts larger than USD 50 million) issued by US companies. To assess the impact of currency denomination on the pricing of credit risk, a separate regression for every cross-section is estimated as: $S_{it} = \alpha_{ct} + \beta_{ft} + \gamma_{mt} + \delta_{rt} + \varepsilon_{it}$, where S_{it} is the option-adjusted corporate bond spread, α_{ct} is the currency effect, β_{ft} are the firm fixed effects, γ_{mt} are maturity bucket fixed effects and δ_{rt} are rating fixed effects. The residual credit spread is represented by the estimated coefficient α_{ct}. "Unhedged borrowing cost differential" is the sum of the residual credit spread and the OIS rate differential. "Hedged borrowing cost differential" is the sum of the residual credit spread and the covered interest parity (CIP) deviation (or cross-currency basis). Ten-year risk-free rates and the forward premium are used for computing interest rate differentials and CIP deviations to match the average maturity of the bonds in the sample. The data reported in the chart is monthly, using the first available observation each month; all underlying variables are daily except for credit spreads, which are weekly. The total number of observations is 892,280 and the total number of bonds is 6,212. Some residual credit spread data for 2020 are missing and therefore interpolated.

Borrowing cost differentials without FX risk hedging are measured as the yield differential between bonds denominated in euro and in US dollars. This is determined by (i) the difference between risk-free rates in the United States and the euro area, and (ii) the difference in corporate bond spreads paid by US firms in US dollars and euro, respectively, over the respective risk-free rates. To derive the latter, spreads of individual US firms that issue corporate bonds in both currencies are regressed on currency, firm, maturity bucket and rating fixed effects for each monthly cross-section. The estimated time-varying currency coefficient is the residual credit spread, which

16 The analysis follows Liao, G.Y., "Credit migration and covered interest rate parity", *Journal of Financial Economics,* Vol. 138, 2020, pp. 504-525 and Caramichael, J., Gopinath, G. and Liao, G.Y., "U.S. Dollar Currency Premium in Corporate Bonds", *IMF Working Paper*, No 185, 2021. For further details of the estimation, see the notes to Chart A and the accompanying text.

17 The unhedged and hedged bond yield differentials between euro and US dollar-denominated bonds are formally defined as follows:

$$\Psi_t = y_t^{eur} - y_t^{usd} = RCS_t^{eur-usd} + r_t^{eur} - r_t^{usd}$$
$$\Psi_t^h = y_t^{eur} - y_t^{usd} + (f_t - s_t) = RCS_t^{eur-usd} + CIP_t$$

where y_t is the risky bond yield, RCS_t is the residualised credit spread, r_t is the risk-free rate, f_t and s_t are the forward and spot exchange rates, and CIP_t is the CIP deviation.

indicates how much a US firm would save or overpay, relative to risk-free rates, when issuing in euro instead of US dollars. This spread is added to the risk-free rate differential between the euro and the US dollar to derive the relative unhedged borrowing cost. The unhedged borrowing cost differential has historically been negative, thus making borrowing in euro more attractive, all else being equal (blue line in **Chart A, panel b**). The combination of declining euro risk-free rates and broadly stable residual credit spreads translated into lower costs for borrowing in euro without hedging against FX risk in 2024.

If a company chooses instead to hedge against FX risk, other components need to be added. The borrowing cost differential between the US dollar and the euro is then the residual credit spread plus any deviation from covered interest parity (CIP), also known as the cross-currency basis, which represents the extra cost to be borne by the issuing firm when it hedges euro liabilities into US dollars.[18] It can be thought of as the unhedged borrowing cost differential plus the forward premium. Assuming that the FX risk is fully hedged until the bond's maturity, this hedged relative borrowing cost indicator (yellow line in **Chart A, panel b**) is slightly positive, i.e. unfavourable for the euro, suggesting that, on average, US firms do not have a financial incentive to borrow US dollars synthetically through the euro market.[19] In fact, the hedged borrowing cost differential has recently been more favourable in absolute terms for US dollar issuance because of compressed corporate bond spreads in the United States and, to a lesser extent, because of CIP deviations.

Local projections suggest that declining hedged and unhedged borrowing costs in euro both provide an incentive for US firms to issue more Reverse Yankee bonds. On average, a 10 basis point reduction in the unhedged borrowing cost differential is associated with an increase of approximately 0.5 percentage points in the relative share of euro-denominated corporate bond issuance by US firms (**Chart B, panel a**). The effect is largest in the first two months after a shock. Using exchange rate-hedged borrowing cost differentials, a similar pattern emerges – lower hedged borrowing costs in euro also appear to affect the choice of issuance currency (**Chart B, panel b**). While the sensitivity of issuance to a 10 basis point reduction in hedged and unhedged borrowing costs is similar, the variability of unhedged borrowing costs is relatively stronger and therefore a more powerful driver.[20] In fact, univariate regressions on data since 2017 suggest that variations in unhedged borrowing costs explain up to 40% of the variations in the share of euro-denominated issuance by US firms over a six-month horizon, whereas hedged borrowing costs explain less than 20%. By components, changes in interest rate differentials are the main drivers, explaining up to 30% of the variation, with changes in residual credit spreads accounting for 17% and CIP deviations for a mere 4%.

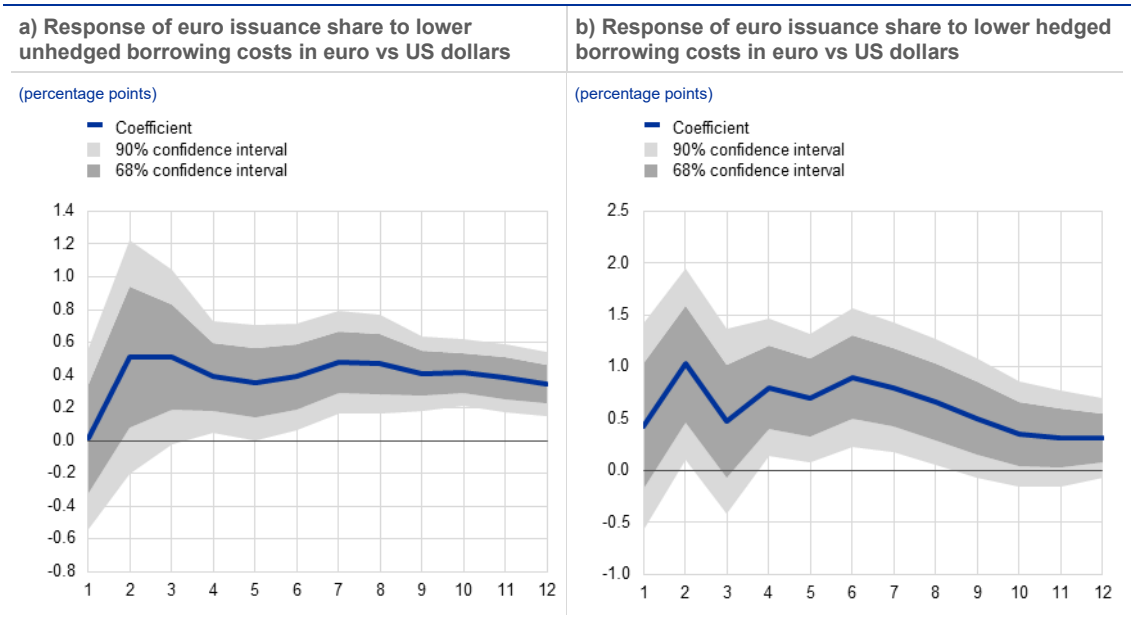
18 From an investor demand perspective, CIP fluctuations can also drive euro area investors (especially those more exposed to exchange rate rollover risk) away from US dollar-denominated bonds towards bonds denominated in euro. See Kubitza, C., Sigaux, J-D. and Vandeweyer, Q., "The Implications of CIP Deviations for International Capital Flows", *Chicago Booth Research Paper,* No 24-18, 2024.

19 US firms may still decide to issue in euro and hedge, for example, to cater to a broader international investor base or by using more efficient hedging strategies.

20 In particular, the unhedged borrowing cost differential decreased by around 50 basis points in 2024, while the euro-US dollar residual credit spread widened only marginally (6 basis points). The hedged differential, while still more favourable for US dollar issuance, decreased by only 10 basis points.

Chart B

More attractive borrowing costs in euro are associated with stronger issuance in euro by US firms



Sources: Dealogic, Moody's Analytics, Bloomberg and ECB staff calculations.
Notes: The charts show the cumulated response of the share of investment-grade bond issuance in euro versus US dollars by US firms over 12 months after a 10 basis point change in either hedged or unhedged borrowing costs, which makes borrowing in euro relatively cheaper. Local projections control for a time trend, a measure of mergers and acquisitions involving European companies compiled by Bloomberg and aggregated monthly, the 30-day average of the CBOE VIX volatility index, a COVID-19 period dummy from March to June 2020, five lags of the dependent variable and one lag of the shocked variable. Unhedged borrowing cost differentials are computed as the sum of the residual credit spread and the risk-free rates differential. Hedged borrowing cost differentials are computed as the sum of the residual credit spread and CIP deviations. Ten-year maturities for risk-free rates and the forward premium are used for computations to match the average maturity of the bonds in the sample. Monthly data are from January 2017.
The latest observations are for the end of 2024.

Overall, the findings presented in this box highlight the crucial role that changes in expected borrowing costs play as determinants of the euro's appeal as an international funding currency. The analysis shows that expectations for future policy rate paths in the euro area and the United States, the relative pricing of corporate credit risk in the two markets and frictions in cross-currency markets all influence US firms' decisions to issue in euro, albeit to different extents. This box shows that, in recent years, changes in risk-free rate differentials have been the main driver reflecting shifts in expectations for relative policy rates. Meanwhile, the estimated relative credit spreads and CIP deviations, which also impact borrowing costs, have remained more stable.

1.3 Use of the euro in international payments and trade

In 2024 the role of the euro in global payments remained stable. Euro payments settled through the T2 platform were comparable with those in previous years: the monthly value involving at least one non-euro area bank stood close to €12 trillion in 2024, accounting for about 43% of total payments on the platform (**Chart 11**).[21] Cross-border euro payment messages processed via Swift – a global financial messaging network – hovered around 2023 levels. In March 2023 euro area banks adopted the ISO 20022 standard while migrating to the new consolidated T2-T2S Eurosystem platform. In that year, the share of cross-border payment messages in Swift denominated in euro declined from about 32% to around 13%. There are two main reasons for the decline. First, the launch by the Eurosystem in March 2023 of the new T2-T2S platform has increased the efficiency of liquidity management and payment practices, allowing participants to streamline their payment activities, thus reducing messaging volumes.[22] Second, the new ISO 20022 standard has enabled Swift to single out cross-border payment instructions from other cross-border reporting messages exchanged between banks, with the latter no longer counted as cross-border payment messages. Under the old standard (MT 202), Swift cannot distinguish between the two types of messages and therefore considers both to be cross-border payment messages. Approximately 70% of Swift traffic, including traffic from the United States and the United Kingdom, still relies on the MT 202 standard. This results in larger volumes of cross-border payment messages exchanged by banks in these jurisdictions, which predominantly use the US dollar and pound sterling, compared with those exchanged by euro area banks, which account for the largest share of cross-border euro payments.

Geopolitical tensions could fragment the global cross-border payment landscape. Economic reasons such as cost reduction and trade expansion have traditionally been significant drivers for countries investing in new payment systems. However, strategic goals such as independence and geoeconomic influence are also relevant. **Box 3** analyses the determinants of interconnecting fast payment systems across countries and provides empirical evidence that geopolitics is a crucial factor in establishing cross-border payment links. It shows that geopolitics has a stronger influence than trade relationships or technical standards on interlinking.[23] If geopolitical tensions persist, the role of major payment infrastructures could be challenged, contributing to the fragmentation of the global payment landscape. One way to reduce these risks is to strengthen cross-border links and increase their appeal by reducing costs and settlement times. For instance, in October 2024 the Eurosystem decided to launch initiatives to help improve cross-border payments within the EU and beyond by implementing cross-currency settlement services in its TARGET Instant Payment Settlement (TIPS) service, exploring the benefits of linking TIPS with other fast payment systems. It is also considering whether to join Project

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21 T2 is the Eurosystem's real-time gross settlement system for euro-denominated payments, processing and settling large-value payments in central bank money.

22 See "The euro as a global currency: a payments perspective", *Economic Bulletin*, Issue 2, ECB, 2024.

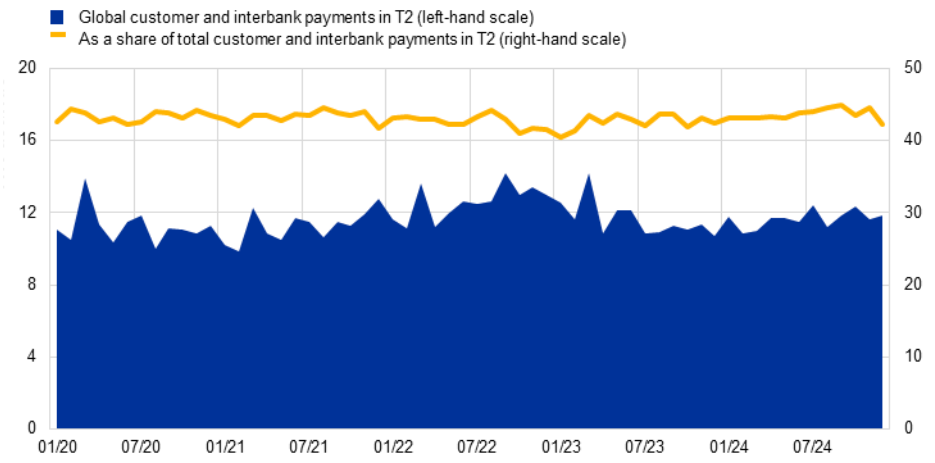
23 Fast payment systems are payment systems that settle transactions within seconds. They already exist in over 100 jurisdictions and represent 19% of all electronic payments globally; with 27% expected in 2028 (see Frost, J., Wilkens, P.K., Kosse, A., Shreeti, V. and Velasquez, C. "Fast payments: design and adoption", *BIS Quarterly Review*, 2024, p. 31).

Nexus, a multilateral platform project led by the Bank for International Settlements Innovation Hub.[24]

Chart 11

Global customer and interbank payments in T2

(left-hand scale: EUR trillions; right-hand scale: percentages; monthly totals)



Sources: TARGET2, T2 and ECB staff calculations.
Notes: The last data point relates to December 2024. Global payments are those in which the instructing bank and/or the beneficiary bank is located outside the euro area.

In particular, correspondent banking, which has traditionally stood at the centre of the cross-border payment network, has retrenched in recent years. Correspondent banking relations are financial arrangements in which one bank (the correspondent) provides payment services on behalf of another bank from another country. In 2022 there were 90,000 active correspondents over 9,000 payment corridors, about 20-30% fewer than a decade earlier (**Chart 12, panel a**). Surveys suggest that 40% of banks terminated these relationships owing to revisions in their business strategies, while one-third cited a lack of profitability and one-fifth higher compliance and reputational risks.[25] In reflection of this, correspondent banking started to retrench after financial sanctions were imposed on Russia in 2014 and one major bank was fined for facilitating transactions with Iran, Cuba and Sudan.[26] The retrenchment accelerated after other packages of sanctions were imposed on Russia from 2022 onwards. All regions were affected, with Central and South America experiencing the steepest decline (nearly 50%), followed by Asia, Europe and Oceania (between 30% and 40%), while the impact in North America was less (around 20%). These developments have left many countries and corridors under-served.

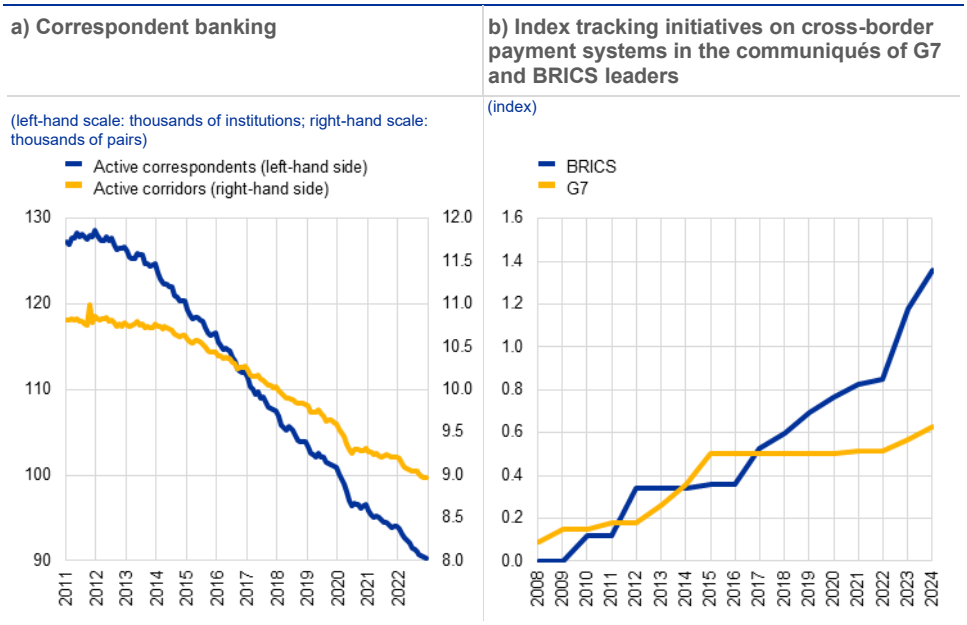
[24] See "Eurosystem launches initiatives to improve cross-border payments by interlinking fast payment systems" *press release*, ECB, 21 October 2024.

[25] See "Correspondent banking data report", *Financial Stability Board*, 2017.

[26] BNP Paribas was fined USD 8.9 billion in 2014 by the US authorities for its involvement in the violation of sanctions against Sudan, Cuba and Iran. The bank was also prevented from clearing certain transactions in US dollars for one year. Observers noted that the episode served as a reminder that any bank headquartered in a jurisdiction violating US financial sanctions or involved in related chains of transactions is within the reach of US courts, encouraging small and medium-sized banks to stop offering cross-border banking services to riskier countries from a compliance perspective (see "BNP Paribas to pay $9bn to settle sanctions violations", BBC, 1 July 2014).

Chart 12

Global correspondent banking relationships have retrenched, with BRICS countries promoting alternative cross-border payment solutions in parallel



Sources: BIS, Rice et al. (2020) and ECB staff calculations.
Notes: In panel a), active correspondents refer to banks that sent or received at least one cross-border payment message in a given year. Active corridors are jurisdiction-pairs that processed at least one cross-border payment message in a given year. Corridors are unidirectional (e.g. Germany to India is one corridor and India to Germany is another one). For further details, see Rice, T., von Peter, G. and Boar, C., "On the global retreat of correspondent banks", *BIS Quarterly Review*, March 2020. The latest observation is for December 2022. In panel b), the index is derived from GPT-4o, a Large Language Model (LLM), which detects and quantifies the extent to which cross-border payment system initiatives are mentioned in official statements by BRICS and G7 members. Each communiqué is broken down into paragraphs, which are scored by the LLM on a scale of 0 (no mention of cross-border payment initiatives) to 10 (mention of immediate action on cross-border payments). The index is computed as the weighted average of the scores obtained for each paragraph in a given year, with weights being proportional to the relative length of the sentences in each paragraph. The latest observation is for the end of 2024.

Moreover, some countries have continued to explore alternatives to traditional cross-border payment systems. An index tracking mentions of initiatives on cross-border payments in communiqués of G7 and BRICS leaders since 2008 shows that mentions by BRICS leaders picked up noticeably in the wake of Russia's full-scale invasion of Ukraine (**Chart 12, panel b**). In particular, at the summit attended by BRICS+ nations held by Russia in Kazan in October 2024, the leaders of Brazil, Russia, India, China, South Africa and other nations welcomed an increased use of local currencies in global financial transactions and discussed establishing a new cross-border settlement and depository infrastructure, BRICS Clear (**Table 4**). In March 2025 Hong Kong announced plans to develop an Asian international settlement house aimed at reducing dependence on traditional financial infrastructure and boosting the global use of the renminbi. News reports suggested that crypto-assets were being increasingly used to settle a portion of oil exports by Russia and smooth the conversion of Chinese renminbi and Indian rupees into roubles.

Table 4

Overview of selected news and statements on the use of alternative units to the major international currencies

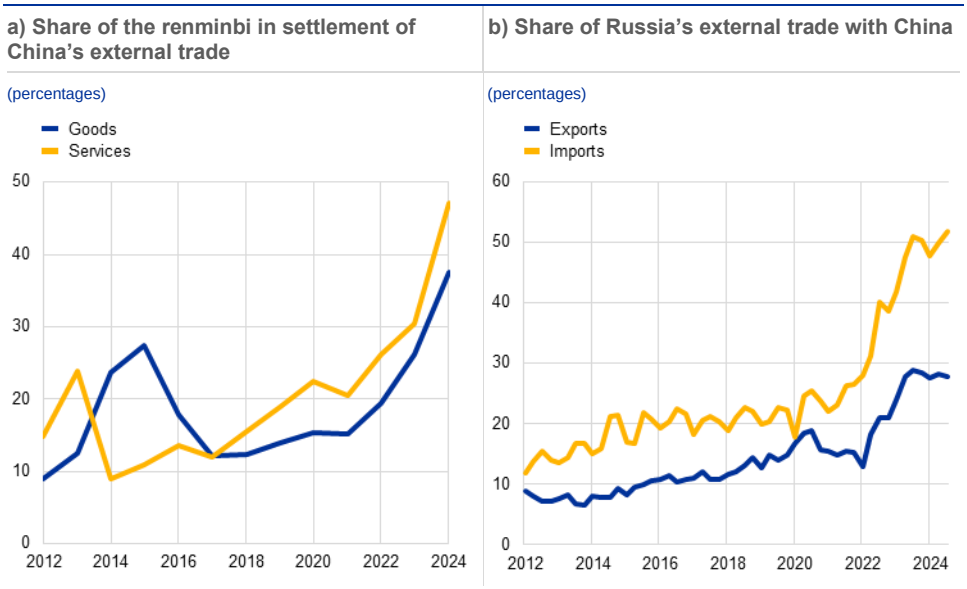
Date	News and statements	Source
21/04/2025	China's central bank announces that it encourages state-owned enterprises to prioritise yuan usage in payment and settlement in their overseas expansion.	Reuters
14/03/2025	Russian oil companies have used Tether, bitcoin and ether, sources say. Crypto are a small but growing part of Russia's USD 192 billion oil trade. They are used to smooth conversion of yuan and rupees to roubles.	Reuters
04/03/2025	Hong Kong Exchanges and Clearing announces it is working to turn the HKMA's Central Moneymarkets Unit into an Asian international settlement house. The platform is envisioned to become an international securities house that can handle cross-border payments and multiple currencies.	Financial Times
27/12/2024	Finance minister Siluanov confirms that Russia is using bitcoin and other digital currencies for trade payments as part of its efforts to avoid G7 sanctions.	Regtechtimes
23/10/2024	BRICS members welcome the use of local currencies in financial transactions between BRICS countries and their trading partners. They also agree to discuss and study the feasibility of establishment of an independent cross-border settlement and depository infrastructure, BRICS Clear.	XVI BRICS Summit Kazan Declaration
27/2/2024	BRICS members meet in Brazil to discuss the BRICS Bridge payment platform.	Ledger Insights
31/1/2024	The Bank of Russia holds consultations with like-minded countries about use of CBDCs in cross-border payments.	Central Banking
16/1/2024	Four new countries join the Russian Financial Messaging System (SPFS), increasing the number of members to 20.	Interfax
16/1/2024	Trading volumes in Chinese yuan surpass those in US dollars on the Moscow Exchange in 2023.	Reuters
03/07/2023	Indian refiners start paying in yuan for Russian oil imports.	Reuters
14/06/2023	Pakistan starts paying in yuan for discounted oil from Russia.	Reuters

Sources: Reuters, Bloomberg L.P., Ledger Insights, Central Banking, Financial Times, Regtechtimes and Interfax.

In parallel, the role of the Chinese renminbi in international trade continued to increase in the review period. The share of the renminbi in the settlement of China's external trade increased to 38% for goods and 47% for services in 2024, up from 26% and 31% respectively in 2023 (**Chart 13, panel a**). In particular, this increase reflected a higher use of the renminbi for settling Russia's trade with China, which has expanded rapidly since sanctions were imposed after the full-scale invasion of Ukraine (**Chart 13, panel b**). Use of the renminbi in trade finance has become similarly more prominent, accounting for 6% of global Swift trade finance messages in 2024, on a par with the euro. The US dollar continued to dominate this market segment, with more than 80% of total messages (**Chart 14, panel a**).

Chart 13

Increasing use of the renminbi in China's and Russia's trade



Sources: CEIC, IMF Direction of Trade Statistics, People's Bank of China, Bank of Russia, Amighini and García-Herrero (2023) and ECB staff calculations.
Notes: In panel a), the latest observation is for the end of 2024. In panel b), the latest observation is for the third quarter of 2024. The share of trade with China in Russia's total trade is derived from data reported by Russia's trading partners.

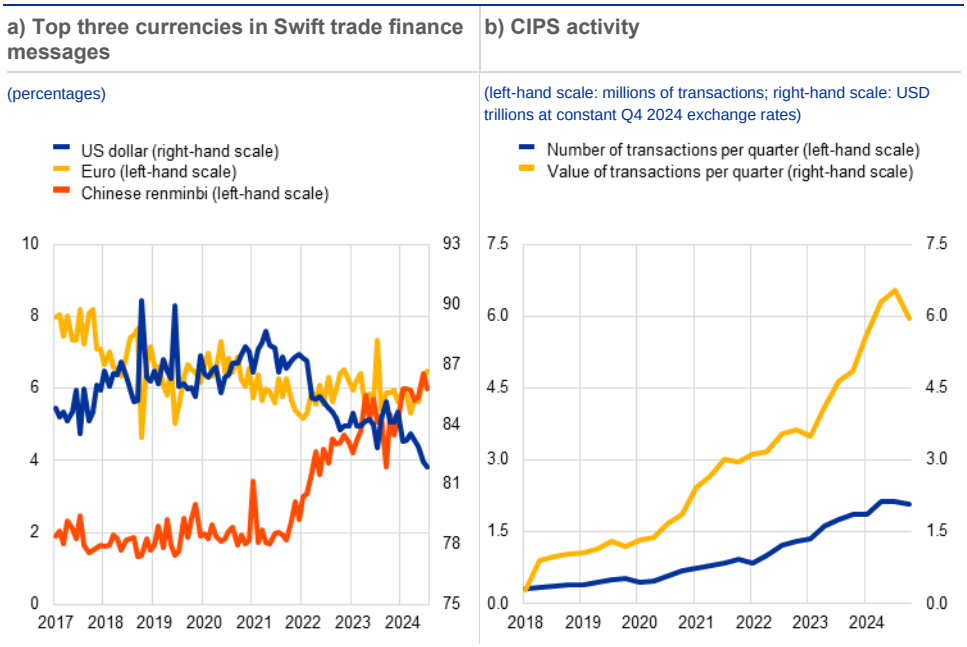
These developments reflect the efforts made by China to promote the international use of its currency in global payments. The most prominent initiative remains the Chinese CIPS, a cross-border payment and messaging system with the renminbi as a settlement currency, which has grown rapidly since it was created in 2018.[27] The system now connects banks across 200 countries and cleared approximately two million transactions with a total value of about USD 6 trillion in the fourth quarter of 2024 (**Chart 14, panel b**). Turnover remains an order of magnitude smaller than the almost 45 million transactions processed daily by Swift. Moreover, CIPS continues to rely on Swift messaging to process cross-border transactions and more than 90% of direct participants are located in either China and Hong Kong or are foreign branches of Chinese banks.[28]

27 Other examples of initiatives include the Belt and Road initiative and the establishment of a renminbi platform to trade oil futures in Shanghai. See Anaya Longaric, P. and Di Casola P., "The internationalisation of the renminbi: regaining strength?", published as part of *The international role of the euro*, ECB, Frankfurt am Main, June 2022.

28 A large portion of the remaining banks are subsidiaries of Hong Kong banks. See data from the CIPS website and the full list of direct participants.

Chart 14

Role of the renminbi in global trade finance and evolution of activity in CIPS

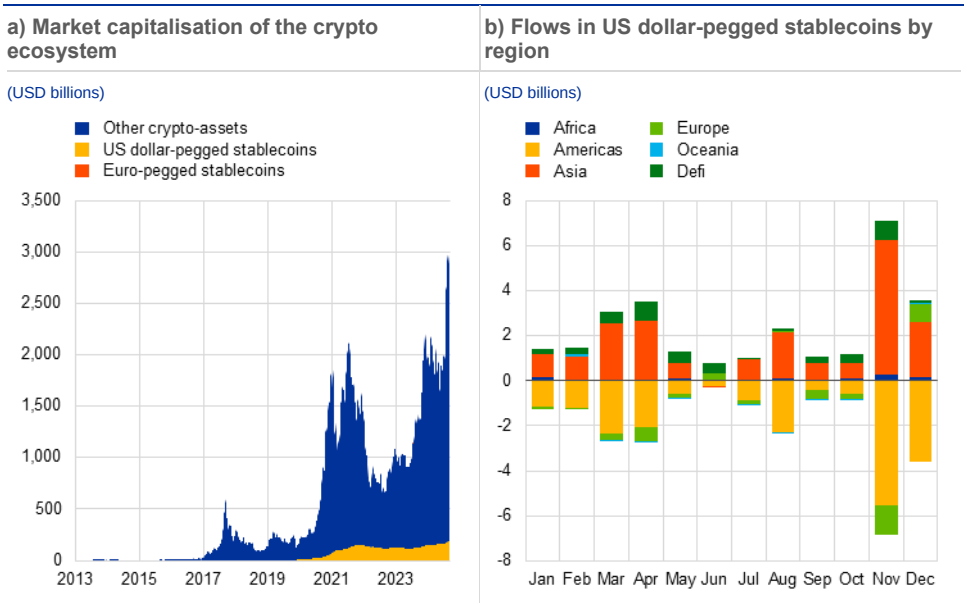


Sources: Swift RMB Tracker, People's Bank of China and ECB staff calculations.
Note: The latest observation is for the end of 2024.

Meanwhile, crypto-assets and stablecoins are making strides in cross-border payments. Recently, the new US Administration has taken initiatives to enhance the use of crypto-assets and dollar-pegged stablecoins. This includes the creation of a "strategic bitcoin reserve" using USD 17 billion worth of bitcoin seized by the US Treasury in forfeiture proceedings, while other crypto-assets owned by the US government would be pooled to make a "digital assets stockpile". In addition, some initiatives aim to encourage innovation and facilitate the issuance and use of dollar-based stablecoins. The capitalisation of the stablecoin market reached about USD 190 billion at the end of 2024, roughly 7% of the capitalisation of the entire crypto-assets market. Almost all (99%) of stablecoins are pegged to the US dollar (**Chart 15, panel a**). The primary advantage of using stablecoins for cross-border payments is the elimination of intermediaries and middlemen. Moreover, they offer pseudo-anonymity, faster payment processing and the ability to operate 24/7/365. This can make stablecoins particularly attractive in countries with unstable and volatile domestic currencies, where a significant portion of the population is unbanked or subject to high remittance fees.

Chart 15

Market capitalisation of the crypto ecosystem and transaction flows in US dollar-pegged stablecoins



Sources: Chainanalysis, CryptoCompare, CoinGecko, IntoTheBlock and ECB staff calculations.
Notes: In panel a), the latest observation is for the end of 2024. In panel b), "Defi" stands for decentralised finance. The latest observation is for 31 December 2024.

A greater use of US dollar-pegged stablecoins could boost demand for US Treasuries from stablecoin issuers, thus contributing to lowering US interest rates and strengthening the US dollar. Demand for dollar-pegged stablecoins is global but is particularly strong in Asia (**Chart 15, panel b**). Going forward, dollar-pegged stablecoins could further attract international depositors seeking to access US safe assets, in particular from jurisdictions with weak banking systems or high inflation, strengthening the role of the US dollar in global finance. The largest dollar-pegged stablecoins hold US dollar assets to back their liabilities. For instance, holdings of US Treasuries by Tether – the world's largest stablecoin – are around USD 100 billion. Dollar-based stablecoin issuers combined hold nearly USD 150 billion in US government debt securities, which is comparable with the holdings of residents in countries such as Saudi Arabia, Korea, Mexico and Germany (**Chart 16, panel a**). Stablecoin issuers typically invest in short-term paper for reasons of liquidity. As the market for short-term US debt amounts to about USD 6 trillion, stablecoins issuers already account for almost 3% of this market segment.[29]

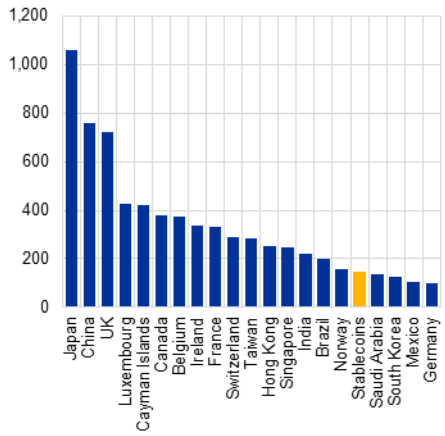
[29] This refers to the amount of marketable US T-bills reported in the U.S. Treasury Monthly Statement of the Public Debt (MSPD) dataset.

Chart 16

Issuers of US dollar-pegged stablecoins are major holders of US government debt, while transaction costs of Tether exceed those on centralised payment networks

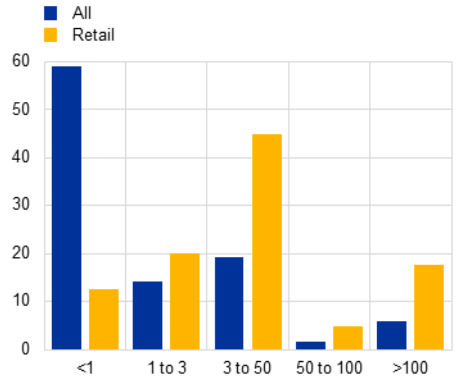
a) Major foreign country holders of US Treasury securities (bonds, notes and money market instruments)

(USD billion)



b) Transaction costs of Tether on the Ethereum blockchain in 2024

(x-axis: costs in percentages of transacted amounts, y-axis: share of total transactions in percentages)



Sources: US Department of the Treasury, independent auditors'/accountants' reports on Tether (USDT) and USD Coin (USDC) reserves, Tether blockchain and ECB staff calculations.
Notes: In panel a), data refer to the end of 2024. Stablecoins include the holdings of US Treasury securities and repos in Tether (USDT) and Coin (USDC) reserves. In panel b), the chart shows the distribution of transaction costs of Tether on the Ethereum blockchain (one of the two largest blockchains on which Tether is traded) in 2024. Both total transactions and retail transactions are considered, with the latter referring to transactions of less than USD 200 in value, as defined by the Financial Stability Board.

A more widespread adoption of US dollar-pegged stablecoins could also raise several challenges. First, households and businesses could substitute deposits for stablecoins, in turn leading to higher volatility in deposit supply and higher funding costs for banks, thus adversely impacting the cost and availability of credit. Second, stablecoins may fail to guarantee convertibility at par value at all times, making them susceptible to runs and potentially destabilising to the system they are meant to improve.[30] Third, the widespread adoption of stablecoins could increase currency substitution risks, leading to "digital dollarisation" in countries with weak fundamentals.[31] This could impair the effectiveness of domestic monetary policy and amplify capital outflows in response to adverse shocks, hence raising risks to financial stability.[32] These developments could have a destabilising effect on emerging markets and less developed economies, particularly small economies that are integrated into global value chains. Fourth, stablecoins often incur higher transaction fees compared with centralised payment networks.[33] In 2024 transaction fees on Ethereum, one of the two largest Tether ledgers, exceeded the transacted

30 None of the existing stablecoins have managed to always maintain parity, see Kosse, A., Glowka, M., Mattei, I. and Rice, T., "Will the real stablecoin please stand up?", *BIS Papers*, No 141, 2023.

31 See Brunnermeier, M., James, H. and Landau, J-P., "The digitalisation of money", *BIS Working Papers*, No 941, 2021.

32 See also Special feature A, *Financial Stability Review*, ECB, May 2025.

33 For example, a single transaction on TIPS (the Eurosystem's fast payment system) costs only 0.002 euro.

value in 6% of all transactions and 18% of retail transactions (**Chart 16, panel b**). Nearly 70% of retail transaction costs exceeded 3%, far above the average cross-border transaction costs in 2024.[34] Finally, stablecoins tend to react to global risk shocks in a similar manner to speculative assets, perhaps reflecting the fact that they are often used as vehicles for transactions in more speculative crypto-assets.[35] For all these reasons, stablecoins should be properly regulated in line with the agreed Financial Stability Board principles,[36] as achieved in Europe, for example, through the Regulation on markets in crypto-assets.[37]

Against this background, accelerating progress on a digital euro is key, as emphasised by European leaders at the March 2025 Euro Summit.[38] It would support a competitive and resilient European payment system, thereby contributing to Europe's economic security and strengthening the international role of the euro. Moreover, the ECB's initiatives to offer solutions for settling wholesale financial transactions recorded on distributed ledger technology platforms in central bank money[39] and to improve cross-border payments by interlinking fast payment systems[40] will support the efficiency of European financial markets and the global appeal of the euro.

Box 3
Geopolitics and global interlinking of fast payment systems

Prepared by Massimo Ferrari Minesso and Olga Triay Bagur

Payments are an essential part of the global economy and constitute a crucial network that goes unnoticed until something goes wrong.[41] Developments in global payments affect the role of major currencies in the international monetary system. Not only do they influence how easily currency transactions can be settled but also transaction costs in financial markets, while generating strategic complementarities between trade and finance.[42] Most cross-border payments are currently processed through a global network of correspondent banks – a chain of intermediaries that processes transactions between banks in different countries and regions. Rice

34 According to gasfeesnow, fees on Tron, another popular blockchain on which Tether is exchanged remain equally high, at between USD 3 and USD 7 per transaction.

35 See Aldasoro, I., Cornelli, G., Ferrari Minesso, M., Gambacorta, L. and Habib, M.M., "Stablecoins, money market funds and monetary policy", *Economic Letters*, Vol. 247, 2025.

36 See "High-level Recommendations for the Regulation, Supervision and Oversight of Global Stablecoin Arrangements: Final report", *Financial Stability Board*, July 2023.

37 Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 (OJ L 150, 9.6.2023, p. 40).

38 European Council, "Statement of the Euro Summit", 20 March 2025.

39 ECB, "Eurosystem expands initiative to settle DLT-based transactions in central bank money", 20 February 2025.

40 ECB, "Eurosystem launches initiatives to improve cross-border payments by interlinking fast payment systems", 21 October 2024.

41 See Kahn, C.M. and Roberds, W., "Why pay? An introduction to payments economics", *Journal of Financial Intermediation*, Vol. 18, Issue 1, 2009, pp.1-23.

42 See Rey, H., "International Trade and Currency Exchange", *The Review of Economic Studies*, Vol. 68, Issue 2, 2001, pp.:443-464; Coppola, A., Krishnamurthy, A. and Chenzi, X., "Liquidity, Debt Denomination, and Currency Dominance", *National Bureau of Economic Research,* 2023; Devereux, M.B. and Shi, S., "Vehicle currency," *International Economic Review*, Vol. 54, Issue 1, 2013, pp. 97-133 and Gopinath, G. and Stein, J.C., "Banking, Trade, and the Making of a Dominant Currency", *The Quarterly Journal of Economics*, Vol. 136, Issue 2, 2021, pp. 783-830.

et al. (2020)[43] have explored the network of correspondent banking relationships, finding that transactions are often expensive and slow. One reason for this is that they often have to go through multiple correspondent banks, as there is no direct link between the payer and payee banks, or because several currency conversions are needed.[44]

Limitations in existing payment networks have motivated the emergence of fast payment systems (FPS), which can settle transactions within seconds. FPS improve the efficiency of cross-border payments as they require less time to process transactions, thus reducing settlement risk. They currently exist in over 100 jurisdictions, with more to be launched in the coming years.[45] Additionally, many countries are experimenting by interlinking their domestic FPS with those of other countries.[46]

As of 2024, the network of FPS connections appears to be concentrated on large regional platforms, with hardly any links across clusters. Chart A shows a total of 523 dyadic connections at the country level, with 117 FPS across the globe. There are huge differences in interconnections among FPS across countries and time, resulting in a global fast payment space that is concentrated on a number of large regional platforms, especially in Europe and Africa. TARGET Instant Payment Settlement (TIPS) is the Eurosystem's FPS, designed to enable pan-European reachability in instant payments. It currently settles real-time payments in euro, Swedish krona and Danish krone, with more currencies expected to be included soon.[47] By contrast, in Latin America and Asia, connections are dependent on the successful domestic FPS of specific countries (Brazil and India respectively). Overall, a striking feature of the global network is that there are hardly any links across clusters.

Direct interlinking of FPS can be prompted by economic, technical or geopolitical reasons. Interlinking can lower transaction costs by reducing the number of intermediaries and exchange rate conversions needed to settle payments. However, interoperability arrangements that enable interlinking are complex to set up and monitor. Such arrangements would therefore only be warranted if there was a sufficiently large potential volume of cross-border flows. Interlinking can also be motivated by technological independence if nations perceive their dependence on payment technologies controlled by foreign countries to be excessive and therefore a risk. Finally, payment systems are a source of geoeconomic leverage: they are a natural monopoly and can effectively be used to impose economic sanctions, as available substitutes are limited.

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43 See Rice, T., von Peter, G. and Boar, C., "On the global retreat of correspondent banks", *BIS Quarterly Review*, March 2021. Correspondent banking is an arrangement whereby one bank (correspondent) holds deposits owned by other banks (respondents) and provides those banks with payment and other services.

44 Fees for business cross-border payments range from 1.6% in Europe to almost 4% in Africa. The average cost of sending remittances is 6.4%. On average, less than 50% of global payments are settled within one hour. See *Annual Progress Report on Meeting the Targets for Cross-border Payments: 2024 Report on Key Performance Indicators*, Financial Stability Board, October 2024.

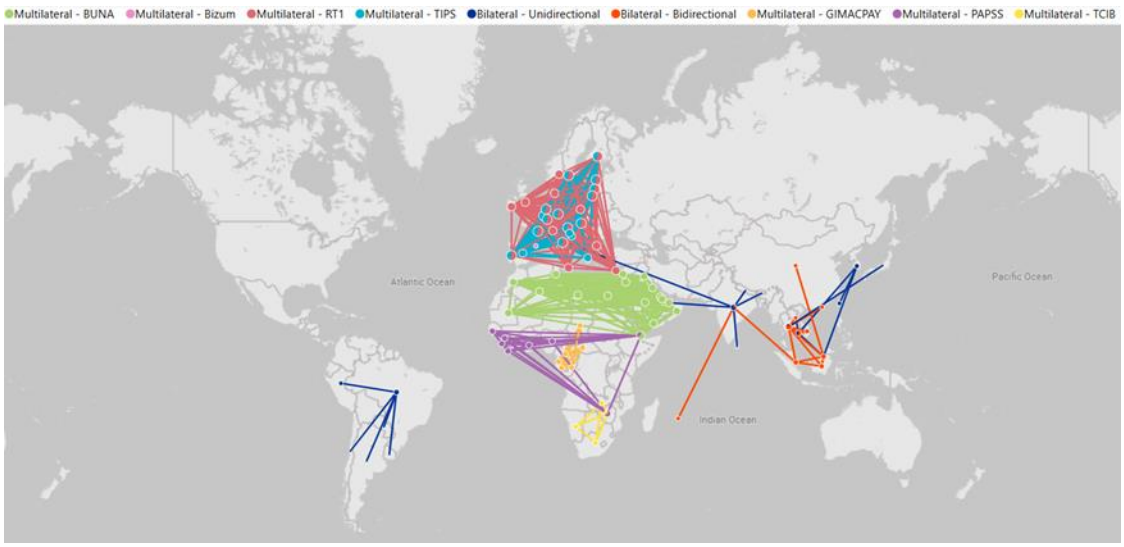
45 Fast-payment transactions represented 19% of all electronic payments globally, a figure expected to rise to 27% by 2028, see Frost, J., Wilkens, P.K., Kosse, A., Shreeti, V. and Velasquez, C., "Fast payments: design and adoption", *BIS Quarterly Review*, 2024, p. 31.

46 See *Steady as we go: results of the 2023 CPMI cross-border payments monitoring survey*, Committee on Payments and Market Infrastructures, June 2024.

47 See "Sweden joins TIPS – Eurosystem instant payments platform also settles in kronor", *MIP News*, February 2024, and the press release entitled "Danish krone now available in all TARGET Services" published on 23 April 2025 on the ECB's website.

Figure A

Global network of FPS connections



Sources: Ferrari Minesso, M., Mehl, A., Triay Bagur, O. and Vansteenkiste I. (2025).
Notes: The figure shows existing cross-border FPS connections in 2024. It shows bilateral connections – split between unidirectional and bidirectional (depending on the originating currencies enabled) – and multilateral connections, represented as dyads and coloured by regional platform. BUNA is the platform of the Arab Monetary Fund, Bizum is owned by the Spanish company Iberpay, RT1 is the FPS of EBA Clearing, TARGET Instant Payment Settlement (TIPS) is owned and operated by the Eurosystem, GIMACPAY is the FPS of the Economic and Monetary Union of Central Africa, PAPSS stands for Pan-African Payment and Settlement System and is designed to serve members of the African Union, and Transactions Cleared On An Immediate Basis (TCIB) is used by the Southern Africa Development Community. Data are based on Ferrari Minesso, M., Mehl, A., Triay Bagur, O., Vansteenkiste I., "Geopolitics and Global Interlinking of Fast Payment Systems", *CEPR Discussion Paper,* No 20105, 2025.

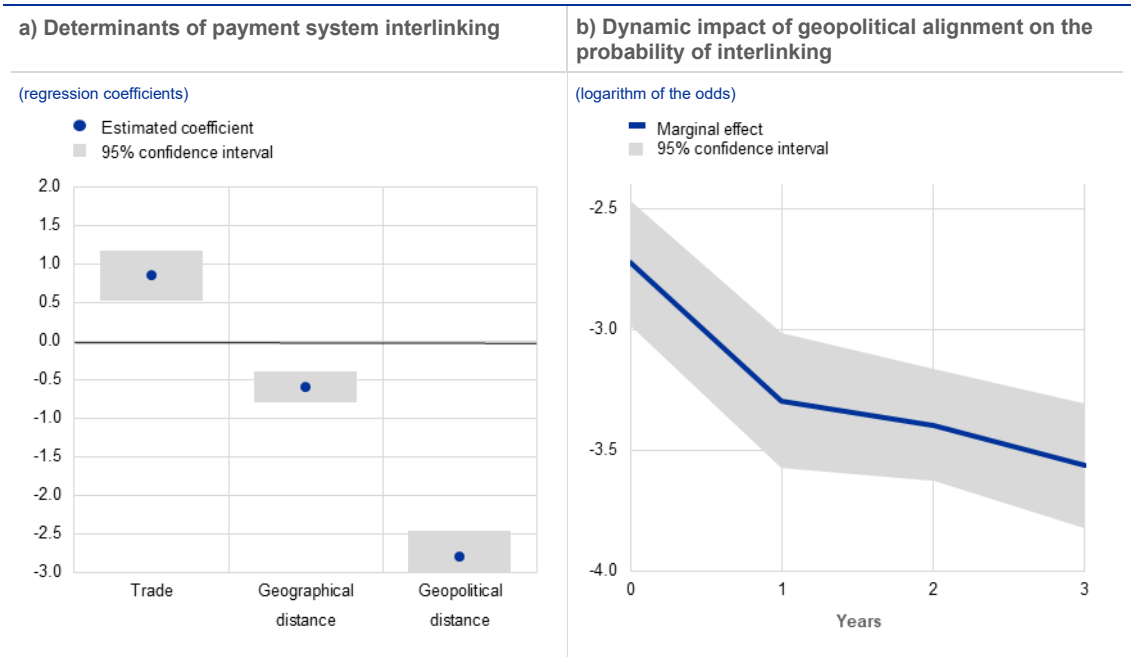
Empirical results point to geopolitics as an important driver of the interconnection of payment systems. The relative importance of the different underlying forces driving the interconnection of FPS can be quantified through an extension of the standard logit model.[48] **Chart A, panel a)** shows the model's estimated effect on the (logarithm of the) odds of interlinking two fast payment systems of one-standard deviation increase in bilateral trade intensity, geographical distance and geopolitical distance after controlling for GDP and technological standards.[49] One finding that stands out is the strength of geopolitical distance – whose effect is estimated to be much larger than that of geographical distance and bilateral trade. Quantitatively, a one-standard deviation increase in geopolitical distance from the sample average – which is roughly one-third of the geopolitical distance between the United States and China – reduces the (logarithm of the) odds of observing a payment link by about 2.8, compared with about 0.5 for the same increase in geographical distance. The results are robust to excluding TIPS links among euro area countries from the sample.

48 This is similar to the literature studying the determinants of trade agreements. See Martin P., Mayer, T. and Thoenig, M., "Make Trade not War?", *The Review of Economic Studies*, Vol. 75, Issue 3, 2008, pp. 865-900.

49 Geopolitical distance is proxied by the ideal point distance measure of Bailey et al., which is constructed using voting patterns in the United Nations General Assembly. See Bailey et al., "Estimating Dynamic State Preferences from United Nations Voting Data", 2017.

Chart A

Geopolitical factors can shape payment system interlinking



Source: Ferrari Minesso, M., Mehl, A., Triay Bagur, O. and Vansteenkiste, I. (2025).

Notes: The chart reports the estimates of the following logit model: $P(y_{i,j,t}|X) = \frac{1}{1+e^{-(\beta' X + \alpha_i + \alpha_j + \lambda_t)}}$. The dependent variable is a dummy equal to one if fast payment systems between country *i* and *j* are connected in year *t*. Control variables, that are standardised, include: GDP, trade flows, geographical distance, geopolitical distance measured as the ideal point distance in UN voting, the presence of common messaging standards, ISO 20022 standards and the volume of real-time settlements (RTS) in 2023. The model further controls for origin, destination and year fixed effects. The sample covers the period 2016-23. In panel b), the dependent variable is forwarded to obtain dynamic estimates as in Jordà (2023) and Ferrari Minesso et al. (2022).[50] Data are based on Ferrari Minesso, M., Mehl, A., Triay Bagur, O. and Vansteenkiste I., "Geopolitics and Global Interlinking of Fast Payment Systems", *CEPR Discussion Paper,* No 20105, 2025.

Moreover, the effects of geopolitical distance are found to be long-lasting. A one-standard deviation increase in geopolitical distance is estimated to reduce (the logarithm of) the odds of creating a new link by 3.5 in three years' time (**Chart A, panel b**). Therefore, if geopolitical tensions continued to rise, this could reduce the odds of forming new connections and bridging different clusters even further.

Payment fragmentation could weaken the international role of major currencies and increase trade costs. If bilateral FPS became widely used, systems with new (regional) settlement currencies might emerge. This could diminish the role of major currencies in the international monetary system, while exposing new systems to stronger currency risks. A fragmented payment network could also make international trade more expensive, as exchanging funds across competing platforms would become slower and more costly in the absence of interoperability arrangements. To tackle the risks of fragmentation in global payments, in 2020 the G20 drew up a roadmap to enhance cross-border payments.[51] In pursuing this roadmap, the ECB has recently launched an initiative aimed at exploring whether to interlink TIPS with FPS in other key countries outside the euro area.

50 See Jordà, O., "Local Projections for Applied Economics", *Annual Review of Economics*, Vol. 15, 2023, pp. 607-631 and Ferrari Minesso, M., Lebastard, L. and Le Mezo, H., "Text-Based Recession Probabilities", *IMF Economic Review*, Vol. 71, Issue 2, 2022, p. 415.

51 See *Enhancing cross-border payments: building blocks of a global roadmap*, Stage 2 report to the G20 – technical background report, Committee on Payments and Market Infrastructures, BIS, July 2020.

2 Special features

A Geopolitics and foreign holdings of euro area government debt

By Roland Beck, Vlad Burian, Georgios Georgiadis and Peter McQuade

This special feature uses granular data from the ECB's Securities Holdings Statistics (SHS) to investigate whether foreign holdings of euro area securities react to geopolitics. Where similar information is available from the US Treasury, a comparison is made with respect to foreign holdings of US Treasury securities. The analysis reveals several key insights. First, foreign investors hold almost a quarter of both euro area and US government debt. While these total foreign holdings are concentrated in countries geopolitically aligned with the West, foreign official sector holdings of euro area government debt are mainly held by non-aligned countries. Second, official foreign investors' holdings of euro area government debt have remained generally resilient since Russia's invasion of Ukraine. The decline in holdings of countries (excluding Russia) that are not geopolitically aligned with the West, which have dropped by 5% relative to pre-invasion levels, has so far been contained, highlighting the importance of upholding the rule of law. Econometric estimates suggest that geopolitical non-alignment explains at least part of this decline. These patterns still hold, even after correcting for geographic biases in international financial statistics to the extent possible. As the decline is small, the impact on euro area bond yields has been very limited thus far.

A.1 Motivation

The willingness of foreign investors to hold a country's government bonds has important economic consequences. Greater appetite among foreign investors for a country's government bonds lowers borrowing costs.[52] Since sovereign bond yields often serve as a benchmark for the pricing of other assets, this appetite also affects borrowing costs in other sectors. As such, changes in foreign holdings of government bonds can interfere with the transmission of monetary policy decisions to market interest rates. Foreign demand for a country's government debt is also a key determinant of the international role of the country's currency, influencing monetary policy spillovers and shaping the global monetary system.[53] Therefore, changes in foreign holdings of government debt are closely monitored by market

[52] See, for example, Rashad, A. and Rebucci, A., "Dollar Reserves and U.S. Yields: Identifying the Price Impact of Official Flows", *Journal of International Economics*, Vol. 152, 2024.

[53] See Gräb, J. and Mehl, A., "Special feature A – The benefits and costs of the international role of the euro at 20", *The international role of the euro,* ECB, 2019.

participants, particularly for major reserve currencies such as the US dollar and the euro.[54]

Foreign holdings of euro area government debt are important from a monetary policy perspective. Overall, foreign holdings of government debt can have stabilising or destabilising effects on sovereign bond markets. Foreign investors may contribute to a more diversified investor base and lower bond yields.[55] For instance, as net purchases of euro area sovereign debt by the Eurosystem came to a halt at the end of June 2022, foreign holdings have contributed to the smooth absorption of sovereign debt issuances.[56] At the same time, foreign holdings could also have destabilising effects on sovereign bond markets in the event of sudden reversals of holdings, e.g. in response to global economic or political shocks. For example, during the euro area sovereign debt crisis, non-euro area investors appear to have "under-invested" in stressed euro area countries relative to the predictions of a gravity model.[57]

Geoeconomic risk in portfolio investment decisions has come to the fore since Russia's invasion of Ukraine in 2022. The increase in geopolitical tensions over the past few years may have increased the importance of geopolitical factors as drivers of trade and financial flows. In the growing literature in this area, Gopinath et al. (2025) define "geoeconomic fragmentation" as "policy-induced changes in the sources and destinations of cross-border trade or financial flows guided by strategic considerations, such as national and economic security".[58] The authors find some evidence for geoeconomic fragmentation in overall portfolio investment flows, while ECB research has also documented the importance of fragmentation for foreign direct investment.[59]

Against this background, this special feature explores the role of geoeconomic factors for holdings of euro area debt by foreign official sectors. Foreign official holders of government debt can be various types of entities including, most notably, central banks but also sovereign wealth funds and international organisations.[60] Since central banks typically hold foreign debt securities primarily for exchange rate

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54 See, for example, Goldberg, L. and Hannaoui, O.Z., "Drivers of Dollar Share in Foreign Exchange Reserves", *Federal Reserve Bank of New York Staff Reports,* No 1087, March 2024. Revised August 2024.

55 See, for example, Arslanalp, S. and Poghosyan, T., "Foreign Investor Flows and Sovereign Bond Yields in Advanced Economies", *Journal of Banking and Financial Economics,* 2016, pp. 45-67.

56 See "Box 1 – Sovereign bond markets and financial stability: examining the risk to absorption capacity", *Financial Stability Review*, ECB, November 2023.

57 See Beck, R., Georgiadis, G. and Gräb, J., "The geography of the great rebalancing in euro area bond markets during the sovereign debt crisis", *Journal of Empirical Finance*, Vol. 38, Part A, 2016, pp. 449-460.

58 See Gopinath, G., Gourinchas, P.-O., Presbitero, A.F. and Topalova, P., "Changing Global Linkages: A new Cold War?", *Journal of International Economics*, Vol. 153, 2025.

59 The authors use bilateral data on portfolio flows from the IMF's Coordinated Portfolio Investment Survey (CPIS), including equity and debt securities while excluding cross-border direct investment and reserve assets. For evidence on foreign direct investment, see "Box 1 – Geopolitical fragmentation in global and euro area greenfield foreign direct investment", *Economic Bulletin*, Issue 7, ECB, 2024.

60 Sovereign wealth funds are more focused on the pursuit of return objectives compared with central banks, for which other considerations such as liquidity may be important. See Beck, R. and Fidora, M., "The Impact of Sovereign Wealth Funds on Global Financial Markets", *Review of European Economic Policy,* Vol. 43, No 6, 2008 and Palacios, M.D. and Habib, M.M., "Box 1 – Sovereign wealth funds and the euro area: preliminary evidence", *The international role of the euro*, ECB, 2024.

intervention and management as well as other precautionary motives, the composition of their reserves tends to be determined by economic considerations. The latter may also include geoeconomic considerations, which can be economically rational if central banks anticipate that assets could become less liquid amid geopolitical tensions. In some cases non-economic, political motives can also play a role, for instance, for reserve managers and central banks with limited independence.

A.2 Stylised facts

To study foreign official holdings of euro area sovereign debt, this special feature uses, in addition to standard macroeconomic data, the third-party holdings of the ECB's Securities Holdings Statistics (SHS). For euro area debt securities issued by general governments, the ECB's data on the euro area international investment position (i.i.p.) provide information about the extent to which such holdings are held by non-residents (**Table A.1**). Analysing the geography of foreign holdings of government debt requires country-level information that is often not publicly available.[61] For the euro area, granular information on the holders of euro area government debt is therefore obtained from the ECB's SHS data on "third-party holdings (TPH)". While these data offer breakdowns by geography and sector for issuers and holders, they only cover holdings with euro area "custodians", i.e. entities which are often a credit institution and provide securities custody services to their customers.[62] This means that the data may cover only part of the total non-euro area official holdings of euro area government debt, which may also be held via non-euro area custodians. At the same time, SHS data on non-resident holdings may also deviate somewhat from official i.i.p. data (**Table A.1**) as the latter are constructed based on the difference between reported intra-euro area assets and total euro area issuances, while SHS TPH data are based purely on custodial information.[63]

The US TICS provides information on total foreign holdings of US government debt, but a breakdown of private and official sector holders by holding area is not publicly available. As a result, distinguishing between foreign official and private sector holdings by holder country as in the ECB's SHS data is not possible. In addition, there is a custodial bias in US TICS data, which do not look through holdings in European financial centres (**Box A**). Keeping this caveat in mind, the analysis starts by comparing total foreign holdings – that is, the sum of official and private holdings – of euro area and US government debt.

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61 The euro area's international investment position provides a geographic breakdown by holding area, but only for total portfolio investment debt liabilities, not broken down by issuing sector.

62 SHS data are collected on a security-by-security level (based on Regulation ECB/2012/24). For foreign investors' third-party holdings data, the reported shares of global financial centres such as the United Kingdom and the United States, which show in the data as the primary non-euro area investors, may be exaggerated because of the presence of custodians in London and New York. For more detailed information on SHS data, see the dedicated section of the ECB's website as well as "Who holds what? New information on securities holdings", *Economic Bulletin*, Issue 2, ECB, 2015.

63 As a result, some of the holdings which TPH data show as belonging to non-euro area investors may actually reflect euro area holdings.

Table A.1

Sources and values of variables

Variable	Source	EUR bn
Euro area debt securities issued by general governments:	ECB, quarterly sector accounts	11,186.3
… of which held by non-residents	ECB, international investment position	2,591.5
	ECB, Securities Holdings Statistics	2,674.2
… of which held by the foreign official sector	ECB, Securities Holdings Statistics	952.4

Sources: ECB, sectoral accounts and SHS.
Note: The latest observations are for the fourth quarter of 2024.

Overall foreign holdings

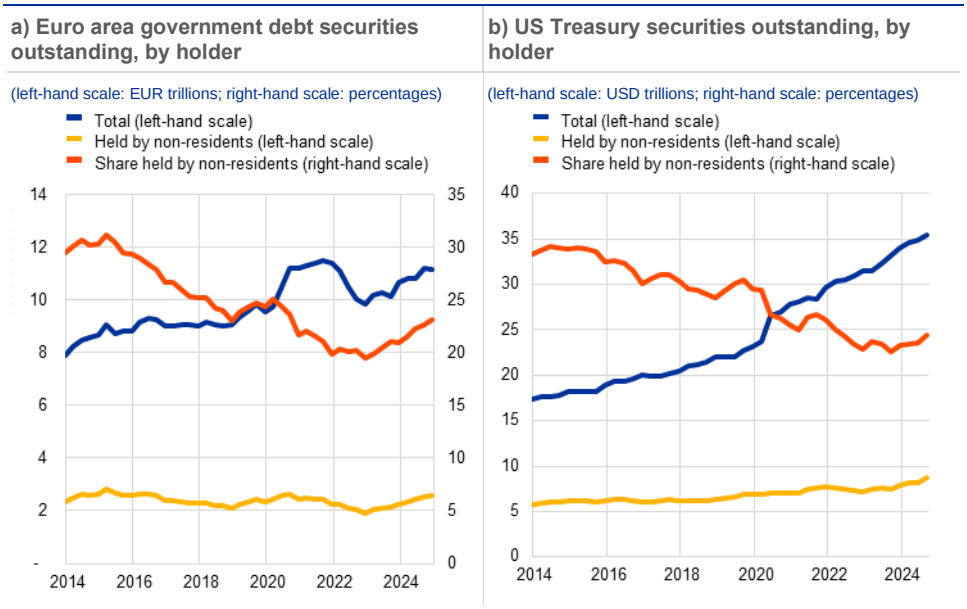
Over the last decade, foreign investors have been major holders of both euro area and US government debt, accounting for between one-fifth and one-third of all holdings of government debt in these economies. With around €2,600 billion at the end of the fourth quarter of 2024 (**Table A.1**), around 23% of outstanding euro area government debt was held by non-residents (**Chart A.1**). This share had started to decline when the Eurosystem acquired euro area government debt as part of its asset purchase programmes but has increased again since net purchases came to an end in mid-2022.[64] Holdings of US government debt exhibit a similar trend, as the share of non-resident holdings in total outstanding US Treasuries declined over the past decade and has recently risen to around 24%.[65]

[64] See Koijen, R.S.J., Koulischer, F., Nguyen, B. and Yogo, M., ”Euro-Area Quantitative Easing and Portfolio Rebalancing”, *American Economic Review,* Vol. 107, No 5, 2017, pp. 621-27; Bergant, K., Fidora, M. and Schmitz, M., “International capital flows at the security level: evidence from the ECB’s Asset Purchase Programme”, *Working Paper Series*, No 2388, ECB, 2020.

[65] In its reports about foreign holdings of US Treasury securities, the Congressional Research Service refers to the share of foreign holdings in total marketable Treasury securities held by the public, excluding holdings held by the Federal Reserve System. As the total outstanding amount of Treasuries is therefore reduced, the reported share of foreign ownership stands at 31% as at the end of 2023.

Chart A.1

Foreign holdings of euro area and US government debt securities



Sources: ECB, US TICS and ECB staff calculations.
Notes: Euro area debt securities refer to securities issued by general governments. Data for the United States include all Treasury securities outstanding. The latest observations are for the fourth quarter of 2024.

To analyse foreign holdings in terms of geopolitical alignment, countries are assigned into three groups – aligned, non-aligned and connector countries. The split is based on estimates of bilateral geopolitical distance, reflecting voting patterns at the United Nations General Assembly, whereby "aligned countries" refer to countries in political proximity to the United States, "non-aligned countries" excluding Russia[66] refer to those in political proximity to China and "connector countries" serve as bridges between the hypothetical blocs.[67] While this measure is transparent and used in other empirical studies, some caveats should be kept in mind. For example, it might be an imprecise measure of geopolitical alignment as it does not account for differences in geopolitical relevance across the issues which countries are voting on and for strategic absences. In addition, geographic biases in international financial statistics could blur portfolio shifts between these country groups given the complex financial intermediation chains in financial centres (**Box A**). While these biases are corrected in the analysis to some extent, the evolution of geopolitical alignment patterns in foreign holdings should be treated with some caution.

Euro area government debt is largely held by geopolitically aligned countries, and increasingly so since 2022. According to information from third-party holdings in the ECB's SHS,[68] aligned countries account for around 70% of foreign holdings of euro area government debt – a share which has increased somewhat since 2022

66 To ensure that results are not driven by mechanical effects, the sample excludes Russia since the assets of the Bank of Russia held in the EU were immobilised in response to Russia's invasion of Ukraine.

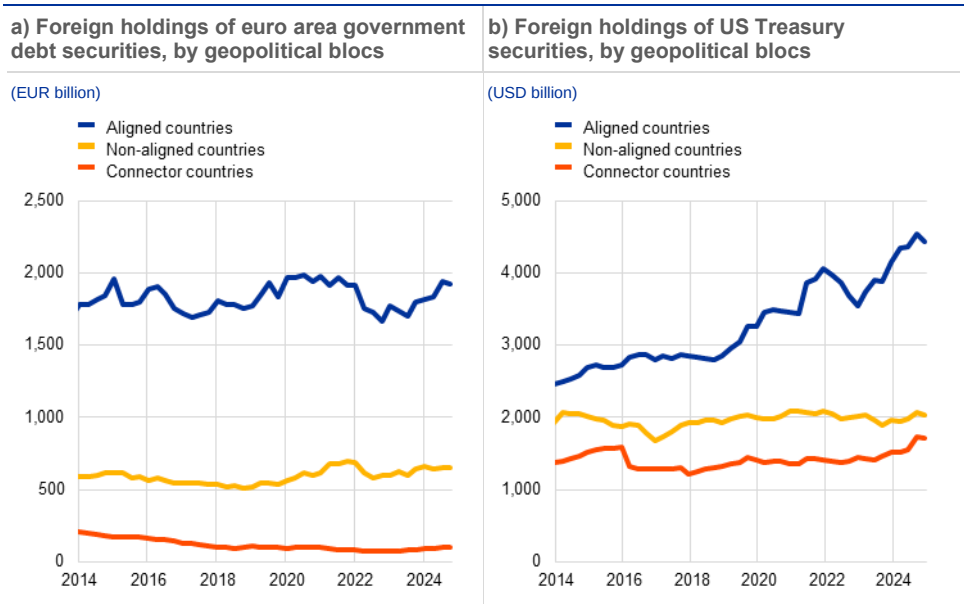
67 See Gopinath et al. (2025) and the references provided therein.

68 Total foreign holdings of euro area government debt roughly match the information in the euro area's international investment position (**Table A.1**).

(**Chart A.2**, **panel a**).[69] Similarly, aligned-country holdings of US Treasuries account for around 55% of total foreign holdings, with a somewhat more significant role played by "connector countries" (**Chart A.2**, **panel b**).[70] As a result, the share of non-aligned countries in foreign holdings of government debt is around one-quarter in the euro area and around one-fifth in the United States.

Chart A.2

Foreign holdings of euro area and US government debt securities broken down by geopolitical blocs



Sources: ECB SHS, US Treasury and ECB staff calculations.
Notes: Euro area debt securities refer to securities issued by general governments excluding holdings of non-euro area EU countries. Data for the United States include all Treasury securities outstanding. The latest observations are for the fourth quarter of 2024.

Box A

Geographic biases in international financial statistics

Prepared by Roland Beck and Martin Schmitz

International financial statistics can be subject to geographic biases owing to complex financial intermediation chains. It can be particularly difficult to properly identify the holders of securities held in custody abroad as well as those held through investment funds. These biases could be particularly relevant in the analysis of geopolitical tensions, as financial flows may be redirected via financial centres to their final destinations.

69 Following Gopinath et al. (2024), countries are divided into three groups based on the 2021 ideal points distance. The aligned bloc includes countries in the top quartile in their political proximity to the United States, while the non-aligned bloc includes countries in the top quartile in their political proximity to China. The connector countries bloc comprises the remaining economies.

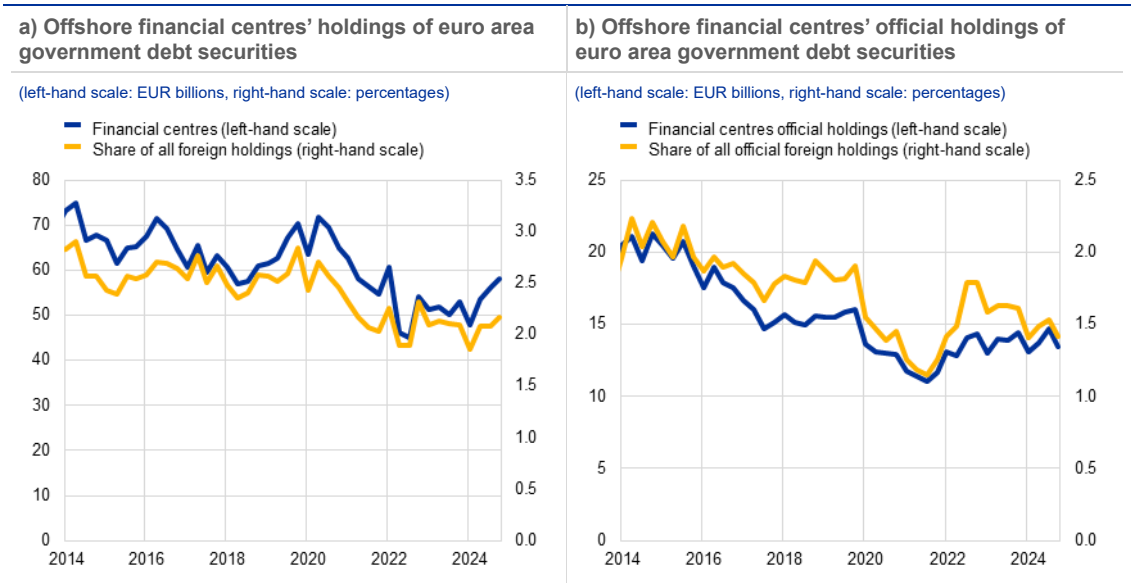
70 US TICS data are corrected for Chinese holdings of US Treasury securities via Euroclear in Belgium using as an upper bound the assumption that all Treasury holdings in Belgium originate from China, in the spirit of Setser (2023), op. cit.

With regard to the first bias, US TICS data do not look through custodians located outside the United States, e.g. in large financial centres, including from the euro area.[71] As a result, the rise in aligned holdings as shown in **Chart A.2, panel b)** could be biased if non-aligned investors hold securities through custodians located in these financial centres. One example that has been mentioned in this context are Chinese holdings of US Treasury securities through Euroclear in Belgium.[72]

With regards to foreign holdings of euro area government debt securities, the ECB's SHS TPH data trace foreign holdings to the immediate counterpart of the reporting custodians (for custodians located in the euro area). The immediate counterpart may coincide with the actual holder in some cases (e.g. in the case of China where holdings are mainly held by the official sector).[73] However, SHS TPH data do not track holdings to the ultimate investor through chains of financial intermediation, e.g. in the case of holdings via global financial centres. For euro area government debt holdings, offshore financial centres as immediate counterparts account for only around 2% of overall foreign holdings of euro area debt and around 1.5% of foreign official holdings, having declined somewhat overall in recent years (**Chart A.3**).

Chart A.3

Holdings of euro area government debt securities by financial centres



Sources: ECB SHS and ECB staff calculations.
Notes: The definition of offshore financial centres is based on the country list in Coppola et al. (2021) and includes data for the respective non-EU countries, such as, for example, the Cayman Islands, Hong Kong, Singapore and the Virgin Islands. The latest observation is for the fourth quarter of 2024.

In the case of investment funds, the economic ownership principle underlying international financial statistics implies that the assets of an investment fund are recorded as holdings of the country of residence of the investment fund. As a result, foreign holdings of government debt securities can be large for countries which serve as hubs in the investment fund industry. These countries often do

71 According to the US Treasury, "this custodial bias contributes to the large recorded foreign holdings of U.S. securities in major financial centers, such as Belgium, the Caribbean banking centers, Luxembourg, Switzerland, and the United Kingdom."

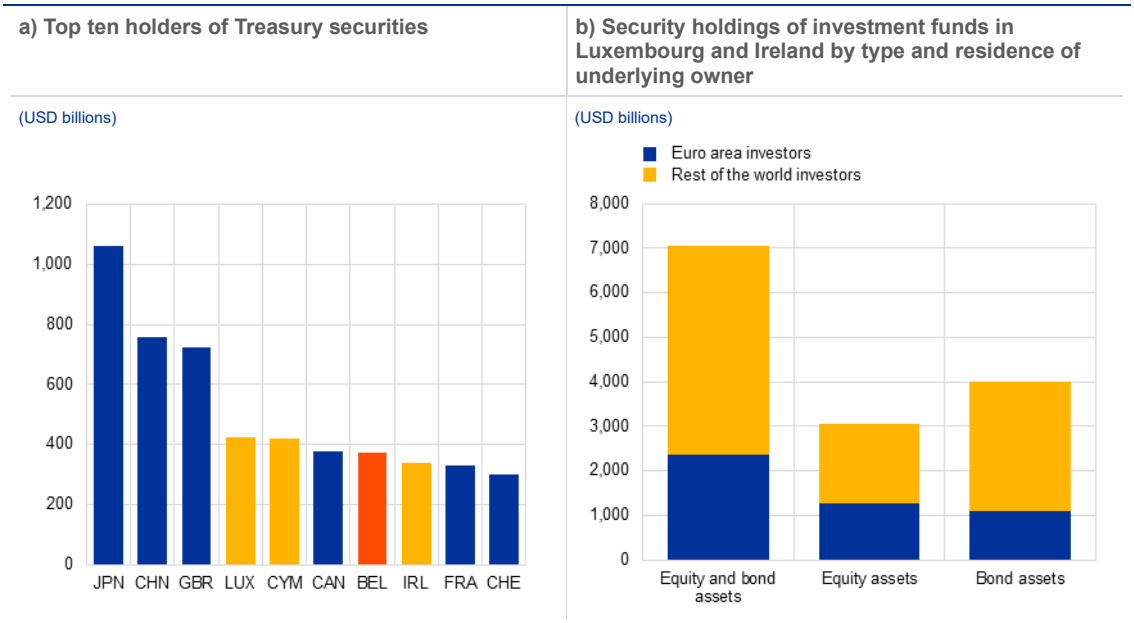
72 See Setser, B.W., "China Isn't Shifting Away From the Dollar or Dollar Bonds", *Council on Foreign Relations*, Blog Post, October 2023.

73 See Bosetti, I., Incardona, R. and Rodríguez Caloca, A., "Filling the gap: the geographical allocation of euro area portfolio investment liabilities and related income", *Statistics Paper Series,* No 50, ECB, 2025.

not correspond to the countries where the holders of the underlying investment fund shares reside. For example, Luxembourg and Ireland are among the largest holders of Treasury securities according to US TICS data (**Chart A.4**, **panel a**), mainly due to their large investment fund industry. Estimates using security-level data suggest that euro area residents account for only around one-third (one-quarter in the case of bonds) of investment fund assets held by investment funds in Luxembourg and Ireland (**Chart A.4**, **panel b**).

Chart A.4

Geographic bias in foreign holdings of US Treasury securities



Sources: US TICS data and ECB staff calculations.
Notes: In panel a), the bars for the financial centres and Belgium (where Euroclear is located) are highlighted in yellow and red respectively. Panel b) reproduces figures reported in Beck, R., Coppola, A., Lewis, A., Maggiori, M., Schmitz M. and Schreger, J., "The geography of capital allocation in the euro area", *Working Paper Series*, No. 3007, ECB, 2024. The authors provide an estimate of underlying euro area and rest of the world investor ownership of investment funds in Luxembourg and Ireland after performing a fund unwind procedure using security-level data. The latest observation is for the fourth quarter of 2024.

For around 40% of the investment fund shares issued in Luxembourg and Ireland, no owners can be identified in international financial statistics such as the IMF Coordinated Portfolio Investment Survey. However, there is some evidence that a part of these "missing assets" is held by investors from outside the euro area through custodians in the United Kingdom.[74] Hence, euro area investment fund holdings of US government securities as shown in **Chart A.2, panel b)** partly reflect the underlying investments of non-aligned countries.

Foreign official sector holdings

Geoeconomic alignment can be particularly relevant for official investors. Even when investing with economic objectives, official investors may be influenced by their government's broader strategic considerations. In normal circumstances, central

[74] See Beck, R., Coppola, A., Lewis, A., Maggiori, M., Schmitz, M. and Schreger, J., "The geography of capital allocation in the euro area", *Working Paper Series*, No 3007, ECB, 2024 and Milesi-Ferretti, G.M., "Many Creditors, One Large Debtor: Understanding The Buildup of Global Stock Imbalances after the Global Financial Crisis," *IMF Economic Review*, 2023.

banks hold government debt for precautionary reasons and their holdings must meet certain safety and liquidity requirements,[75] while ideally also offering some return.[76] However, central banks might also internalise the risk that the liquidity of their holdings could become constrained when geopolitical tensions rise.

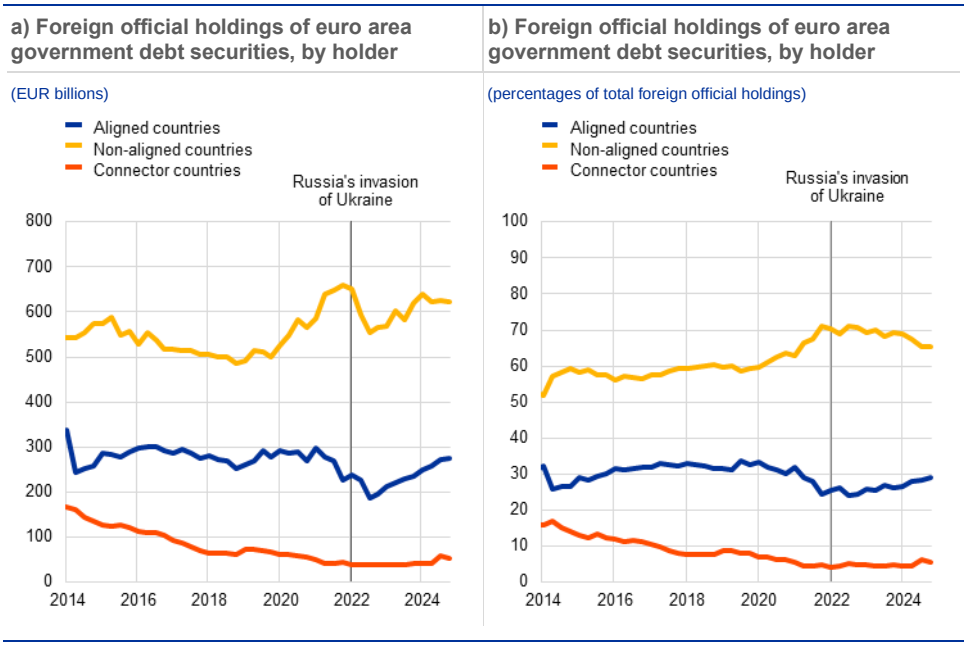
Euro area government debt held by the official sector in non-aligned countries has slightly decreased since Russia's invasion of Ukraine, while total foreign official holdings rebounded to close to historic highs. Non-aligned countries excluding Russia, account for the bulk of foreign official sector holdings of euro area government debt (**Chart A.5**, **panel a**). Following Russia's invasion of Ukraine in early 2022, non-aligned foreign official holdings dropped somewhat in the second quarter of 2022 and have increased slightly since then. From the end of 2021 onwards, the decline in these holdings has been limited to around 5% of pre-war holdings, highlighting the importance of upholding the rule of law. Moreover, they are still well above the levels witnessed at the time of Russia's annexation of Crimea in 2014. After an initial drop in early 2022, foreign official holdings of aligned countries grew strongly, while those of connector countries also picked up slightly in the latter half of 2024. As a result, overall foreign official holdings rebounded, while the share of foreign official sector holdings held by non-aligned countries declined somewhat between the end of 2021 and the fourth quarter of 2024 (**Chart A.5**, **panel b**). While substantial as a share of foreign official sector holdings, non-aligned foreign official holdings accounted for a small portion, around 6%, of the outstanding euro area government debt in this period.

[75] Central banks may also hold reserves for investment purposes and sometimes split their reserve portfolio into a liquidity tranche and an investment tranche. In emerging economies, central banks may also hold foreign reserves to cushion shocks to the availability of foreign financing for imports and external debt payments. For a more detailed review of the motives for holding foreign exchange reserves, see, for example, "Assessing Reserve Adequacy—Specific Proposals", *IMF Policy Paper*, IMF, Washington, 2015.

[76] See, for example, "HSBC Reserve Management Trends 2023", edited by Robert Pringle and Joasia E. Popowicz, April 2024.

Chart A.5

Foreign official holdings of euro area government debt



Sources: ECB SHS and ECB staff calculations.
Note: The latest observation is for the fourth quarter of 2024.

A.3 Empirical analysis

In addition to geopolitics, various other factors could drive the changes in foreign official sector holdings of euro area government debt. These could include, among others, valuation effects or changes in bond yields. To control for such factors, a standard gravity model is used to estimate the effect of Russia's invasion of Ukraine on official sector holdings of non-aligned countries, adapting the analysis in Gopinath et al. (2025). The estimates are generated using bilateral data in a regression that is fully saturated with fixed effects at the country-pair, source-times and destination-time level to account for all the time-invariant, country-pair determinants of official securities holdings, as well as all time-varying source-specific and destination-specific factors.[77] The regressions track the change in the difference between aligned and non-aligned countries' foreign official sector holdings of euro area government debt before and after Russia's invasion of Ukraine. The regressions analyse the average difference in bilateral foreign official holdings between aligned and non-aligned countries excluding Russia, which can be termed the "geopolitical alignment differential", following the invasion.

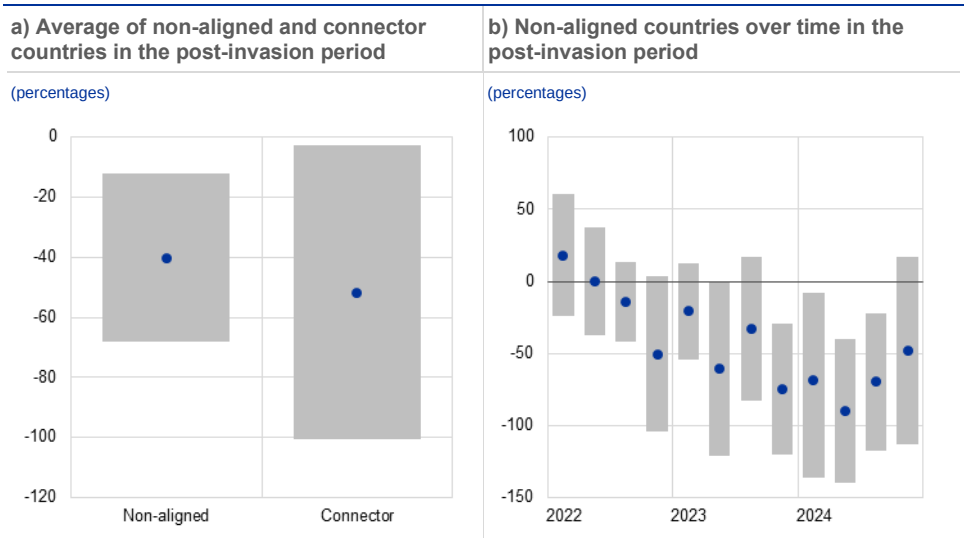
The analysis suggests that Russia's invasion of Ukraine has increased the geopolitical alignment differential in foreign official sector holdings of euro area sovereign debt, although the estimates are imprecise and may not fully capture all factors driving shifts in official reserve portfolios. Official sector holdings of euro area sovereign debt by non-aligned countries, excluding Russia, are

[77] The reported regressions include non-EU financial centre holdings, but the results remain largely unchanged if these holdings are excluded in the regression framework.

estimated to be almost 40% lower, on average, than holdings of aligned countries following the Russian invasion of Ukraine in 2022 (**Chart A.6**, **panel a**).[78] However, the size and significance of this finding is sensitive to the countries included in the non-aligned group and the estimate loses statistical significance at conventional levels if specific countries are excluded. Moreover, despite the comprehensive set of fixed effects, the estimates might not entirely account for other factors influencing changes in official reserve portfolios, as explained in greater detail below. The results also provide some evidence that there may be an effect on the holdings of connector countries, which are not assigned to either geopolitical bloc. Rather than an abrupt shift, the effect on non-aligned holdings appears to have materialised gradually, as shown by the estimates in **Chart A.6, panel b)**.

Chart A.6

Estimated effect of Russia's invasion of Ukraine on holdings of euro area sovereign debt in geopolitically distant countries



Sources: ECB SHS and ECB staff calculations.
Notes: The diamonds show estimated percentage changes in the difference in holdings of euro area sovereign debt between more and less geopolitically distant countries after the Russian invasion of Ukraine. Estimates are obtained from regressions of a non-euro area foreign country's official sector holdings of a euro area country's government debt on dummy variables denoting whether the foreign country is in a different geopolitical grouping from the euro area country, interacted with a dummy variable that equals one after Russia's invasion of Ukraine in the first quarter of 2022. Regressions are estimated on country pairs of 20 euro area issuers and 57 non-euro area foreign holder countries over the period from the first quarter of 2017 to the fourth quarter of 2024. Following Gopinath et al. (2024), the baseline specification includes country-pair fixed effects and source *x* time and host *x* time fixed effects to control for time-varying country-specific factors. The shaded areas indicate the 90% confidence intervals, based on standard errors clustered at the country-pair level. Panel b) shows the results of an analogous regression, but with the post-invasion variable and interactions replaced with individual dummy variables for each quarter after the Russian invasion of Ukraine.

The impact of changes in non-aligned official holdings on euro area bond yields is likely to have been contained thus far. Recent estimates of the link between portfolio changes and bond yields in the euro area suggest that a 10% purchase of government debt (around €1,120 billion) by the Eurosystem lowers euro area bond yields by 25 basis points.[79] Assuming these effects are symmetric and the same for all investor types, the decline in non-aligned holdings since the end of

[78] The coefficient estimate is slightly larger if Russia is included in the sample, likely reflecting the mechanical impact of immobilised assets of the Bank of Russia held in central securities depositories in the European Union.

[79] These estimates were obtained in the context of quantitative easing. See Koijen, R.S.J., Koulischer, F., Nguyen, B. and Yogo, M., "Inspecting the mechanism of quantitative easing in the euro area", *Journal of Financial Economics*, Vol. 140, Issue 1, 2021, pp. 1-20.

2021 (i.e., €35 billion or 0.3% of euro area government debt) would lead to a negligible increase in euro area bond yields (less than 1 basis point).

These findings should be treated with caution as they are subject to several caveats. First, measuring geopolitical alignment is challenging. Using past United Nations voting behaviour is only one approach to measuring geopolitical alignment and the assessment is sensitive to some of the modelling choices. Second, the ECB SHS TPH data do not cover the full holdings of euro area securities by foreign investors, as the holdings of non-euro area custodians are not included. As a result, some euro area sovereign debt holdings in the reserves of non-aligned countries might have been transferred to custodians outside the euro area, which are not reflected in the SHS data. Third, this analysis is limited to debt securities holdings so that any eventual shifts of foreign reserves into other instruments such as deposits are not captured. Notably, in 2022 and 2023 policy interest rates in major economies rose significantly, prompting official reserve managers to mitigate duration risks by reallocating a portion of their reserves into deposits. Fourth, bilateral holdings data as used in this analysis are subject to custodial biases because the ultimate holders may not always correspond to the initial investors reported in the ECB SHS TPH. Finally, the estimates for the effect of foreign official purchases on euro area government bond yields are subject to several caveats as back-of-the-envelope calculations use elasticities borrowed from the literature on quantitative easing. These may not take into account geopolitical developments, which could lead to non-linearities in demand for international reserve assets and the related response of yields.

B Global trade invoicing patterns: new insights and the influence of geopolitics

By Anja Brüggen, Georgios Georgiadis and Arnaud Mehl

This special feature uses new data collected by ECB and IMF staff from over 120 countries to examine trends in global trade invoicing currency patterns up to 2023. The analysis reveals several key insights: the US dollar and the euro remain the most prominent primary invoicing currencies, together accounting for over 80% of global trade invoicing. While the US dollar serves as a global vehicle currency, the euro's role as a vehicle currency is particularly significant in Europe and parts of Africa. Despite some growth, the renminbi's share in global trade invoicing remains very low, at less than 2%, although it is increasing in the Asia-Pacific region and in some parts of Europe. Finally, this special feature presents some evidence of a relationship between shifts in invoicing currency patterns and geopolitical alignment, especially since Russia's full-scale invasion of Ukraine. This evidence is most marked for certain countries which have distanced themselves geopolitically from the West, such as Russia, Belarus, Kyrgyzstan and Uzbekistan, where the share of exports invoiced in the US dollars and euro was 10-50 percentage points lower in 2023 than in 2015-19.

B.1 Motivation and context

Trade invoicing currency choices have important implications for the transmission of shocks and policy effectiveness. The standard assumption in traditional open-economy macroeconomic models, such as the Mundell-Flemming model, is that firms set and invoice prices in the currency of the producer.[80] Over short to medium-term horizons, when prices are sticky, this pricing assumption suggests that when a country's exchange rate depreciates, domestic spending will switch from imports to domestically produced goods and that exports will rise. Recent models depart from this assumption and postulate instead that export prices are set in a vehicle currency – i.e. the currency of neither the exporter nor the importer, but of a third country.[81] The key observation underlying this assumption – also known as the "dominant currency" pricing paradigm – is that most global trade is invoiced in just a few currencies, most often the US dollar, and sometimes the euro, regardless of the countries involved.[82] The implications of this assumption differ from those of traditional models. In particular, when export prices are set in a vehicle currency, a depreciation of the exchange rate does not boost a country's exports.

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80 See Obstfeld, M. and Rogoff, K.S., "Foundations of International Macroeconomics", *MIT Press*, 1996. The currency in which firms set optimal prices does not necessarily coincide with the invoicing currency specified on customs declarations. Evidence finding that prices are sticky in the currency of invoicing in the short term suggests that they correlate, however; see Amiti, M., Itskhki, O. and Konings, J., "Dominant Currencies: How Firms Choose Currency Invoicing and Whylit Matters", *Quarterly Journal of Economics*, Vol. 137, Issue 3, 2022, pp. 1435-1493.

81 See Gopinath, G., Boz, E., Casas, C., Diez, F., Gourinchas, P.-O. and Plagborg-Møller, M., "Dominant Currency Paradigm", *American Economic Review*, Vol. 110, No 3, 2020, pp. 677-719.

82 See Goldberg, L. and Tille, C., "Vehicle Currency Use in International Trade", *Journal of International Economics*, Vol. 76, No 2, 2008, pp. 177-192 and Gopinath, G., "The International Price System", *Working Paper*, No 21646, National Bureau of Economic Research, 2015.

For instance, if China's exports to Germany are priced in US dollars, a depreciation of the Chinese renminbi against the euro does not make China's exports cheaper for German buyers, so it does not boost China's export sales. Also, an appreciation of the vehicle currency raises the prices of all imports, not only of those sourced from the vehicle currency's issuer. As the choice of the export pricing currency has implications for the impact of exchange rate movements on prices and quantities, it also affects the effectiveness of domestic monetary policy through the exchange rate channel and monetary policy spillovers, especially from the United States.

An open question is whether the expansion of China and other emerging market economies in global manufacturing and trade could reshape global invoicing trade patterns, which have historically centred on the US dollar and the euro. China's spectacular rise has changed patterns in global final goods trade, input-output linkages and the structure of competition in export markets. Standard invoicing currency choice models suggest that these secular changes may make it optimal for some exporters to switch from established vehicle currencies to the renminbi. Such a shift would align their invoicing currency choice with that of foreign suppliers and competitors in destination markets increasingly using the renminbi. However, since larger switches would require coalescing effects in addition to changes in patterns in global trade in final goods, input-output linkages and the structure of competition in export markets, standard models predict that changes in invoicing currency patterns are likely to remain limited.

Additionally, policy initiatives and rising geopolitical tensions could reshape global invoicing currency patterns. Since the global financial crisis of 2009, the Chinese authorities have launched various initiatives to promote the internationalisation of the renminbi. These initiatives include allowing Chinese firms to settle trade transactions in renminbi, establishing renminbi swap lines with foreign central banks and partially opening up China's financial account to non-residents. Providing the option and reducing the costs for settling external transactions in renminbi might influence exporters' decisions to use it as an invoicing currency. Moreover, following the financial sanctions imposed on Russia following its full-scale invasion of Ukraine, alternative cross-border payment systems and corridors have emerged, challenging established correspondent banking networks and messaging systems. Rising and potentially prohibitive costs for settling transactions in major currencies might have also influenced exporters' decisions regarding their choice of invoicing currency (see **Section B.3** below for a more detailed discussion on the role of geopolitics in invoicing currency patterns).

Assessing whether invoicing currency patterns in global trade have shifted owing to these developments is challenging, as the relevant information is not readily available in existing cross-country datasets. Standard cross-country datasets like Comtrade, compiled by the United Nations, and the Direction of Trade Statistics, compiled by the IMF include detailed information on bilateral goods trade,

but do not provide information on invoicing currency patterns.[83] So far, these patterns have not been included in the IMF's Balance of Payments Manual – the main set of guidelines coordinating global accounting standards for external sector statistics. However, it will become a supplementary item that countries are encouraged to report from the Manual's seventh edition onwards.

Invoicing currency information is collected from customs declarations which differ across country and time depending on national legislation. Information on invoicing currency patterns is not always a mandatory – or even a voluntary – item that importers and exporters are required to disclose. Moreover, even if the information is provided, it might not be stored or processed by customs authorities, or transferred to other authorities, such as national statistics offices or central banks.[84]

A new initiative implemented by ECB and IMF staff sheds light on developments invoicing currency patterns in global trade. Various studies have collected data on invoicing currency patterns in global trade.[85] Earlier efforts were generally confined to advanced economies, restricted to collecting information on invoicing patterns in only the US dollar and the euro. Recent work by ECB and IMF staff has significantly expanded the cross-sectional coverage of earlier studies, adding observations on a larger array of emerging and developing countries for the period from 1990 to 2019.[86] ECB and IMF staff have now updated this dataset in follow-up work, with a view to including the period following Russia's full-scale invasion of Ukraine. The updated data include additional countries and, importantly, information on invoicing currency patterns in the renminbi. This updated and expanded database provides information on the shares of exports and imports of more than 120 countries from 1990 to 2023 invoiced in the US dollar, euro, renminbi and other currencies.

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83 The United Nations' Comtrade database is maintained by the United Nations Statistics Division, which works directly with national customs authorities, statistics offices, relevant ministries and central banks to collect data on exports and imports. The IMF's Direction of Trade Statistics relies on data reported by IMF member countries, augmented by trade statistics from other international organisations, such as Eurostat COMEXT and United Nations Comtrade for countries which do not report to the IMF.

84 Overall, cross-country reporting and processing of trade invoicing currency information is largely uneven. Only a few countries routinely provide official data on their trade invoicing currency.

85 See, for instance, Kamps, A., "The euro as invoicing currency in international trade", *Working Paper Series*, No 665, ECB, 2006; Goldberg, L. and Tille, C., "Vehicle Currency Use in International Trade", *Journal of International Economics*, Vol. 76, No 2, 2008, pp. 177-192; Ito, H. and Chinn, M., "The Rise of the 'Redback' and the People's Republic of China's Capital Account Liberalization: an Empirical Analysis of the Determinants of Invoicing Currencies", *Working Paper*, No 473, Asian Development Bank Institute, 2014; and Gopinath, G., "The International Price System", *Working Paper*, No 21646, National Bureau of Economic Research, 2015.

86 Boz, E., Casas, C., Georgiadis, G., Gopinath, G., Le Mezo, H., Mehl, A. and Nguyen T., "Patterns of invoicing currency in global trade: New evidence", *Journal of International Economics*, Vol. 136, Issue C, 2022.

B.2 Stylised facts and trends in global trade invoicing currency patterns

The updated and expanded data suggest that the US dollar and the euro continued to account for the lion's share of global trade invoicing up to 2023.[87] The new data confirm key facts observed in earlier studies**. Chart B.1, panel a)** shows that the share of global exports invoiced in US dollars, at about 40%, remains much larger than the share of exports to the United States. As noted earlier, this difference testifies to the US dollar's dominant role in the invoicing of global exports. Patterns for imports are similar. **Chart B.1, panel b)** confirms that the US dollar's leading role reflects more than its use for invoicing commodity exports: even if exports of commodities are excluded, the dollar share of invoicing still exceeds the share of exports to the United States by a sizeable margin. **Chart B.1, panel a)** also reveals that the euro's share of global export invoicing, at more than 40%, remains as large as the share of the US dollar, in line with the euro area's larger trade openness relative to that of the United States.[88] The chart also shows that the euro's share of global export invoicing is not much larger than the share of exports to euro area countries – an observation also made in earlier studies.[89]

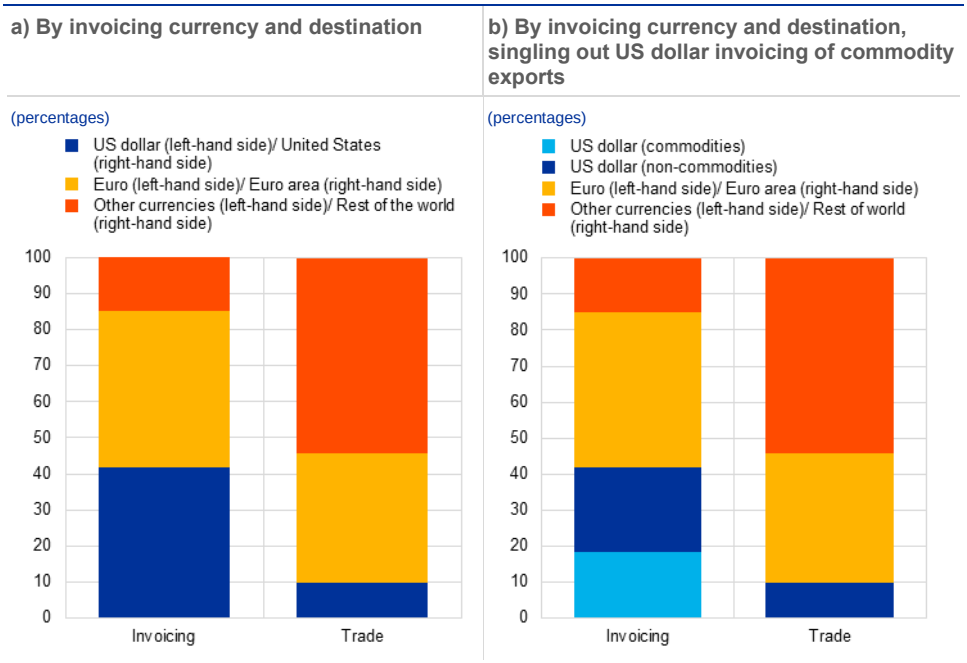
87 The analysis of trends in the updated and expanded data from Boz et al. (2022) is carried out in Boz, E., Brüggen, A., Casas, C., Georgiadis, G., Gopinath, G. and Mehl, A., "Patterns of invoicing currency in global trade in a fragmented world economy", *Working Paper Series*, ECB, 2025, forthcoming.

88 These estimates exclude the United States and include the euro area countries, in line with Gopinath (2015). If euro area countries are excluded, the share of the US dollar and the euro was about 60% and 25% respectively in 2023.

89 Considering intra-euro area trade does not artifactually boost the share of global exports invoiced in euro, as intra-euro area trade is included when calculating the shares of both invoicing *and* trade.

Chart B.1

Global export shares by invoicing currency and destination



Sources: ECB staff calculations based on the analysis in Boz et al. (2025) and updated and expanded data from Boz et al. (2022), Taiwan Ministry of Finance, IMF Direction of Trade Statistics and World Development Indicators.
Notes: Following Boz et al. (2025), missing country invoicing data are interpolated and extrapolated to obtain a balanced panel. For extrapolation, the earliest (latest) available data point is used to extend backwards (forwards); in each case, the value of the first (last) available data point is held constant. Invoicing shares are rescaled proportionately if the sum across currencies exceeds 100%. Interpolated and extrapolated raw data are averaged over time from 1999 to 2023. As in Gopinath (2015), the United States is excluded from the sample. The difference between panel a) and panel b) is that panel b) singles out the invoicing of commodity exports from total invoicing in US dollars. Since data on the invoicing currency for commodities exports are not available, commodity exports are assumed to be invoiced in US dollars (even if this is not necessarily always the case).

Another salient fact confirmed in the new data is that the US dollar continues to be used as a global vehicle currency for trade invoicing, while the use of the euro is more restricted geographically. Chart B.2, panel a) shows that, for most countries, the share of exports invoiced in US dollars is a multiple of the share of exports to the United States, which reflects the dollar's use as a global vehicle currency. By contrast, **Chart B.2, panel b)** shows that only countries in or close to Europe, as well as some parts of Africa, invoice a larger share of their exports in euro than their share of exports to the euro area. This points to the relevance of the euro as a regional rather than a global vehicle currency.[90]

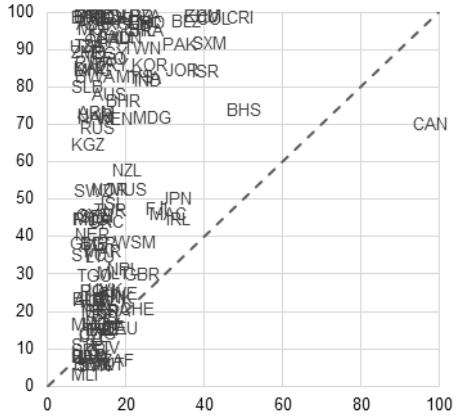
[90] See also Mehl, A., Mlikota, M. and Van Robays, I., "How is a leading international currency replaced by another? Old versus new evidence", published as a special feature in *The international role of the euro*, ECB, 2023.

Chart B.2

Average share of exports by destination and invoicing currency at the country level between 1990 and 2023

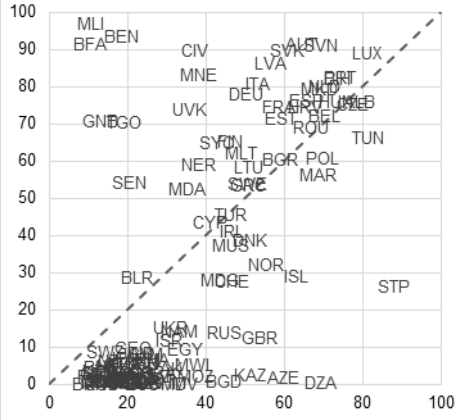
a) Share of exports to the United States and US dollar export invoicing share

(x-axis: share of exports to United States, percentages; y-axis: US dollar export invoicing share, percentages)



b) Share of exports to the euro area and euro export invoicing share

(x-axis: share of exports to euro area, percentages; y-axis: euro export invoicing share, percentages)

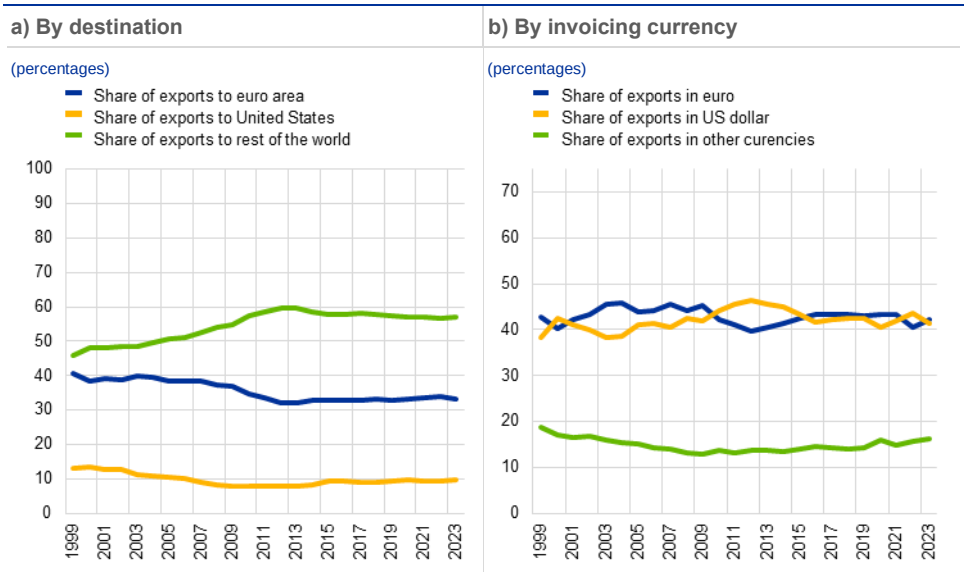


Sources: ECB staff calculations based on analysis in Boz et al. (2025) and expanded and updated data from Boz et al. (2022), Taiwan Ministry of Finance, IMF Direction of Trade Statistics and World Development Indicators.
Notes: Data are averaged over the period 1999-2023. Country names on the chart are displayed as three-letter ISO codes.

The updated and expanded data suggest that patterns in global US dollar and euro invoicing shares continue to remain remarkably stable over time, even after Russia's full-scale invasion of Ukraine. Chart B.3 expands **Chart B.1** over time. **Chart B.3, panel a)** shows the evolution of export shares by destination, while **Chart B.3, panel b)** shows the evolution of export shares by invoicing currency. **Chart B.3, panel a)** shows that the share of global exports to the United States and the euro area, respectively, has declined since 2000, in line with the decline in their share of global output. At the same time, **Chart B.3, panel b)** shows that the share of global exports invoiced in US dollars and euros has remained broadly stable. Importantly, the share of the US dollar and the euro in global trade invoicing remained stable in both 2022 and 2023 – in the wake of Russia's invasion.

Chart B.3

Evolution of the share of global exports by invoicing currency and destination



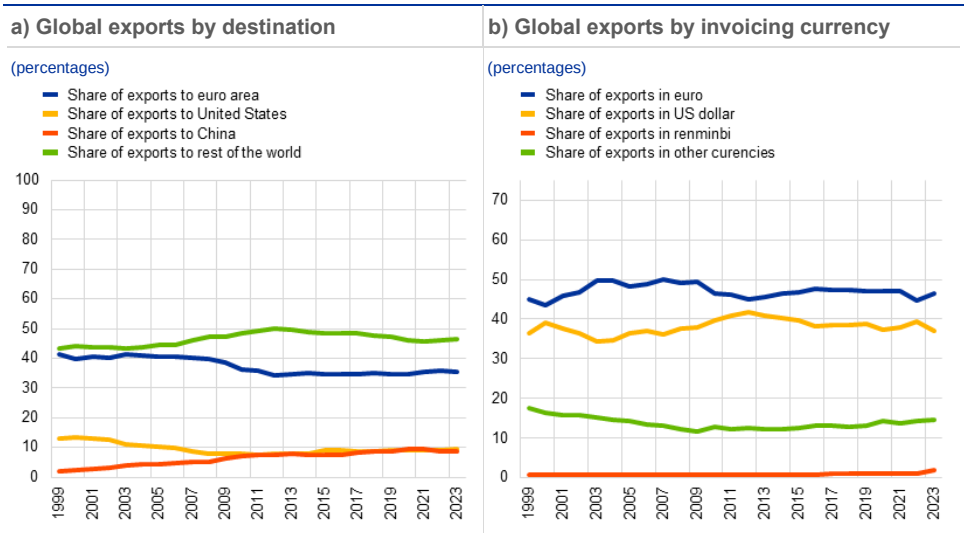
Sources: ECB staff calculations based on analysis in Boz et al. (2025) and expanded and updated data from Boz et al. (2022), IMF Direction of Trade Statistics, Taiwan Ministry of Finance and World Development Indicators.
Notes: In Chart B.3, panel b), following Boz et al. (2025), missing country invoicing data are interpolated and extrapolated to obtain a balanced panel. For extrapolation, the earliest (latest) available data point is used to extend backwards (forwards); in each case, the value of the first (last) available data point is held constant. Invoicing shares are rescaled proportionately if the sum across currencies exceeds 100%. Estimates exclude the US but include the euro area countries, in line with Gopinath (2015). If euro area countries are also excluded, the shares of the US dollar and the euro were about 60% and 25% in 2023, respectively. The latest observation is for 2023.

Another important insight from the new data is that, while increasing, the renminbi's share of global trade invoicing remains very low. Chart B.4, panel a) adds information on the share of global exports to China and **Chart B.4, panel b)** on the share of global exports invoiced in renminbi, both of which are available for a smaller sample of countries compared with **Chart B.3**. Although the share of global exports to China has increased significantly since it joined the World Trade Organization in 2001, the share of global exports invoiced in renminbi remains very low. There was a small uptick after 2022, but this is barely noticeable from a global perspective.[91]

[91] **Chart B.4** does not use renminbi, US dollar or euro data on cross-border settlements by currency available for China from 2010 onwards. According to data for 2024, more than one-third of China's exports of goods were settled in renminbi. Further analysis is needed to test whether the assumption that the currency of settlement coincides with the currency of invoicing – which is the conventional assumption in the literature (see e.g. Friberg, R. and Wilander, F., "The currency denomination of exports – a questionnaire study", *Journal of International Economics*, Vol. 75, Issue 1, 2008, pp. 54-69 – is valid for China's trade. If data on China's settlements were added in the chart, the share of the renminbi in global trade would be substantially larger.

Chart B.4

Evolution of the share of global exports by invoicing currency and destination (smaller sample with renminbi invoicing currency information)

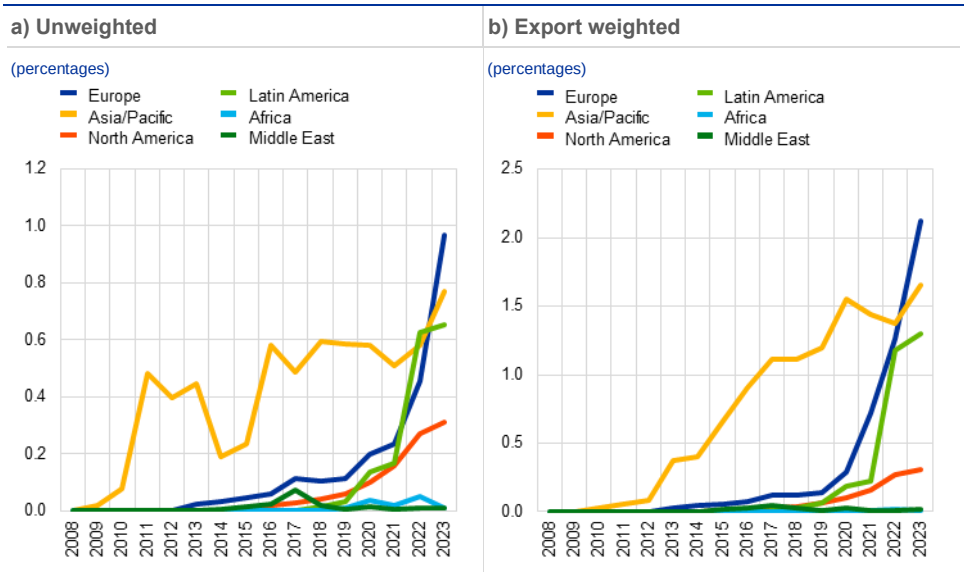


Sources: ECB staff calculations based on analysis in Boz et al. (2025) and updated expanded and data from Boz et al. (2022), IMF Direction of Trade Statistics, Taiwan Ministry of Finance and World Development Indicators.
Notes: In Chart B.3, panel b), following Boz et al. (2025), missing country invoicing data are interpolated and extrapolated to obtain a balanced panel. For extrapolation, the earliest (latest) available data point is used to extend backwards (forwards); in each case, the value of the first (last) available data point is held constant. Invoicing shares are rescaled proportionately if the sum across currencies exceeds 100%. The export and invoicing currency shares are slightly different from those in Chart B.2 because of differences in the country sample, as a country is only included if data are available for all export shares and all invoicing currency shares. As in Gopinath (2015), the United States is excluded from the sample. The latest observation is for 2023.

Invoicing in renminbi has increased more rapidly in certain regions, such as Asia-Pacific and parts of Europe, but still accounts for less than 2% of global exports. Chart B.5 presents patterns in invoicing currency shares for exports in different regions. In the Asia-Pacific region, invoicing of exports in renminbi started to rise from 2010. In the rest of the world, the use of the renminbi was negligible until 2018, but has subsequently risen rapidly in parts of Europe and the Western Hemisphere. However, the share of renminbi invoicing remains below 1-2% of exports in each region.

Chart B.5

Evolution of the share of exports invoiced in renminbi by region



Sources: ECB staff calculations based on analysis in Boz et al. (2025) and updated and expanded data from Boz et al. (2022), IMF Direction of Trade Statistics, Taiwan Ministry of Finance and World Development Indicators.
Note: The latest observation is for 2023.

B.3 Changes in invoicing currency patterns and geopolitical alignment

Geopolitics could induce shifts in invoicing currency patterns by changing the structure of global trade networks. Standard models emphasise the role of predetermined trade patterns, input-output linkages and the structure of competition in export markets as determinants of an exporter's choice of invoicing currency.[92] The key insight from these models is that exporters choose the currency in which their optimal price is expected to be most stable – or deviations of optimal reset from optimal preset prices are least volatile – considering future shocks to demand for their products and to the cost of their inputs. Geopolitical tensions could lead to a redirection of trade flows for final goods and intermediate inputs in cross-border value chains away from a globally integrated economy dominated by an established vehicle currency towards fragmented blocs. Fragmentation of global trade could result from changes in relative trading costs – including owing to tariffs – or even trade restrictions motivated by geopolitical considerations.[93] In blocs that are geopolitically distant and less integrated with the issuer of the established vehicle

92 See, for instance, Engel, C., "Equivalence Results for Optimal Pass-Through, Optimal Indexing to Exchange Rates, and Optimal Choice of Currency for Export Pricing", *Journal of European Economic Association*, Vol. 4, Issue 6, 2006, pp. 1249-60; Gopinath, G., Itskhoki, O. and Rigobon, R., "Currency Choice and Exchange Rate Pass-Through", *American Economic Review*, Vol. 100, No 1, 2010, pp. 304-336; and Mukhin, D., "An Equilibrium Model of the International Price System", *American Economic Review*, Vol. 112, Issue 2, 2022, pp. 650-688.

93 See Clayton, C., Maggiori, M. and. Schreger, J., "A Theory of Economic Coercion and Fragmentation", *Working Paper,* No 33309, National Bureau of Economic Research, 2024; Trebesch, C., Meyer, J., Zhou Wu, J., Martin, A. and Broner, F., "Hegemony and International Alignment", *Working Paper,* No 1483, Barcelona School of Economics, 2025; and Martin, P., Mayer, T. and Thoenig, M., "Make Trade Not War?", *Review of Economic Studies*, Vol. 75, Issue 3, 2008, pp. 865-900.

currency, exporters could be incentivised to abandon the latter for another unit of invoicing.

Other factors could also influence trade invoicing currency patterns within the existing structure of the global trade network. Standard invoicing currency choice models abstract from the role of settlement of trade transactions. In fact, in the empirical literature, the conventional assumption is that the settlement currency coincides with the invoicing currency, meaning that settlement of payments is inconsequential compared with the pricing of exports.[94] However, this might not be a valid assumption in trade between geopolitically divergent economies. For example, if its use is prohibited, or financial sanctions are (or are expected to be) imposed that reduce the availability of a certain currency to settle transactions, it may no longer be optimal to use it to invoice exports. The reason is that for such a currency it becomes increasingly difficult to minimise deviations of the optimal preset sticky price from the optimal price the exporters would choose if they could reset their price when shocks occur.[95] Interactions in international currency choice for different uses have been studied for trade pricing, financing and saving decisions, but less so for pricing and settlement decisions.[96]

Alternatives to traditional payment infrastructures centred around the US dollar and the euro have gained momentum since Russia's full-scale invasion of Ukraine, underscoring the importance of geopolitical considerations for trade invoicing. Alternative infrastructures started to emerge in 2013 when Iran, in response to its exclusion from Swift, developed its own messaging system. Russia followed suit in 2014 with the creation of the System for Transfer of Financial Messages (SPFS) after the annexation of Crimea. China's Cross-Border Interbank Payment System (CIPS) was launched in 2015. The pace of these initiatives has accelerated significantly since Russia's invasion of Ukraine. In the past two years alone, more than 20 new initiatives have been launched by emerging countries as alternatives to traditional payment infrastructures. At the BRICS Summit in October 2024, leaders from Brazil, Russia, India, China, South Africa and other nations supported the increased use of local currencies in global financial transactions. They also discussed establishing a new cross-border settlement and depository infrastructure, BRICS Clear, to facilitate this transition.

The updated data compiled by the ECB and the IMF suggest there is weak evidence of a relationship between changes in invoicing currency patterns and

94 See Friberg and Wilander (2008), op. cit.

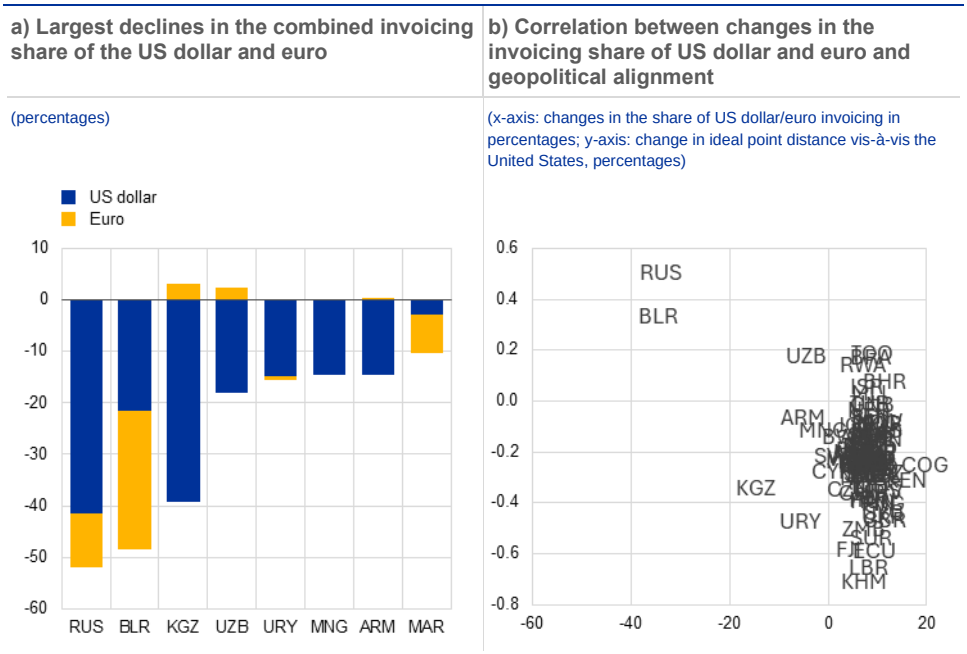
95 Specifically, when settlement in the invoicing currency, e.g. the US dollar, is prohibited, an exporting firm may simply quote its price set in US dollars in its home currency. In this case, the exporter would be exposed to exchange rate risk from the moment it sets and quotes the price of its output to the moment it sells and receives payment for its output. If the home (i.e. the quoting and settlement) currency happens to depreciate against the US dollar (i.e. the price setting currency) between pricing/quoting and selling, the preset invoicing currency price in US dollars and the home currency will turn out to have been too low. If the movement in the exchange rate had been predictable, the exporter could have factored in the depreciation and set a higher price in US dollars and hence quoted a higher price in its home currency. But since exchange rates are hard to forecast and may also appreciate, quoting and settling in the home currency implies more volatile deviations of optimal reset from optimal preset US dollar prices, which undermines the attractiveness of the US dollar as an invoicing currency.

96 See Chahrour, R. and Valchev, R., "Trade Finance and the Durability of the Dollar", *Review of Economic Studies*, Vol. 89, Issue 4, 2021, pp. 1873-1910; and Gopinath, G. and Stein, J., "Banking, Trade, and the Making of a Dominant Currency", *Quarterly Journal of Economics*, Vol. 136, Issue 2, 2020, pp. 783-830.

geopolitical alignment after the rise in geopolitical tensions. Chart B.6, panel a) shows that across all countries in the sample, Russia, Belarus, Kyrgyzstan and Uzbekistan experienced the largest declines in the share of exports invoiced in US dollars and euro in 2023 relative to the average between 2016 and 2021. In the case of Russia, the combined invoicing share of the US dollar and euro have roughly halved.[97] **Chart B.6, panel b)** indicates that the declines in US dollar and euro invoicing shares for these countries coincided with an increase in geopolitical divergence vis-à-vis the United States and the imposing of sanctions on Russia and Belarus, for both trade and financial transactions.[98]

Chart B.6

Changes in the invoicing share of the US dollar and euro and geopolitical alignment between the average for 2016-21 and 2023



Sources: ECB staff calculations based on analysis in Boz et al. (2025) and updated and expanded data from Boz et al. (2022), IMF Direction of Trade Statistics, Taiwan Ministry of Finance and Bailey et al. (2009).
Notes: Geopolitical alignment vis-à-vis the United States is measured as the ideal point distance derived from Voeten, E., Strezhnev, A. and Bailey, M., "United Nations general assembly voting data", *Harvard Dataverse*, 32, 2009. The measure is computed using data on voting in meetings of the General Assembly of the United Nations. In panel b), euro and US dollar invoicing shares represent the average export and import invoicing shares for each country. Country names on the chart are displayed as three-letter ISO codes. The latest observation is for 2023.

The relationship between changes in invoicing currency patterns and geopolitical alignment is robust to controlling for various confounding factors. Country-level invoicing currency patterns may also change due to composition effects unrelated to changes in producer decisions about pricing currency. For

97 For reasons of availability, in Russia, Belarus, Kazakhstan and Kyrgyzstan, the data refer to trade settlement rather than trade invoicing as specified on customs declarations. This is noteworthy because evidence suggests that the Bank of Russia has drawn from its swap line with the People's Bank of China to provide renminbi liquidity to Russian commercial banks to enable them to pay for imports from China and save US dollar reserves; see Horn, S., Parks, B., Reinhart, C. and Trebesch, C., "China as an International Lender of Last Resort", *NBER Working Paper*, No 31105, 2023.

98 Geopolitical alignment vis-à-vis the United States is measured as the ideal point distance measure put forward by Voeten, E., Strezhnev, A. and Bailey, M., "United Nations general assembly voting data", *Harvard Dataverse*, 32, 2009. This measure is computed using data on voting in meetings of the General Assembly of the United Nations.

instance, for given US dollar and euro pricing decisions taken by US and euro area firms, when a country increases its imports from the euro area at the expense of imports from the United States, the share of its imports invoiced in euro increases, while that of its imports in US dollars declines. Similar effects may materialise owing to exchange rate valuation effects and commodity price changes. Together, these effects can blur the relationship between changes in a firm's invoicing currency decisions and geopolitical alignment in aggregate data and may even induce spurious correlations. However, **Table B.1** shows that declines in US dollar and euro invoicing shares remain correlated with declines in geopolitical alignment even after controlling for these confounding factors. The evidence of the role of geopolitical alignment is relatively weak. Excluding Russia, Belarus, Kyrgyzstan and Uzbekistan – the four countries for which the association is the clearest (**Chart B.6, panel b**) – from the estimation sample, the coefficient estimate of the change in geopolitical alignment variable is no longer statistically significant.

Table B.1

Declines in US dollar and euro invoicing shares correlate to some extent with increases in geopolitical distance

Regression estimates for changes in invoicing currency shares

	Imports				Exports			
	(1) USD	(2) EUR	(3) EUR/USD	(4) CNY	(5) USD	(6) EUR	(7) EUR/USD	(8) CNY
Change in geopolitical distance	-1.25 (0.22)	-0.84** (0.01)	-2.26** (0.05)	-0.24* (0.09)	-2.48* (0.08)	-0.67 (0.28)	-2.48 (0.12)	-0.09 (0.46)
Change in bilateral trade share	-0.36 (0.32)	0.24 (0.13)	0.34 (0.12)	0.10* (0.09)	-0.27* (0.10)	0.29** (0.03)	0.35* (0.08)	0.07 (0.33)
Change in trade block share	0.20 (0.26)	0.23** (0.04)	0.32** (0.05)	-0.05 (0.23)	-0.01 (0.96)	0.02 (0.89)	0.13 (0.48)	0.02 (0.49)
Change in bilateral exchange rate	0.11* (0.08)	0.00 (0.89)	0.08 (0.28)	-0.01 (0.34)	0.14 (0.11)	0.00 (0.96)	0.20* (0.06)	-0.03 (0.21)
R-squared	0.09	0.13	0.25	0.19	0.14	0.14	0.24	0.09
Countries	97	95	94	81	97	96	95	79

Sources: ECB staff calculations based on analysis in Boz et al. (2025) and updated and expanded data from Boz et al. (2022), IMF Direction of Trade Statistics, Taiwan Ministry of Finance and Bailey et al. (2009).
Notes: P-values are in brackets. ** denotes significance at 5% level and * significance at 10% level.

Overall, the findings suggest that global invoicing currency patterns have remained broadly stable against a backdrop of rising geopolitical tensions. This stability is consistent with models that highlight lock-in effects and network externalities as forces shaping invoicing currency patterns. These externalities are rooted in input-output linkages in cross-border value chains, strategic complementarities in price setting among exporters and domestic producers, and global exchange rate arrangements that reflect asymmetries in volatilities due to policy frameworks and other factors.

In the future, it is crucial to monitor global trade invoicing currency patterns to identify potential tipping points that could trigger more noticeable changes. State-of-the-art models suggest that large shocks and structural changes could

coordinate the behaviour of producers into a different invoicing currency choice equilibrium.[99] Model simulations suggest that when the structural determinants of invoicing currency choice undergo large changes, reshuffling of global trade invoicing patterns can unfold rapidly. Moreover, rising geopolitical tensions might give fresh impetus to state policies that deliberately encourage or enforce changes in trade invoicing currency choices. Therefore, it remains important to monitor patterns in invoicing currency in global trade transactions in the period ahead.

[99] Calibrated simulations of Mukhin (2022)'s rich state-of-the-art general equilibrium models suggest that further increases in China and other emerging market economies' share of global trade and output, combined with the liberalisation of the renminbi exchange rate and economies choosing the renminbi as an anchor currency, would not challenge the dominant role of the US dollar for invoicing global trade. However, the simulations also suggest that a structural increase in US inflation to 10% due to fiscal policy slippages could induce economies to abandon the US dollar as an anchor currency and look for alternatives, thereby significantly reducing its role in the invoicing of global trade.

3 Statistical annex

See more.

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For specific terminology please refer to the ECB glossary (available in English only).

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