Unlocking central banks' vaults: Dollar dominance and the reserves of nations

Serkan Arslanalp, Roger Gomis, Hiro Ito, Alexandre Lauwers, and Arnaud Mehl*

October 27, 2026

Preliminary version — Do not cite without permission

Abstract: We revisit the evidence on the dominance of the US dollar in global foreign exchange reserves, drawing on the most comprehensive and up-to-date panel dataset ever assembled on the currency composition of official foreign exchange reserves. We confirm the well-documented shifts since 2000 in aggregate data away from the US dollar and other major reserve currencies toward non-traditional reserve currencies. However, this is only part of the story. Our analysis of disaggregated data uncovers previously hidden reallocations within the "Big Four" reserve currencies. One trend involves a move away from the euro, pound sterling, and yen toward the US dollar, driven primarily by numerous small reserve holders. The other reflects a shift in preferences away from the US dollar toward the euro, primarily driven by China and Russia, although their contribution has declined over time. These findings help bridge the gap between publicly available aggregate data on global FX reserves and the disaggregated evidence revealed in our new dataset. To further illustrate the usefulness of the data, we revisit empirical estimates of the security premium on US dollar reserves as a potential application.

Keywords: Foreign exchange reserves, currency composition, US dollar dominance, geoeconomics, global security premium
JEL classification: F30

*Serkan Arslanalp: International Monetary Fund (sarslanalp@imf.org); Hiro Ito: Portland State University (ito@pdx.edu); Roger Gomis: International Labour Organization (gomisr@ilo.org); Alexandre Lauwers: European Stability Mechanism (a.lauwers@esm.europa.eu); Arnaud Mehl: European Central Bank and Center for Economic Policy Research (arnaud.mehl@ecb.europa.eu). We thank Gwen Kwende, Philip Lane, Erin Nephew, Stephen Redding, Ken Rogoff, Jesse Schreger and participants in an internal ECB seminar for comments and discussions. The views expressed in this paper are solely those of the authors and do not necessarily reflect the opinions or positions of the European Central Bank, the Eurosystem, the European Stability Mechanism, the International Labour Organization, or the International Monetary Fund.

1. Introduction

Official foreign reserves are vital for ensuring the stability and smooth functioning of the global monetary and financial system. This has been a long-standing view: as early as the aftermath of World War I, Keynes emphasized the importance of adequate gold reserves to maintain the "two ideals" of having both "stability of internal prices" and "stability of external exchanges" during debates on whether to restore the prewar gold standard.[1] But in today's global economy, official foreign reserves are no longer primarily held in gold but are instead predominantly maintained in foreign exchange (FX). Nearly 85% of these reserves are invested in mainly four major currencies—the US dollar (USD), euro (EUR), Japanese yen (JPY), and pound sterling (GBP), collectively known as the "Big Four". These foreign exchange reserves enable central banks to back domestic money issuance and continue to play a critical role in stabilizing exchange rates, supporting international trade, and meeting external payment obligations.[2]

Yet the composition of reserves is far from balanced: the USD alone accounts for the lion's share of the Big Four, a pattern that mirrors—and is reinforced by—its outsized role in trade invoicing and the denomination of international financial contracts. This confluence of reserve, transactional, and financing roles is at the heart of what has come to be known as the dominant currency paradigm, whereby a small number of currencies, and the USD in particular, dominate international trade invoicing, cross-border financial contracts, and the currency composition of foreign exchange reserves, often to a degree far exceeding what economies' shares of global trade or output would predict (see e.g., Goldberg and Tille, 2008; Gopinath, 2015; Goldberg and Tille, 2016; Gopinath, Boz, Casas, Díez, Gourinchas, and Plagborg-Møller, 2020; Gopinath and Stein, 2021; Amiti, Itskhoki, and Konings, 2022; Boz, Casas, Georgiadis, Gopinath, Le Mezo, Mehl, and Nguyen, 2022; Coppola, Krishnamurthy, and Xu, 2023; Boz, Brüggen, Casas, Georgiadis, Gopinath, and Mehl, 2025). Therefore, whether the USD can maintain its preeminent role in foreign exchange reserves remains one of today's pivotal questions concerning its broader dominance in the international monetary and financial system (see e.g., Rogoff, 2025; Eichengreen, 2026; Liao, Prasad, and Zhang, 2026).

In this paper, we revisit the evidence on the dominance of the USD in global foreign exchange reserves, drawing on the most comprehensive and up-to-date panel dataset ever assembled on their currency composition. Data on the currency composition of FX reserves is critical but remains fragmented. The main public source of information is the IMF's Currency Composition of Official

[1] As he put it: "The restoration of the gold standard (whether at the pre-war parity or at some other rate) certainly will not give us complete stability of internal prices, and can only give us complete stability of the external exchanges if all other economies also restore the gold standard. The advisability of restoring it depends, therefore, on whether, on the whole, it will give us the best working compromise obtainable between the two ideals" (Keynes, 1931, III, 2.)

[2] See e.g. Farhi, Gourinchas, and Rey (2011), Obstfeld (2013), Farhi and Maggiori (2018).

Foreign Exchange Reserves (COFER) database, which provides aggregate data. A second public source is the IMF's Data Template on International Reserves and Foreign Currency Liquidity, which provides comparable country-level data but only for a limited number of economies that voluntarily disclose this information under the IMF data dissemination standards. A third public source are central banks' annual reports and financial statements, which also disclose information on a voluntary, albeit not always on a comparable basis. This restricts researchers' ability to analyze individual economies' currency compositions and motivations for a broader pool of reserve holders.[3] Researchers have constructed databases, such as Eichengreen and Mathieson (2000); Ito and McCauley (2020); Chinn, Ito, and McCauley (2022); Arslanalp, Eichengreen, and Simpson-Bell (2022, 2025); Laser, Mihailov, and Weidner (2025). However, the data they provide is limited across space, time, currencies, and reserve instruments, and not all consistently adhere to the standard definition of FX reserves.[4]

Our paper seeks to address these gaps. By combining these sources thoroughly and making careful imputations, we construct a cross-comparable database on the currency composition of FX reserves for 149 economies—double the number covered by previous databases. The database provides annual data from 2000 to 2024, thus covering the recent era of heightened geopolitical tensions. The data includes currency shares not only for the Big Four currencies but also for the remaining currencies reported in COFER (Swiss franc, CHF; Australian dollar, AUD; Canadian dollar, CAD; and Chinese renminbi, RMB), as well as, for the first time, the shares of any other currency reported by central banks—a total of over 20 non-traditional reserve currencies (NRCs).

Our analysis yields five key contributions. First, we delve beneath aggregate trends in the evolution of reserve currencies over the past two and a half decades. The traditional narrative suggests a gradual decline in the USD's aggregate share of global FX reserves—from 71% in 1999 to 58% in 2024—while the EUR's aggregate share has remained overall stable at around 20%, and NRCs' aggregate share has grown in parallel to 12%, according to COFER.[5] However, by adding layers to COFER data using our disaggregated database, we reveal that the average and median shares of the USD have steadily increased since the Global Financial Crisis (GFC), while the EUR share held by the median reserve holder has dropped significantly to around 5% after the GFC. This reflects a major shift from the EUR to USD, with many reserve holders now maintaining

[3]Several major reserve holders, such as China, Japan, India, and Taiwan, do not disclose detailed information about their reserve currency composition, creating gaps in understanding global reserve dynamics. Moreover, a complete list of economies included in the COFER dataset is not publicly available.

[4]These datasets typically cover a restricted set of economies (around 70-80), years (often excluding developments after the outbreak of the war in Ukraine in 2022, which is believed to have encouraged greater reserve diversification), and currencies (primarily the Big Four). In addition, researchers have constructed databases on the currency composition of FX reserves for earlier historical periods, including Eichengreen, Mehl, and Chiţu (2019) for the pre-World War I period, Eichengreen and Flandreau (2009) for the interwar period, as well as Eichengreen, Chiţu, and Mehl (2016) and Avaro (2024) for the post-1945 period.

[5]See e.g.,Maggiori, Neiman, and Schreger (2019); Ilzetzki, Reinhart, and Rogoff (2020); Arslanalp et al. (2022); Goldberg and Hannaoui (2026); McCauley, Chinn, and Ito (2024); ECB (2025).

relatively small EUR exposures on average. Because the aggregate series are dominated by large holders, we also show that the discrepancy between COFER and median shares is visible in a rolling decomposition of these holders' contribution, something that was not possible before with publicly available data.

Second, analyzing the cross-section of the data reveals that the USD is held extensively across all regions of the world, underscoring its truly global role. By contrast, EUR reserves are more frequently held in the euro area's immediate neighborhood. Furthermore, the disaggregated data show that the EUR relies on a narrower investor base compared to the USD. The top five EUR holders account for almost two-thirds of total reserves in EUR, whereas the top five USD holders account for around one half. However, the EUR's investor base is geographically diverse. While all five of the largest USD holders are located in Asia, two of the five largest EUR holders are located in Asia and three in Europe. This challenges the conventional wisdom that the EUR is only a regional currency (Ilzetzki et al., 2020).

Third, we use a decomposition that highlights two key forces behind these shifts: active diversification, driven by changes in official reserve managers' preferences across currencies; and volume shifts, which occur when the volume of reserves held by economies evolve, while currency preferences remain stable. We apply this decomposition to both our full sample and various subperiods, documenting patterns beyond the 2015–2021 period for the first time, as well as for currencies other than the USD, going beyond Goldberg and Hannaoui (2026). We find that preferences, or active diversification, account for most of the decline in the USD share and the corresponding rise of NRCs. Preference shifts weigh on the USD in all subperiods, while the EUR exhibits a sharp reversal in preferences post-GFC.

Fourth, given the central role of preference shifts, we propose a new decomposition method that separates diversification patterns within the Big Four currencies from those between the Big Four currencies and other currencies. We reveal diversification patterns previously obscured in aggregate data. We confirm that the shift *away* from the Big Four currencies (notably USD and EUR) into NRCs is one part of the story. But our analysis also reveals reallocations *within* the Big Four that were previously hidden in aggregate data: one trend involving a move away from the EUR, GBP, and JPY toward the USD, driven primarily by numerous smaller reserve holders, with the other reflecting a shift in preferences away from the USD toward the EUR, primarily driven by China in the wake of the GFC and the European debt crisis of 2009-2012 and, to a lesser extent, Russia, especially in the early 2000s. Rolling estimates show that the contribution of China, Russia, and Switzerland to the decline in the aggregate USD share has weakened over time: as of end-2024, they explain only about 40% of the decline since 2000, suggesting that diversification away from the USD has since broadened to other reserve holders. This is consistent with the leveling off in the median USD share in the 2020s. The findings help reconcile the otherwise puzzling differences

between the evolution of the aggregate shares of the USD and EUR in global foreign exchange reserves and their respective median shares.

Importantly, our findings do not depend materially on the imputed observations for China. China's diversification away from the USD, and its resulting drag on the reserve-weighted global USD share, is directly supported by official SAFE data. Likewise, the growing importance of the other Big Four reserve currencies and of NRCs in China's FX reserve portfolio is also established using reported data. China imputations are more consequential for the allocation of diversification across the other Big Four currencies. While we provide a plausible allocation of reserve shifts across the EUR, GBP, and JPY when direct information is unavailable, the precise distribution across these currencies, and therefore the estimated contribution of the EUR, remains subject to a degree of uncertainty. Still, our findings receive support from contemporary statements by Chinese officials and press reports in the wake of the GFC and European debt crisis.

Last, we contribute to ongoing discussions about the implications of a potential US retrenchment from military alliances by revisiting estimates of the security premium on the USD—the fact that its dominance as an international reserve currency is buttressed by the US's role as a global military power guaranteeing the security of allied nations. The size of this premium remains a subject of ongoing debate in the literature (see e.g., Cohen, 1998; Williamson, 2012; Kirshner, 2020; Eichengreen et al., 2019; Goldberg and Hannaoui, 2026; Kim, 2025). Using our dataset, we find robust empirical evidence that greater US military presence significantly increases the share of the USD in global FX reserve portfolios. Importantly, this effect is economically significant: a one-standard deviation increase in the number of US troops stationed in a given country is associated with a near 20 percentage point increase in the USD share of that country's reserves. In contrast, geopolitical alignment, measured by U.N. voting patterns, is negatively correlated with the USD share, a result that corroborates the findings of Goldberg and Hannaoui (2026) and earlier studies.

We also validate findings from earlier studies regarding long-term and average trends in COFER data, the sustained long-term trend of diversification into NRCs, and the shift away from the CNY beginning in 2022. Additionally, we provide a detailed breakdown of NRCs into individual currencies, drawing on COFER and other data from prior research. Notably, we confirm that the rise in NRCs is primarily driven by currencies such as the AUD, CAD, Singapore dollar (SGD), New Zealand dollar (NZD), and Indian rupee (INR), rather than exclusively—or even predominantly—by the CNY. These results corroborate the findings of Arslanalp et al. (2022) and challenge earlier predictions that the Chinese currency would surpass the USD or EUR as the dominant global reserve currency (see e.g., Subramanian, 2011; Prasad, 2017, for broader discussions)

Related literature. Our paper contributes to the literature on dominant currencies in the international monetary system. Eichengreen (2011), Rogoff (2025) and Eichengreen (2026) provide overviews of this topic. Early studies primarily focused on theories of leading currencies, emphasizing the effects of network externalities and increasing returns on transaction costs (e.g.,

Krugman, 1979; Rey, 2001). Recent research has explored the trade-offs faced by issuers of major reserve currencies (e.g., Maggiori et al., 2019), the role of policy interventions (Bahaj and Reis, 2020), strategic interactions in global value chains (Mukhin, 2022), interactions between the use of currencies in banking and trading (Gopinath and Stein, 2021), and the importance of liquidity in determining the dominant unit of global debt contracts (Coppola et al., 2023). Related empirical literature investigates the dominant currency paradigm and vehicle currency pricing patterns (e.g., Goldberg and Tille, 2008; Gopinath, 2015; Goldberg and Tille, 2016; Gopinath et al., 2020; Amiti et al., 2022; Boz et al., 2022, 2025). We provide new evidence on the role of both major and non-standard reserve currencies using a uniquely comprehensive database.

A closely related strand of literature empirically examines currency patterns in global FX reserves, including studies such as Eichengreen and Mathieson (2000); Ito and McCauley (2020); Chinn et al. (2022); Arslanalp et al. (2022, 2025); Goldberg and Hannaoui (2026); Laser et al. (2025). We extend this literature by offering a broader and more consistent evidentiary base, incorporating more economies, currencies, and longer time coverage, while using a common gross-asset definition of FX reserves to enhance cross-country comparability. This results in the most comprehensive and up-to-date dataset available on the currency composition of foreign exchange reserves.

Finally, our paper contributes to the rapidly expanding literature on geoeconomics and international financial fragmentation (for a survey, see Mohr and Trebesch, 2024; Clayton, Maggiori, and Schreger, 2025). Theory papers, such as Clayton, Maggiori, and Schreger (2023) and Broner, Martin, Meyer, and Trebesch (2024), have developed models to understand the core drivers of geoeconomic power, such as the ability to coordinate threats across diverse sets of international linkages. Bianchi and Sosa-Padilla (2023) analyze how the use of international financial sanctions for geopolitical purposes can undermine the hegemonic reserve currency status of the USD. Empirical studies provide evidence that military alliances boost the share of a currency in the partner's foreign reserve holdings by 30 percentage points (Eichengreen et al., 2019), that ideological distance between economies affects the size and direction of capital flows (Kempf, Luo, Schäfer, and Tsoutsoura, 2023; Lauwers and Mimir, 2024), and that foreign direct investment (FDI) and portfolio flows increasingly correlate with geopolitical tensions following the war in Ukraine (see Aiyar, Malacrino, and Presbitero, 2024; Gopinath, Gourinchas, Presbitero, and Topalova, 2025). Our distinctive contribution lies in providing new evidence on the extent of diversification, if any, in global reserve portfolios following the war in Ukraine, on the size of the security premium on the USD and—for the first time—other major reserve currencies.

The rest of the paper is organized as follows. Section 2 introduces the dataset. Section 3 discusses the evidence and provides new insights gleaned from the data. Section 4 presents findings from decompositions of shifts in reserve currency shares. Section 5 explores an application of the dataset, revisiting estimates of the global security premium on the USD and other reserve currencies. Finally, Section 6 concludes and highlights key lessons for both research and policy.

2. Data

2.1. Sources

Information on the currency composition of foreign exchange reserves at individual central banks remains fragmented and difficult to access. There is no centralized global reporting system with broad country participation, and disclosure practices vary widely across monetary authorities. We address this gap by constructing a new dataset on the currency composition of central banks' FX reserves that advances previous academic efforts in scope, consistency, and conceptual coverage.

Among publicly available sources, the IMF Data Template on International Reserves and Foreign Currency Liquidity (IRFCL) offers the closest alignment with the definition of reserve currency denomination data as outlined in the IMF's *Balance of Payments and International Investment Position Manual* (BPM7)—the international standard for official reserve statistics.[6] We restrict attention to central banks' foreign currency reserves, which under the IRFCL guidelines are external reserves assets held on non-residents in gross terms,[7] are readily available and fully controlled by the monetary authority, and consist exclusively of foreign currency denominated securities and total currency and deposits. Other reserve assets, including the IMF reserve position, special drawing rights (SDRs), and monetary gold are consistently excluded.[8]

Its standardized format—despite requiring some harmonization—and timely reporting make the IMF Reserve Data Template a key resource, though detailed currency-level breakdowns are available only for 35 economies from 2016 onward.[9] Therefore, to extend country and time coverage, consistent with previous research efforts, we manually compiled reserve currency shares from annual reports, financial statements, and other public disclosures issued by central banks worldwide. These official national sources, which require substantial harmonization, form the backbone of our dataset.

As explained below, our dataset significantly expands country coverage relative to prior studies while striving to maximize cross-country comparability by adhering to a common working definition of foreign exchange currency composition. When information is incomplete, we document detailed metadata describing the denominator's coverage and any deviations from our baseline def-

[6]The BPM7 defines international official reserves as external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, intervening in foreign exchange markets to influence the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, or serving as a basis for foreign borrowing).

[7]Previous datasets do not consistently adhere to this gross asset definition and in some cases mix gross and net (assets minus liabilities) concepts of reserve holdings.

[8]The exclusion of other foreign-currency assets, such as reverse repos, FX derivatives, or non-reserve foreign holdings, depends on data availability and is determined on a country-by-country basis, with priority given to maintaining consistency over time within each country.

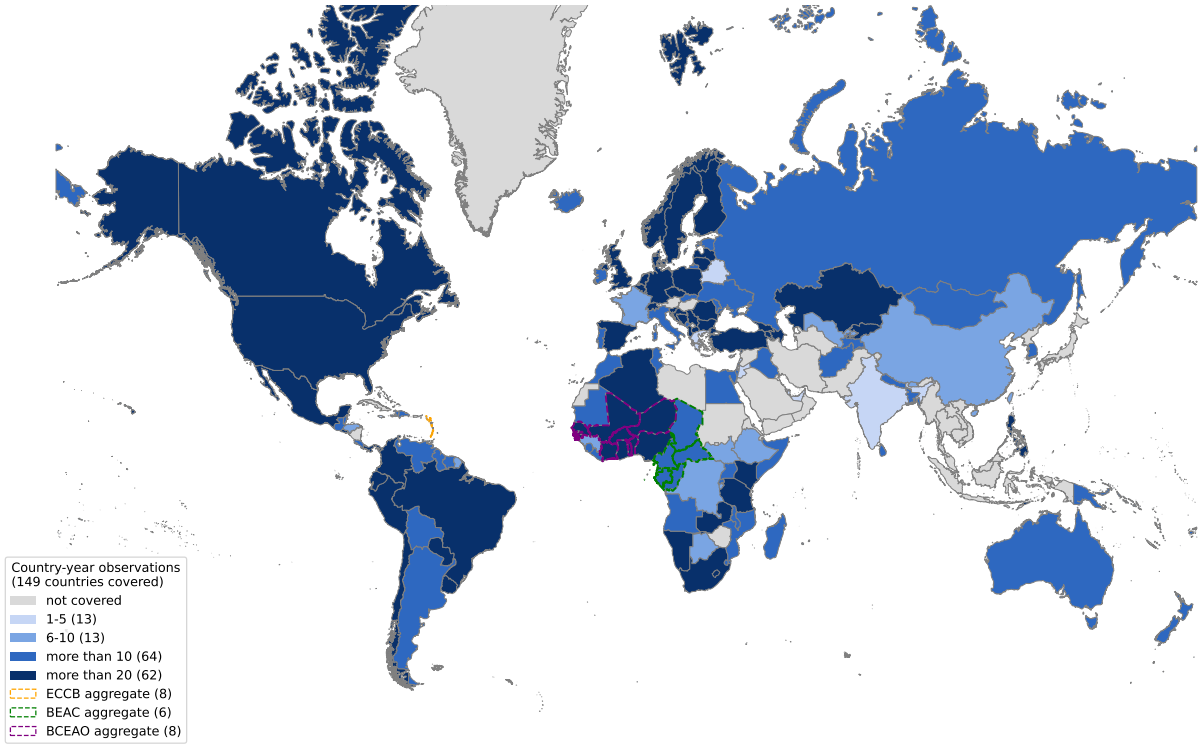
[9]That said, the reserve data template provides a breakdown of SDR and non-SDR currency holdings for 95 economies accounting for about 85% ($11 trillion) of global FX reserves, with data going back to 1999.

inition.[10] Appendix A sets out our working definition of FX reserves, describes data collection from IMF members' Reserves Data Templates and national sources, and details the unofficial sources used for ten economies, along with the imputation methods and external validity checks applied.

2.2. Coverage

Figure 1 illustrates the extensive geographical coverage of our dataset. The map is predominantly blue, with shades indicating the number of annual observations (across all currencies), while gray denotes economies for which no data on reserve currency composition are available. The dataset includes at least one year of observations for 149 economies, broadly coinciding with the number of reporters to the IMF's COFER.[11] Data are missing for a few reserve holders in the Middle East and East Asia, including several large ones. Appendix Table A.6 provides details on the sample.

Figure 1. Geographical coverage of the new dataset



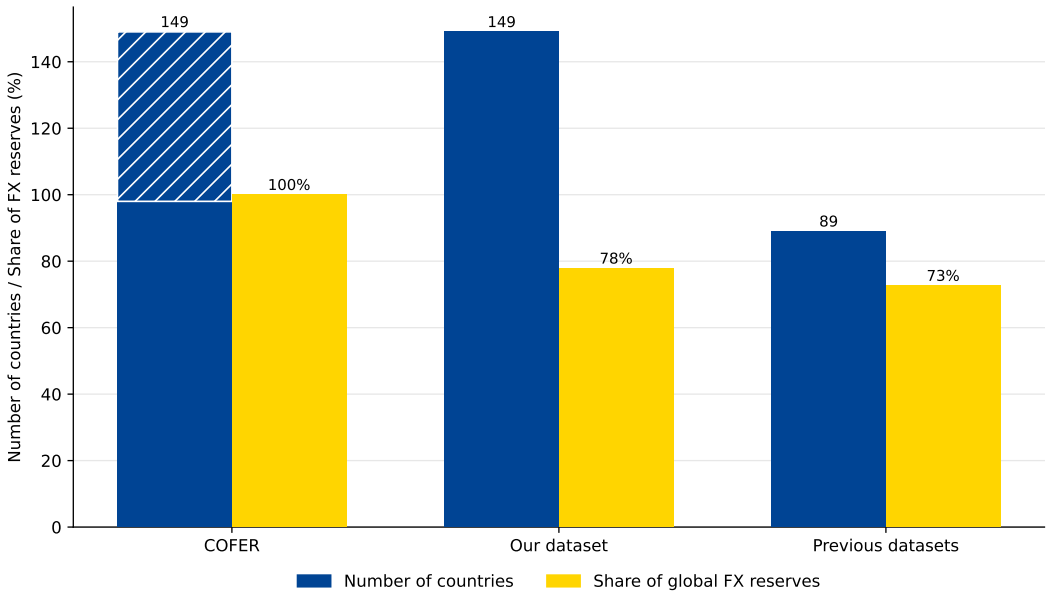
Note: The figure displays the geographical coverage of our dataset on the currency composition of foreign exchange reserves. Different shades of blue represent the number of available annual observations (across all currencies), while economies shown in gray indicate the absence of data.

[10] In some cases, we prioritize consistency within economies over time by avoiding structural breaks in definitions, even if this entails some loss of cross-country harmonization.

[11] We have data for 149 central banks representing 157 economies. Three regional monetary authorities are counted as single entities: the Eastern Caribbean Central Bank (ECCB; covering 8 economies), Banque des États d'Afrique Centrale (BEAC; 6 economies), and Banque Centrale des États d'Afrique de l'Ouest (BCEAO; 8 economies). For the euro area, in addition to the European Central Bank (ECB)'s FX reserves, the Eurosystem national central banks, of which we capture 20, maintain their own reserve portfolios.

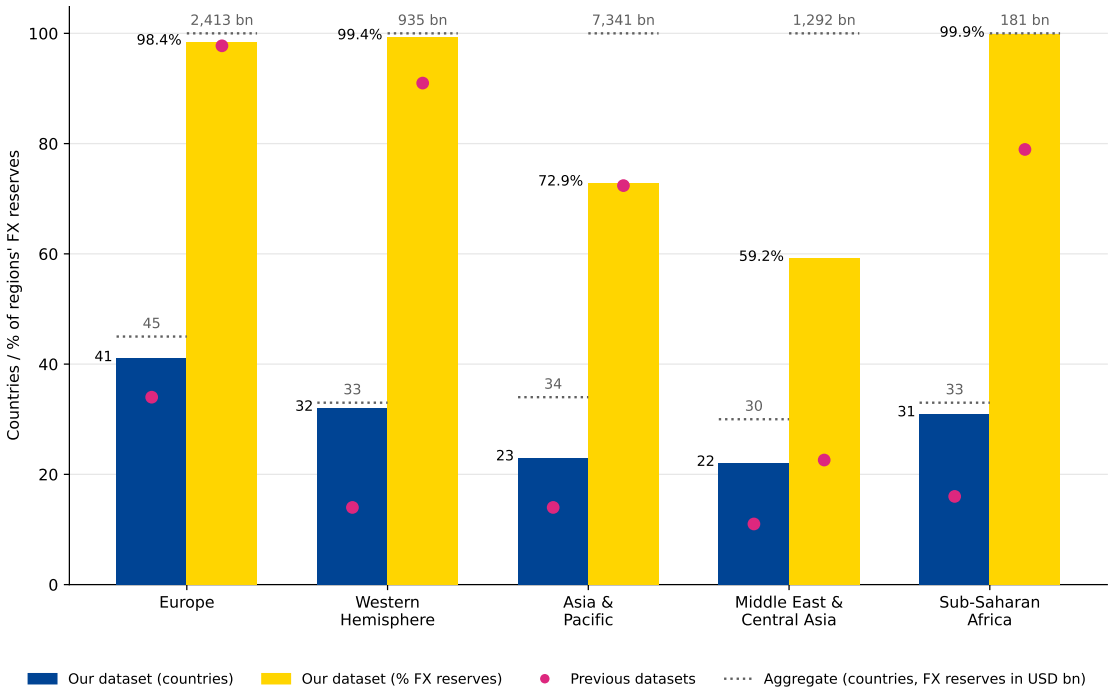
The top panel of Figure 2 compares (i) the number of economies and (ii) the share of global foreign exchange reserves covered by IMF COFER, our dataset, and the previous datasets of Ito and McCauley (2020), Arslanalp et al. (2022) and Laser et al. (2025) pooled together. The bottom panel presents the same comparison by region. As in previous studies, coverage is assessed on the pooled sample, with economies included if data are available for at least one year.[12] The figure illustrates that the main improvement achieved by our dataset relative to previous efforts is its broader country coverage. It encompasses 149 economies, compared with 89 in the pooled previous datasets, an increase of 55%. As shown in the bottom panel, geographical coverage expands across all regions. By contrast, the share of global foreign exchange reserves covered remains broadly comparable to that of earlier datasets (78% versus 73%), with the largest gains observed in Sub-Saharan Africa and the Middle East and Central Asia.[13] Our dataset incorporates all publicly available information on the currency composition of FX reserves. Even so, incomplete disclosure by several major reserve holders remains a challenge, and for five of them (India, Japan, Hong Kong, South Korea, and Taiwan) we have limited or no official data.

Figure 2. Comparing the new dataset against previous datasets



[12]Note that our dataset includes eight economies—Taiwan, India, Qatar, the United Arab Emirates, Algeria, Lebanon, Jordan and Belarus—whose currency decomposition is inferred exclusively from unofficial sources (see Appendix Table A.7). Together, they represent 12% of global FX reserves. Previous datasets included two of these economies (Taiwan and India), also based on news sources, accounting for 9.1%.

[13]Although our dataset covers a broadly similar share of global reserves as earlier datasets, a single coverage metric that pools all currencies and years together understates the dataset's breadth and the extent of harmonization across economies. It is silent on the number of currencies reported by each country, the length of the available time series for each country-currency pair, and the extent to which reserve definitions are made comparable across economies and over time.



Note: The top panel compares (i) the number of economies and (ii) the share of global foreign exchange reserves (based on 2024 reserve holdings) in our dataset (middle bars) with previous datasets of Ito and McCauley (2020), Arslanalp et al. (2022) and Laser et al. (2025) pooled together (right bars) relative to IMF COFER (left bars). Bars representing COFER-unlisted reporters are hatched. The bottom panel presents the same comparison but broken down by region.

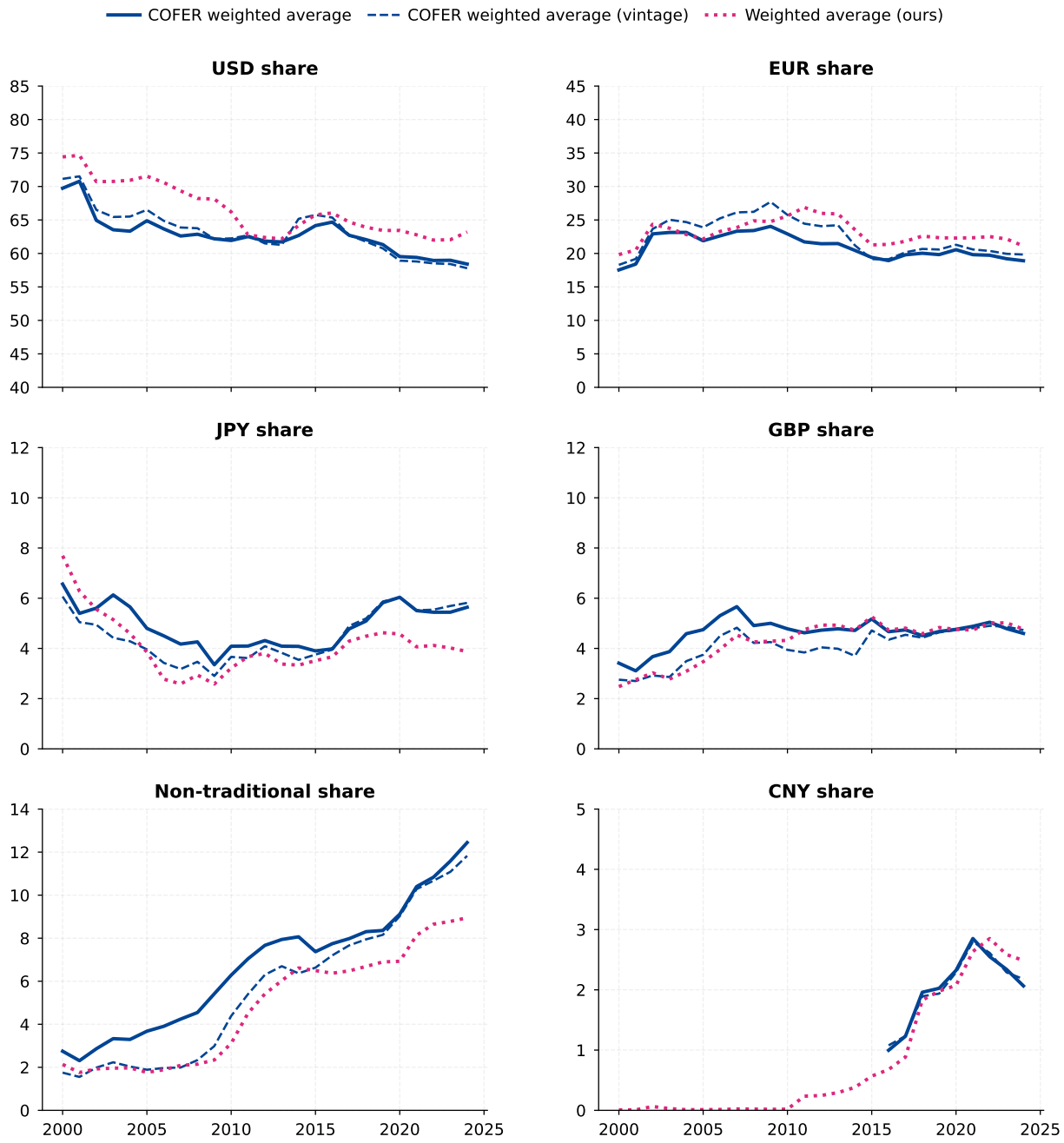
Finally, we compare the level and evolution of aggregate reserve currency shares implied by our dataset with those reported in COFER. Although our dataset is not intended to replicate COFER and inevitably faces coverage limitations, particularly for some large reserve holders in the Middle East and East Asia, as discussed above, this comparison provides a useful benchmark for assessing whether the patterns documented in the remainder of the paper are broadly consistent with global reserve trends.

To facilitate such comparison, we extend the raw data using a set of imputations intended solely to construct consistent aggregate time series and to mitigate distortions arising from missing observations (e.g., country entry and exit) and incomplete coverage of global reserve holdings.[14] Similarly, COFER was recently revised to replace the previously unallocated reserves with imputed currency allocations (Kwende and Nephew, 2025).[15] Figure 3 presents the resulting aggregate reserve currency shares.

[14]Missing currency shares within available country series are linearly interpolated, while those outside observed periods are generally assumed constant, subject to consistency with aggregate SDR currency shares. For a few major reserve holders, however, country-specific information permits more tailored imputations, notably for China, India, and Japan. Further details are provided in Appendix A.4. These imputations are used primarily for the aggregate comparisons presented in this section, unless otherwise noted.

[15]While the unallocated component has averaged around 7% of global FX reserves since 2018, it was substantially larger in earlier years, reaching as high as 46% at end-2013 (Figure B.27).

Figure 3. Comparison with COFER weighted currency shares



Note: The figure presents a comparison between the weighted average currency shares in central banks' FX reserves from our sample and the COFER currency shares (weighted average across all allocated reserves). It also shows the vintage COFER series—excluding imputations—prior to the December 2025 revision, after which IMF staff began imputing previously unallocated reserves to provide a complete currency composition covering 100 percent of global FX reserves. For this comparison, the weighted currency shares in our sample are drawn from an extended dataset that incorporates not only raw data but also interpolated shares and back-/extrapolated constant currency shares for missing observations, subject to constraints that preserve available aggregate SDR basket shares and aggregate shares for other residual currencies. Additionally, for China, India, and Japan, we apply specific imputation methods for their currency shares. For further details on the imputation methodology, see Appendix A.4.

In a nutshell, the aggregate (weighted-average) reserve currency shares implied by our dataset closely mirror those reported in COFER, despite inevitable differences in coverage and methodology. Although some differences in levels remain, the correspondence is particularly strong in the evolution of currency shares over time, not only for the USD and EUR but also for JPY, GBP, and NRCs such as CNY (see Appendix Figure B.28 for other currencies). Several differences nonetheless warrant discussion. Perhaps most notably, while our dataset captures the decline in the USD's share of global reserves during the early 2000s and the corresponding rise in the EUR and, to a lesser extent, the GBP, these movements are somewhat more muted than in COFER. The USD share is also generally higher in our dataset prior to 2015, though the gap narrows thereafter.

These discrepancies may reflect several factors. First, deviations may arise even for country-years covered by both datasets, reflecting differences between information reported confidentially to COFER and that available from public sources, as well as differences in reserve definitions, reporting practices, and instrument coverage. Second, unlike COFER, our dataset does not cover all reserve holders, even after the imputations described above, notably several large reserve-holding economies in the Gulf and East Asia. As their reserve portfolios may differ systematically from the global average, the effect of their omission on aggregate currency shares is ambiguous.[16]

Last but not least, differences in imputation methodologies may matter.[17] China is a particularly important case in this regard. Given its weight in global reserve holdings, assumptions regarding China's reserve currency composition prior to its gradual participation in COFER beginning in 2015 are arguably a major source of divergence between the two series. Consistent with this interpretation, the discrepancy is largest during the period when COFER's unallocated component was most prominent: more than 40% of global FX reserves were unallocated between 2008 and 2014, much of it attributable to China (see Appendix Figure B.27). Our approach is fully documented in Appendix A.4. Specifically, we combine official SAFE disclosures for 1995 and 2014–19 with an unofficial estimate reported by the state-run *China Securities Journal* for 2010. Missing observations for the USD share are then imputed using linear interpolation before 2000, changes in aggregate COFER USD reserve shares through 2005, and changes in adjusted TIC data thereafter. COFER does not disclose how the currency composition of Chinese reserves was allocated.[18]

[16] If Gulf economies, notably Saudi Arabia (USD 454 billion in FX reserves in 2024), hold disproportionately large USD reserves, their omission would tend to lower the aggregate dollar share implied by our data. By contrast, several East Asian reserve holders outside our sample, including Singapore, Thailand, Indonesia, Malaysia, and Vietnam (collectively holding about USD 970 billion in FX reserves in 2024), may exert the opposite effect if they maintain more diversified reserve portfolios than the global average.

[17] Our simplifying assumption that currency shares remain constant outside observed periods, particularly when extrapolating backward, is restrictive. However, given the secular decline in the USD's share, this assumption would, if anything, bias early-period USD shares downward rather than upward.

[18] Introduced in December 2025 and applied retrospectively to 2000 onward, the revised COFER series uses a combination of stratified-mean, carry-forward, and mixed-method imputations (Kwende and Nephew, 2025). The methodology treats reserve-currency issuers as a separate subgroup ("Reservia"), excluding them from the stratified-mean allocations used for other economies. The note provides fewer details

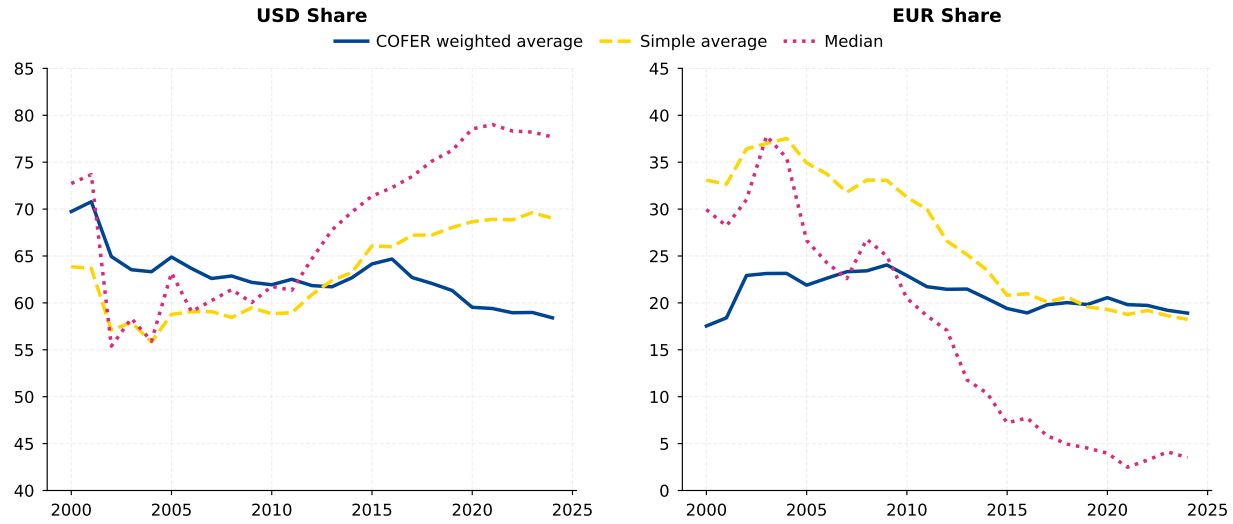
Consequently, COFER may not necessarily be viewed as a fully observed benchmark over this period. Rather, both series inevitably rely on imputations for a sizable share of global reserves, and differences between these assumptions may account for part of the observed divergence.

3. Beyond aggregates: New country-level evidence

3.1. The USD and EUR

The new data enable us to revisit evidence on the dominance of the US dollar in global foreign exchange reserves. To recall, according to the IMF COFER survey, the USD share fell from 71% in 1999 to 58% in 2024, a drop of 13 percentage points (see the blue line in Figure 4, left panel). Our newly assembled disaggregated data for up to 149 reserve holders allow us to move beyond aggregate COFER statistics.

Figure 4. USD and EUR shares in FX reserves since 2000—Unpacking aggregate trends



Note: The figure shows time series of USD and EUR shares in central banks' foreign exchange reserves, contrasting the COFER aggregate (weighted average across all allocated reserves) with the simple average and median across central banks in our sample. For each currency, the issuer country is excluded (e.g., USD excludes the US, EUR excludes euro-area issuers and the ECB). The series based on our dataset use raw data, linearly interpolated for missing values.

Comparing the aggregate reserve composition with those of the average and median reserve holder reveals a striking divergence. The USD share of both the average and median reserve holder

on the general imputation procedures applied to economies within that Reservia subgroup, which notably includes China, whose reserves accounted for a substantial share of the formerly unallocated component before 2015 (see Appendix Figure B.27). Appendix Figure B.29 presents back-of-the-envelope calculations indicating that, even under implausibly low assumptions about the USD share of other non-reporting economies in COFER, the implied USD share of China's reserves remains below 60% in 2008 and 2010, well below our estimate of roughly 65%.

has increased steadily since the 2010s, even as it has declined in the aggregate (see the red dotted line and the yellow dash line in Figure 4). By these metrics, there is little evidence of a broad-based erosion of the USD's role as an official reserve currency, notwithstanding some flattening in recent years. Rather, the secular decline in its aggregate share of global FX reserves reflects, to a significant extent, a shift from USD to EUR by large reserve holders, a point to which we return below.[19]

The new data also shed light on the traditional narrative regarding the internationalization of the EUR over the past quarter century. According to aggregate COFER data, from its launch in 1999, the EUR's share in global foreign exchange reserves steadily grew, and by the mid-2000s, it had cemented its status, alongside the USD, as a key international currency (Figure 4, right panel). However, in the aftermath of the GFC, the EUR's share fell and has hovered since then around 20%, only slightly above its initial level at launch. The stall of the EUR has been highlighted previously in Ilzetzki et al. (2020), Maggiori et al. (2019), and ECB (2025). Yet, a comparison with the average and median reserve holder, enabled by our disaggregated data, reveals a much sharper decline than aggregate data suggest. Both metrics have trended downward since the mid-2000s, accelerating during the euro-area sovereign debt crisis. By 2015, the simple-average share had converged to the aggregate EUR share and stabilized at around 20%, while the share held by the median reserve holder continued to decline, falling below 5%. In other words, many official reserve holders worldwide hold relatively few euros, and if the aggregate EUR share remains steady, it is, again, largely due to large reserve holders (more on this below).[20]

Next, we examine the evolution of USD and EUR simple-average shares in central banks' foreign exchange reserves across alternative country groups. Again, the average reserve holder tells a different story. The first row of Figure 6 splits economies into advanced economies versus emerging market and developing economies (EMDE). The average reserve holder among advanced economies has maintained a USD share of around 60% since the GFC, broadly in line with the aggregate COFER share. By contrast, the average reserve holder in emerging market and developing economies has persistently over-weighted the USD since the GFC, with USD shares rising to around 70% by the late 2010s and remaining at that level thereafter. While USD shares among

[19] Unlike the aggregate reserve-weighted share, both the arithmetic average and the median weight economies equally. The median is additionally more robust to outliers.

[20] Appendix Figure B.30 assesses the role of sample composition. Our sample is unbalanced, with country coverage increasing from 104 (92) in 2010 to a peak of 137 (119) for USD (EUR) in 2020. While changes in sample composition are generally more consequential for reserve-weighted than unweighted statistics such as arithmetic averages and medians, they are not innocuous in our setting. economies entering the sample after 2010 tend to exhibit higher USD shares and lower EUR shares than incumbent reporters, mechanically contributing to the post-2010 increase in average USD shares and decline in average EUR shares. However, both patterns are already evident among economies reporting prior to 2010. Sample expansion therefore amplifies, but does not drive, the trends for the average and median reserve holder documented above.

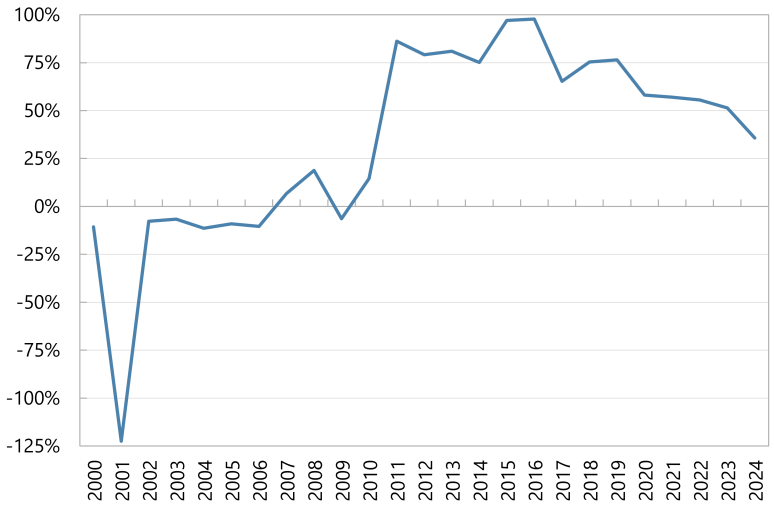
EMDEs trended downward during the 2000s, there is no evidence that they have, on average, lost interest in the USD since the GFC.

The picture for the EUR stands in stark contrast. Advanced economies have remained significantly overweight in EUR reserves, with average shares ranging from 50–60% before the GFC to 30–40% post-GFC, compared to the EUR's aggregate share of approximately 20%. In contrast, emerging markets and developing economies have been underweight, with the average share dropping below 20% post-GFC. Strikingly, for both groups of official reserve holders, the average EUR share has declined steadily since the GFC and has shown no meaningful signs of recovery, stabilizing instead at substantially lower levels from the mid-2010s onward.

The middle row of Figure 6 presents evidence by reserve-holder size. The USD is widely held across economies of all reserve sizes, but exposures are particularly strong among medium and small reserve holders. This overweighting widened over time: while large reserve holders maintained USD shares of around 60%, average USD shares among the other reserve holders rose to 70–75%. In contrast, for the EUR, large and medium reserve holders held comparable shares prior to the GFC. EUR shares subsequently declined across all groups, although the decline was substantially more pronounced among medium and small reserve holders. By the end of the sample, large reserve holders still held EUR shares approximately 10 percentage points higher than medium and small reserve holders. These patterns further underscore the disproportionate role of a small number of large reserve holders in shaping aggregate reserve currency shares.

Figure 5 makes this point visually by showing, on a rolling basis, how much of the change in the aggregate USD share since 2000 can be accounted for by China, Russia, and Switzerland. These economies contribute significantly to the COFER trend, particularly from 2011 onward, but their contribution has declined over time. As of end-2024, they explain only about 40 percent of the decline in the USD share since the turn of the millennium. This suggests that what began with China, Russia, and Switzerland in the 2010s may by now be spreading to other reserve holders, which is consistent with the leveling off in the median USD share in the 2020s shown in the right panel of Figure 4. A rolling window also avoids the sensitivity to the choice of subperiods that a fixed-window split would entail.

Figure 5. Contribution of China, Russia and Switzerland to decline in the USD share of COFER since 2000

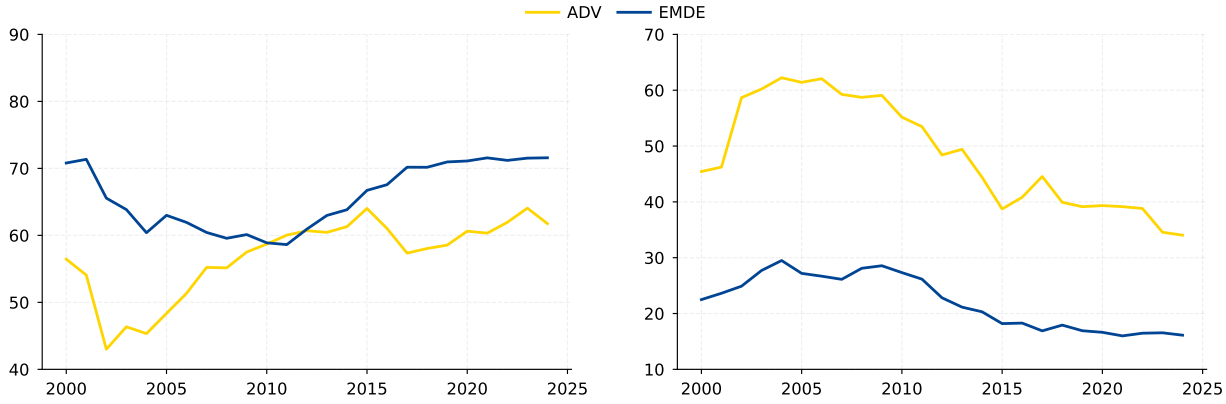


Note: The figure shows contribution of China, Russia and Switzerland to the decline in the USD share of COFER since 2000 on a rolling basis.

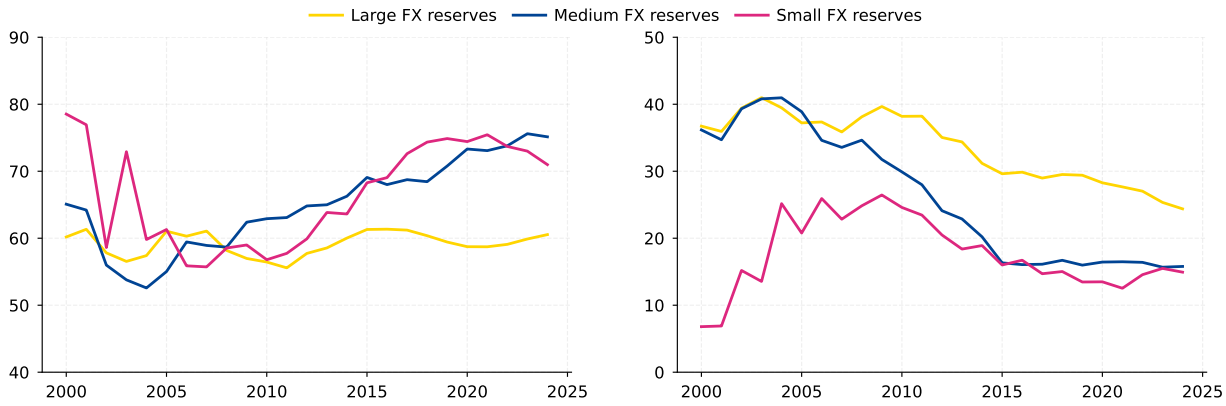
Finally, the bottom row of Figure 6 analyze the data by region of origin. Clearly, the USD is held extensively across all regions of the world, underscoring its truly global role. The Western Hemisphere exhibits by far the highest average USD shares, consistently exceeding 90% throughout the sample. The Middle East and Central Asia follows, many of whose economies are commodity exporters, with average USD shares reaching nearly 80%, following a marked increase after the GFC. Interestingly, Sub-Saharan Africa has also become increasingly exposed to the USD, with average shares rising steadily throughout the sample period. The Asia-Pacific region maintains average USD shares of around 60%, broadly in line with the aggregate COFER share, while Europe exhibits the lowest USD exposure, with average shares fluctuating between 40–50%, reflecting the regional prominence of the euro. Notably, all non-European regions hold average USD shares above the aggregate COFER benchmark. By contrast, EUR reserves are more frequently held in the euro area's immediate neighborhood. The EUR's average share range between 50–60% in Europe, reflecting its dominant role within the region. Outside Europe, however, the euro's role is considerably more limited. Following the GFC, average shares declined across all other regions, most notably in Sub-Saharan Africa and in the Middle East and Central Asia, before stabilizing at low levels. By the end of the sample, average EUR shares stood below 20% in every non-European region and in the low single digits in Asia-Pacific and the Western Hemisphere.

Figure 6. USD and EUR *average* shares in FX reserves since 2000—Alternative groups

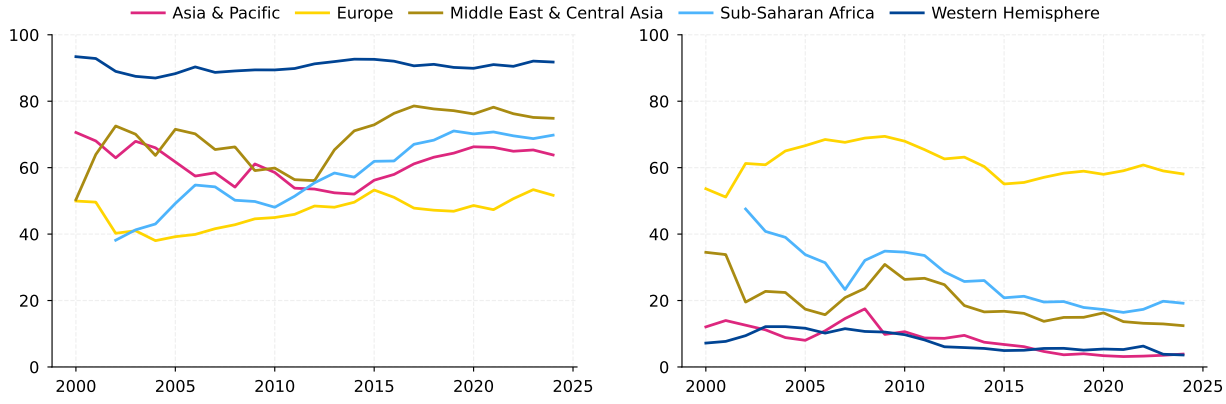
(a) By type of economy *(USD: left panel, EUR: right panel)*



(b) By size of reserve holder *(USD: left panel, EUR: right panel)*



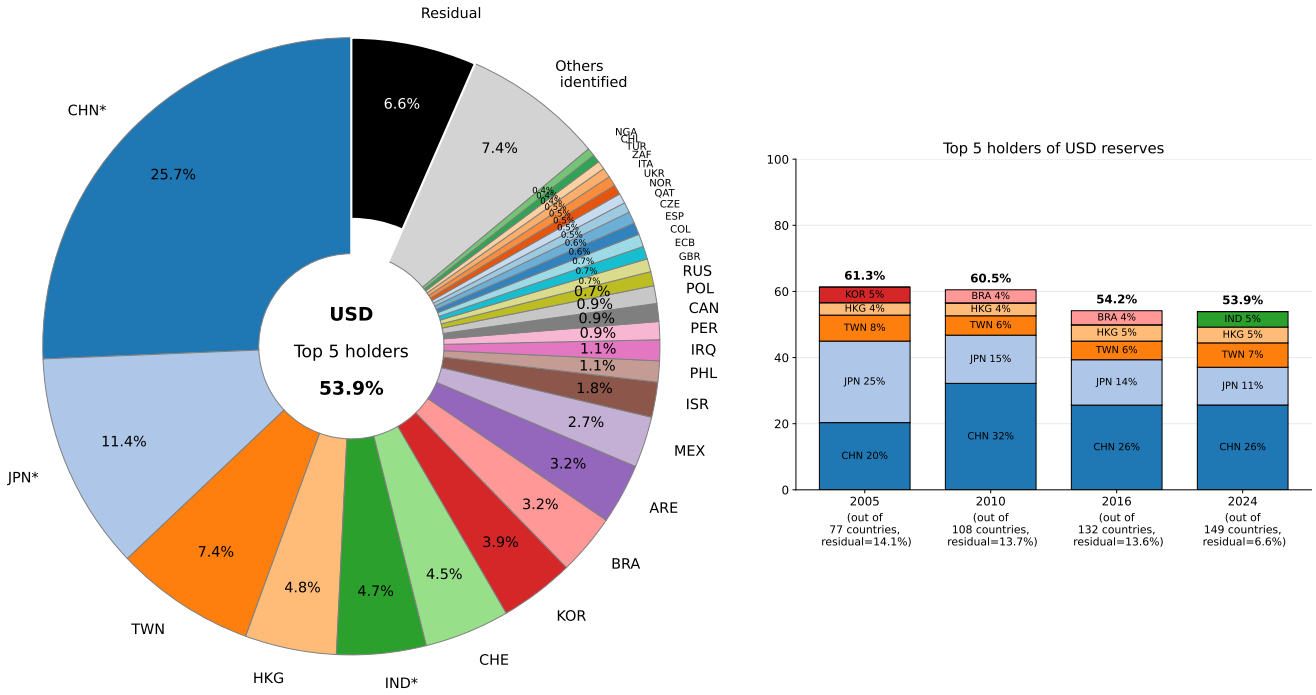
(c) By region *(USD: left panel, EUR: right panel)*



Note: The figure shows the time series of USD and EUR simple average shares in central banks' foreign exchange reserves across alternative country groups, categorized by type of economy (top row), size of reserve holder (middle row), and region (bottom row). Dollar shares are displayed in the left panel charts, while euro shares are shown in the right panel charts. For each currency, the corresponding issuing country is excluded. The series are based on raw data, with missing values linearly interpolated.

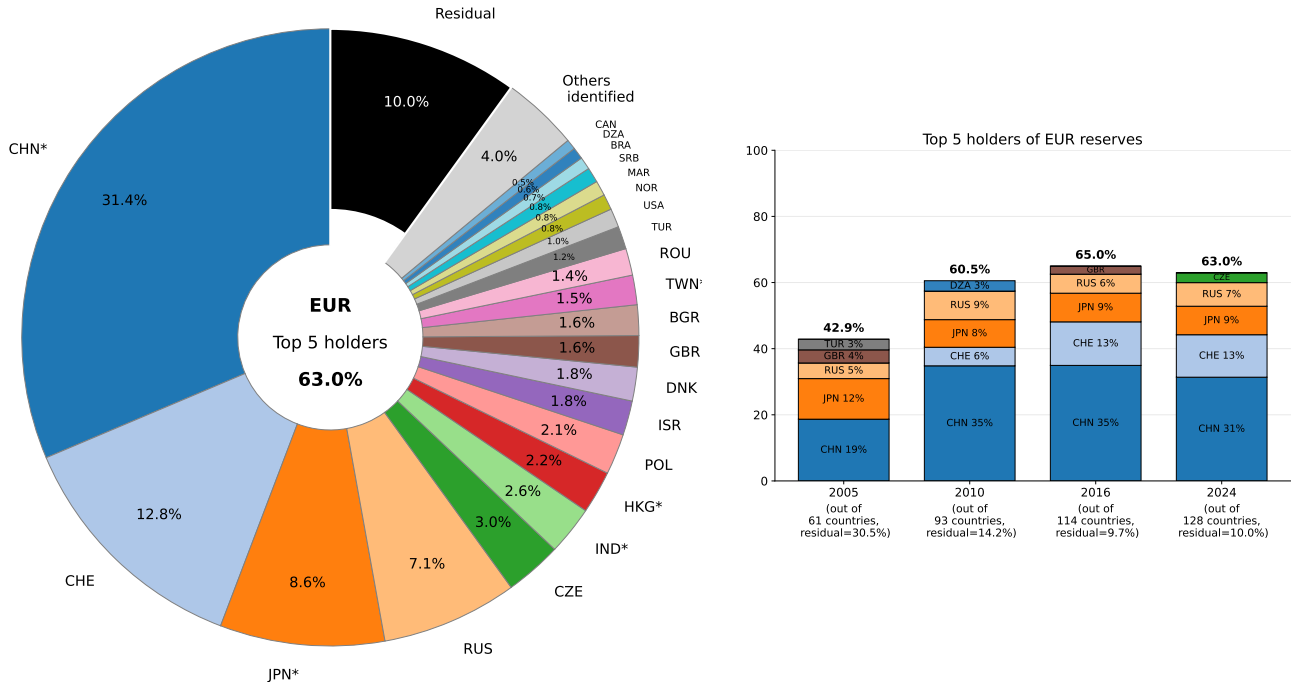
Who holds USD and EUR reserves? Figures 7 and 8 address this question, providing evidence with such granularity for the first time. In each pie chart, slices represent the share of total USD or EUR reserves covered in COFER in 2024 held by the respective country. A supplementary chart reports the share accounted for by the five largest holders in selected earlier years. According to our compiled data, supplemented with the imputations described earlier, the five largest holders of USD reserves are China (with a share of 25.7%), followed by Japan (11.4%), Taiwan (7.4%), Hong Kong and India (each just under 5%). For EUR reserves, the top five holders are China (31.4%), Switzerland (12.8%), Japan (8.6%), Russia (7.1%), and Czechia (3.0%).

Figure 7. Breakdown of USD reserve holdings by country, end-2024 (or latest)



Note: The figure decomposes, by the country of origin of official reserve holders, total FX reserves denominated in USD reported in the IMF COFER database, totaling USD 7.201 trillion in 2024. Only economies with at least USD 30 billion in USD reserves are shown separately. Each pie slice represents a country's share of global USD reserves, based on country-level currency holdings in 2024 or the latest available year, notably RUS (2021), ARE (2010), and QAT (2005) among those labeled in the figure. For CHN*, the USD share is anchored to the last reported value of 55% in 2019 and projected through 2024 to 57%, assuming that its subsequent evolution follows that of a TIC-adjusted proxy for Chinese USD reserves. USD shares for IND* and JPN* are estimated. See Appendix A.4 for details.

Figure 8. Breakdown of EUR reserve holdings by country, end-2024 (or latest)



Note: The figure decomposes, by the country of origin of official reserve holders, total FX reserves denominated in EUR reported in the IMF COFER database, totaling USD 2.331 trillion in 2024. Only economies with at least USD 10 billion in EUR reserves are shown separately. Each pie slice represents a country's share of global EUR reserves, based on country-level currency holdings in 2024 or the latest available year, notably DZA (2022) and RUS (2021) among those labeled in the figure. For TWN* (2015) and HKG* (2002), euro shares are extrapolated by holding constant its weight within non-USD SDR currencies, measured as the reported SDR-currency share net of the reported USD share. For CHN*, the euro share is anchored to an unofficial 2010 benchmark; its weight within non-USD SDR currencies, measured as the reported SDR-currency share net of the estimated USD share, thereafter follows the corresponding weight in global COFER. IND* and JPN* EUR shares are estimated. See Appendix A.4 for details.

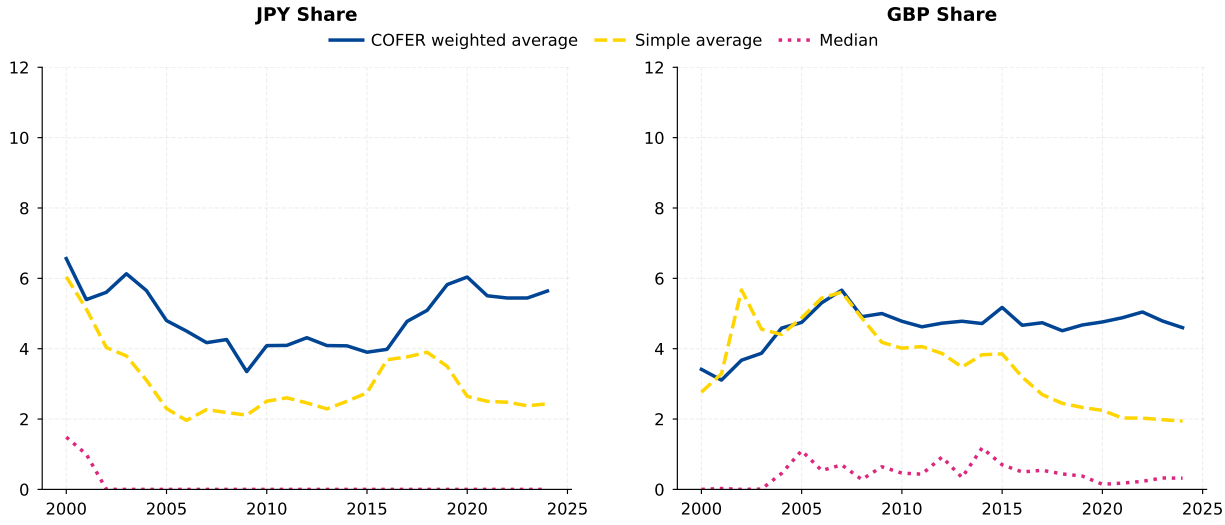
The charts clearly demonstrate that the EUR relies on a narrower investor base than the USD. In 2024, the five largest holders accounted for 63.0% of total EUR foreign exchange reserves, compared with 53.9% of total USD reserves. Interestingly, back in 2010, both currencies exhibited the same degree of concentration, with the top five holders accounting for 60.5% of reserves. Since then, however, EUR reserve holdings have remained highly concentrated among a handful of large holders, whereas concentration among USD holders has fallen substantially, reflecting in part the declining USD shares in the reserve portfolios of China and Japan, as well as their reduced weight in global foreign exchange reserves more broadly. At the same time, the EUR's investor base appears geographically more diverse than that of the USD. While all five of the largest USD holders are located in Asia, two of the five largest EUR holders are located in Asia and three in Europe. This pattern reflects the dominant weight of Asian economies in global foreign exchange reserves, which account for roughly 60% of the world total. Thus, while the EUR is most intensively held in the immediate neighborhood of the euro area, as shown above, even relatively modest EUR portfolio allocations in Asia translate into sizeable EUR holdings.

3.2. Other currencies

Our disaggregated data provide novel insights into the remaining reserve currencies as well. The left panel of Figure 9 demonstrates that the simple average broadly tracks the aggregate COFER share of the JPY, although it remains consistently below it. The yen has markedly lost its appeal among the average reserve holder since 2000, with its simple-average share fluctuating around 3% since 2005, roughly half its level in the early 2000s. Notably, the increase in the aggregate COFER share observed after 2015 is only weakly reflected in the simple average, suggesting that the recovery in aggregate JPY holdings may have been driven disproportionately by a small number of large reserve holders. This interpretation is reinforced by the fact that the median reserve holder holds no JPY at all. This trend might be attributed to the unattractive remuneration on JPY-denominated debt securities: benchmark interest rates from the Bank of Japan have remained close to zero or even negative throughout most of the period, despite the safe-haven properties of the JPY during global risk-off episodes.

As regards GBP, the simple average share broadly tracks the aggregate COFER share during the early 2000s (Figure 9, right panel). What stands out, however, is the steep decline in the simple average share after 2005, in contrast to the broadly stable aggregate series. Together with the persistently low median share, this suggests that the apparent stability of GBP reserve holdings in aggregate statistics may mask a declining role for the currency in the portfolios of most reserve holders.

Figure 9. JPY and GBP shares in FX reserves since 2000—Unpacking aggregate trends

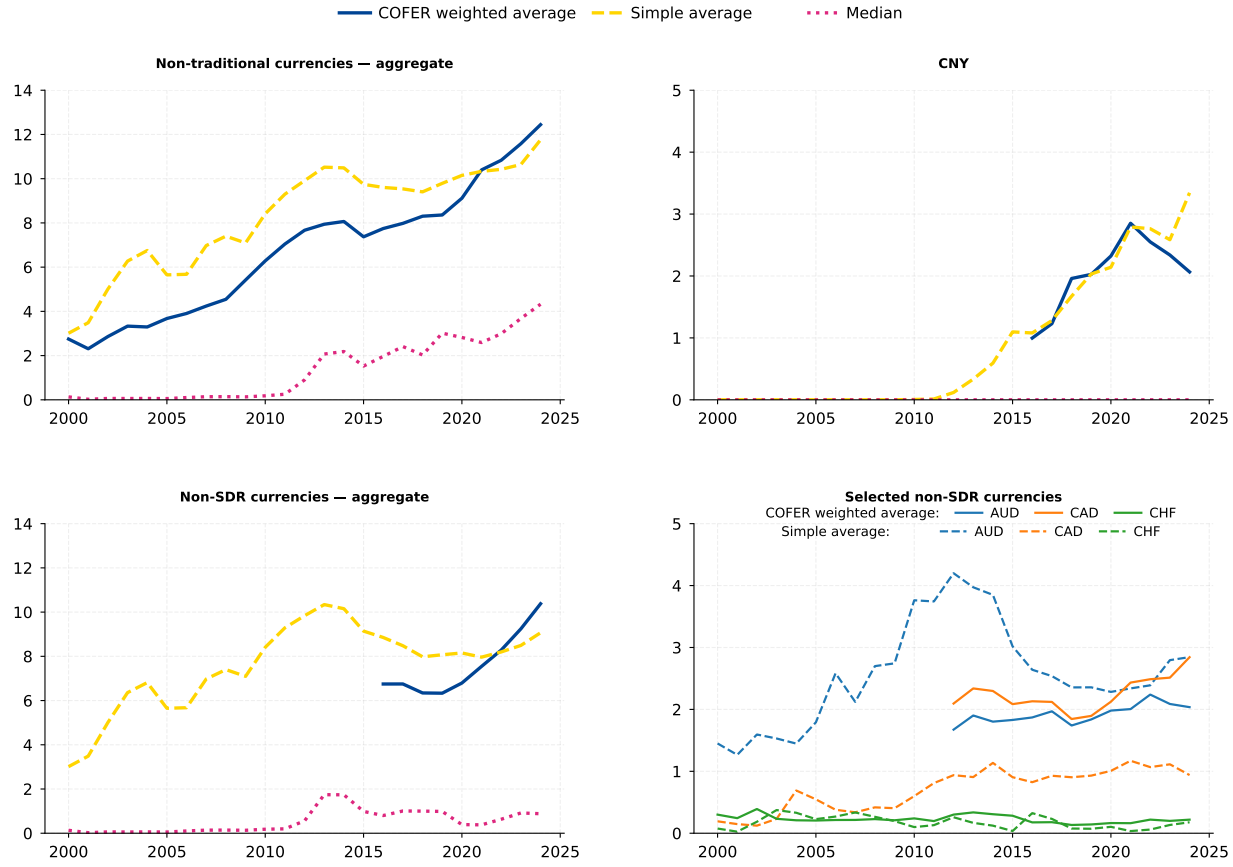


Note: The figure presents the time series of JPY and GBP shares in central banks' foreign exchange reserves, contrasting the COFER aggregate (weighted average across all allocated reserves) with the simple average and median across central banks in our sample. The series based on our dataset utilize raw data, linearly interpolated for missing values.

Finally, our new dataset confirms and extends previous insights into the rise of NRCs, namely

the CNY and other currencies not included in the SDR basket. The declining aggregate share of the USD in global FX reserves has coincided with a notable rise in the share of NRCs. Arslanalp et al. (2022, 2025) argue that these currencies appeal to reserve managers because they offer diversification and higher yields, while also becoming increasingly accessible due to advances in electronic broking systems and trading platforms. The left panel of Figure 10 illustrates the steady rise in the COFER aggregate share of NRCs, from around 2% in the early 2000s to above 12% in 2024. Interestingly, the simple-average share exceeds the aggregate share throughout most of the sample, suggesting that NRC allocations are not confined to a handful of large reserve holders and that their adoption has been broad-based, corroborating the findings of Arslanalp et al. (2022). At the same time, the persistently lower median share points to considerable heterogeneity across reserve holders. Nevertheless, the median has also risen steadily since the early 2010s, indicating that NRCs have gradually gained traction even among the typical reserve holder, albeit from a low base.

Figure 10. Non-traditional currencies (NRCs) in FX reserves since 2000



Note: The figure presents the time series of the share of non-traditional currencies (CNY and non-SDR currencies) in central banks' foreign exchange reserves. It contrasts the COFER (reserve-weighted) aggregate with the simple average and median across central banks in our sample (an unbalanced dataset) in the top-left panel. When available, this share is further disaggregated into CNY (top-right panel) and non-SDR currencies (bottom-left panel). Additionally, depending on data availability, the evolution of the shares of selected non-SDR currencies is presented in the last panel.

The right panel of Figure 10 provides additional insights into the evolution of the CNY in global FX reserves. Although the median reserve holder reported no CNY holdings throughout most of the sample period, the currency gradually gained a modest foothold in reserve portfolios during the early 2010s and experienced a further acceleration following the IMF's 2015 decision to include the CNY in the SDR basket, effective in 2016. During this phase, the simple-average share closely tracked the aggregate share, suggesting that the rise of the CNY reflected both broader adoption across reserve managers and rising allocations among larger holders. In line with the observations of Arslanalp et al. (2025), the growing role of the CNY in global reserve portfolios was driven in part by Russia, which substantially increased its CNY holdings prior to the invasion of Ukraine.[21]

However, this pattern changed after 2021. While the aggregate share of the CNY in global reserves declined from its peak to around 2% by 2024, the simple-average share continued to rise and remained above 3%. This divergence suggests that the recent decline in the aggregate CNY share has been driven primarily by a limited number of larger reserve holders reducing their allocations, whereas the use of the CNY among the average reserve holder has continued to expand. Several factors have been suggested as contributing to this reversal in the CNY's aggregate reserve share including China's continued maintenance of capital controls, higher interest rates on alternative reserve assets, rising geopolitical tensions, and deteriorating economic prospects for China (see, for example, Arslanalp et al. (2025) and ECB (2025)). Nevertheless, our results indicate that the aggregate decline should not be interpreted as a generalized retreat from the CNY. Rather, it reflects considerable heterogeneity across reserve managers, with reductions among a relatively small number of large holders partly offset by continued adoption and accumulation elsewhere.[22] The top panel of Figure 11 demonstrates that Russia remains by far the largest holder of CNY reserves, accounting for one-third of the known global total under the assumption that its reported reserve composition remained unchanged after 2021. However, other economies in the

[21]The share of CNY-denominated assets in Russia's reserve portfolio rose from virtually zero to 3.4% in 2017, before jumping to 17.3% in 2018 and reaching 21.8% in 2021, the last year for which reserve composition data are publicly available.

[22]While the absence of publicly available reserve composition data for Russia, the world's largest holder of renminbi reserves, after 2021 makes it difficult to assess its contribution to the subsequent decline in the aggregate CNY share, Arslanalp et al. (2025) conjecture that the Bank of Russia may have liquidated part of its renminbi holdings when intervening to support the ruble following the imposition of Western sanctions. Beyond Russia, our country-level evidence sheds light on the sources of the subsequent decline. Between 2021 and 2024, 24 economies increased their reported CNY holdings by a cumulative USD 16.1 billion. However, only eight economies increased their holdings by more than USD 100 million, led by Brazil (USD 11.6 billion), Mexico (1.6 billion), Uzbekistan (0.8 billion), and Colombia (0.6 billion). Over the same period, 36 economies reduced their CNY holdings by a cumulative USD 21.8 billion. Of these, 21 economies recorded declines exceeding USD 100 million, with the largest reductions observed in Switzerland (USD 5.6 billion), Argentina (2.5 billion), and Czechia (2 billion). Several other reserve managers, including Peru, Nepal, the Philippines, Chile, Türkiye, Israel, and Nigeria, also recorded notable declines.

Global South—such as Argentina, Brazil more recently, Algeria, Mexico, and South Africa—are also notable holders, together holding more than 20% of the known total.[23]

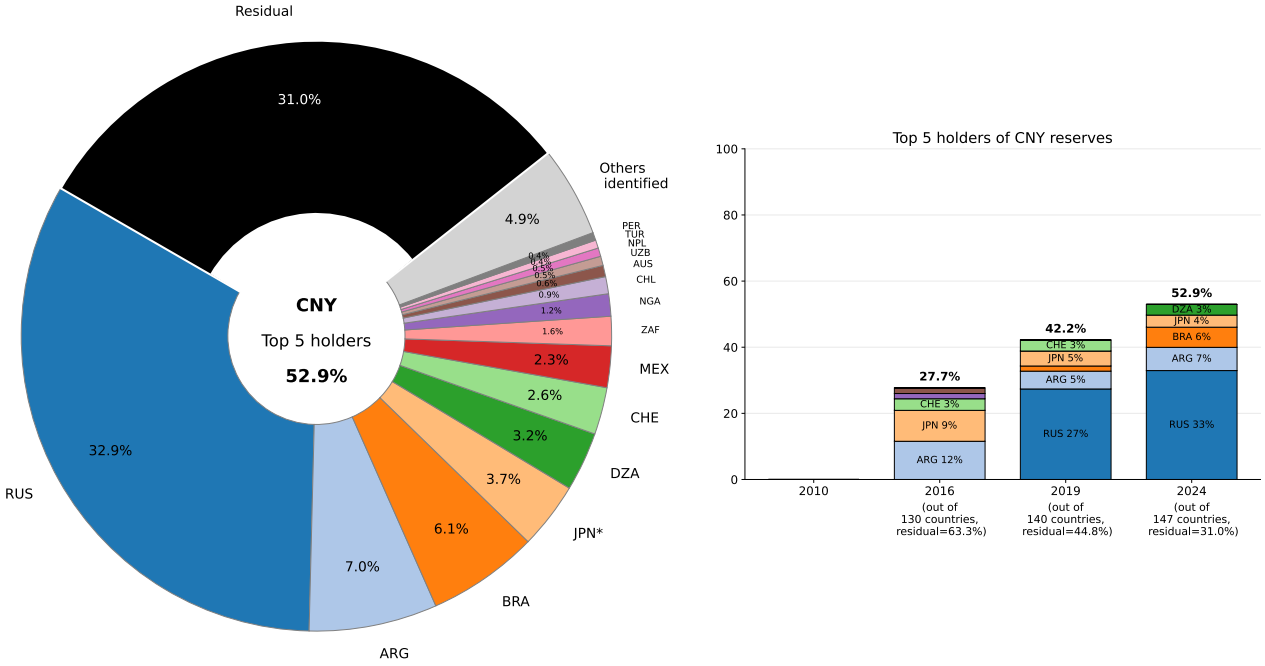
While RMB internationalization in global FX reserves shows signs of stalling, the share of other non-traditional reserve currencies continues to rise steadily and unequivocally (see the bottom-left panel of Figure 10). Interestingly, this trend long predates the emergence of the CNY as a reserve asset. Appendix Figure B.28 shows that the aggregate (reserve-weighted) share of non-SDR currencies in our sample increased markedly in the aftermath of the GFC, rising from around 2% in the late 2000s to more than 6% by 2016, when comparable aggregate data first became available in COFER. Moreover, the simple-average share rose broadly in tandem with the weighted average throughout this period and was often even higher, pointing to widespread adoption of these currencies across reserve managers rather than accumulation by only a handful of large holders. The main contributors to this trend appear to be the AUD and CAD, followed by smaller but growing allocations to the SGD, NZD, Korean won (KRW), INR, and Danish krone (DKK). This finding is consistent with Arslanalp et al. (2022, 2025), who argue that diversification away from the USD, where it occurs, is not primarily directed toward traditional reserve currencies such as the EUR, JPY, or GBP. Instead, reserve managers increasingly allocate to a broad range of non-traditional reserve currencies, and not exclusively, or even primarily, to the CNY. In contrast to CNY reserve holdings, holdings of non-traditional reserve currencies as a whole (i.e. the CNY and other non-SDR currencies combined) are more dispersed across economies (Figure 11, bottom panel). The largest holders are China (16%) and Russia (8.7%), followed by India (6.1%), Switzerland (5.2%), and Singapore (4.2%), among more than 40 economies holding at least USD 2 billion in non-traditional reserve currencies.

Finally, Appendix Table B.10 provides a comprehensive overview of reserve holders with non-negligible allocations to NRCs, covering 78 economies that held more than 2% of their reserves in NRCs either in 2024 or at some point since 2016. Beyond reporting aggregate NRC and CNY shares, the table leverages the full granularity and breadth of our dataset to uncover the underlying composition of non-SDR reserve portfolios whenever such information is available. The resulting picture is one of substantial heterogeneity. This further reinforces the view that the adoption of NRCs is less of a story of CNY internationalization, than a broader shift toward a diverse set of non-traditional reserve currencies.

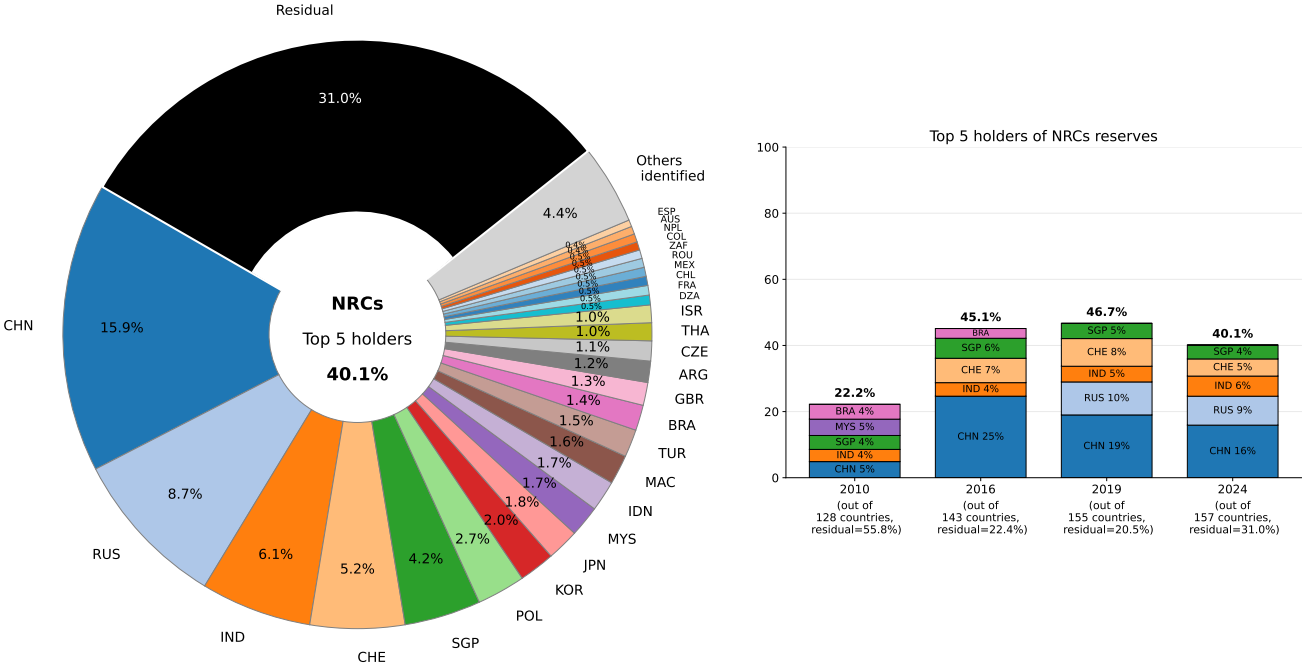
[23]For instance, in the case of Argentina, Benguria and Novy (2025) show that in 2023, amid a dollar shortage, Argentina expanded a currency swap line with China. The share of imports from China invoiced in CNY surged rapidly, displacing the USD, which had previously accounted for virtually all invoicing.

Figure 11. Breakdown of CNY and NRCs reserve holdings by country, end-2024 (or latest)

(a) CNY reserves, end-2024 (or latest)



(b) NRCs reserves, end-2024 (or latest)



Note: The figure decomposes, by the country of origin of official reserve holders, total FX reserves denominated in CNY (panel a) and NRCs (panel b) reported in the IMF COFER database, totaling USD 0.254 trillion and 1.534 trillion in 2024, respectively. Each pie slice represents the share of FX reserves in the respective currency(ies) held by a given country, based on country-level currency holdings in 2024 (or the latest year available). Only economies with at least USD 1 (5) billions in CNY (NRCs) reserves are shown separately. CNY and NRCs shares in economies' FX reserves are based on 2024 data, except for the following economies labeled in the figure: NPL (2023), NGA and DZA (2022), and RUS (2021). The CNY share for JPN* is imputed from 2012 onward using constant CNY holdings of USD 10.3 billion. See Appendix A.4 for details.

4. Decomposing shifts in reserve currency shares

In this section, we leverage our unique dataset to dissect the forces driving changes in reserve currency shares since the turn of the millennium, and to identify who drives these shifts, assessing whether they are broad-based or concentrated among a few central banks. Before turning to the analysis, we briefly outline our step-by-step approach and highlight the main insights.

4.1. Overall methodological approach

We begin with a simple decomposition of changes in currency shares into two components: active diversification, reflecting shifts in central bank currency preferences, and volume effects, arising from changes in reserve levels. Over 2000–2024, active diversification is the dominant force in global reserves, accounting for most of the decline in the USD's share and the corresponding rise of NRCs. By contrast, for the EUR, both active and volume effects were modest and largely offsetting, although this masks substantial variation across subperiods. The EUR's pre-GFC increase was largely preference-led, but these preferences reversed sharply thereafter.

Given the central role of preference shifts, we next introduce a novel decomposition of the active diversification component into two distinct drivers: (i) shifts between the "Big Four" bloc and NRCs and (ii) reallocations within the Big Four bloc itself. This uncovers two long-run diversification patterns. The first, widely recognized, is diversification toward NRCs, contributing primarily to the decline of the USD and, to a lesser extent, the EUR. The second, which has received less attention, is reallocation within the Big Four, eroding the share of the USD while supporting the EUR and, to a lesser degree, the GBP. But how broad-based are these patterns?

Finally, we delve deeper into diversification trends by moving beyond net currency changes. We first identify the central banks that actively diversified into and out of each currency. We then quantify gross inflows and outflows and assess whether these shifts benefit or come at the expense of other Big Four currencies and NRCs, and whether they are broad-based or concentrated. This reveals a stark contrast between the USD and the EUR. While many economies diversify into the USD, these inflows are more than offset by outflows from a smaller number of large central banks; the opposite holds for the EUR. This underscores the tension noted earlier whereby the behavior of a few large reserve holders masks that of a more silent majority. Diversification out of the USD is driven primarily by China and Russia, with the proceeds spread across both other Big Four currencies and NRCs. Diversification into the EUR is also largely driven by these two economies, whereas outflows are broader-based, benefiting NRCs and other major currencies such as the USD.

Taken together, diversification toward NRCs appears relatively broad-based. By contrast, reallocation within the Big Four, particularly from the USD toward the EUR, is largely driven by China and, to a lesser extent, Russia; excluding them, the pattern reverses in favor of the USD. We now turn to a closer examination.

4.2. Preference vs. volume shifts

What drives changes in aggregate reserve currency shares across economies and over time? We use a simple decomposition that highlights two key forces behind these shifts: active diversification, driven by changes in official reserve managers' preferences across currencies; and volume shifts, which occur when the volume of reserves held by economies evolve, while currency preferences remain stable.[24] For instance, faster reserve accumulation among dollar-heavy reserve holders would raise the aggregate USD share, even when their currency allocations remain unchanged.

We aim to decompose the change in the aggregate share of reserve currency C between t_1 and t_2 across all economies $i \in N$ in our sample, represented as $\bar{s}^C_{t_2} - \bar{s}^C_{t_1}$. Let $R_{i,t}$ denote the level of FX reserves held by country i at time t, and $R_t = \sum_{i=1}^{N} R_{i,t}$ the total reserves across all economies N. Country i's weight in aggregate FX reserves in the sample is then $r_{i,t} = R_{i,t}/R_t$. The aggregate share of currency C is given by the reserve-weighted average of economies' currency shares, $\bar{s}^C_t = \sum_{i=1}^{N} s^C_{i,t}\, r_{i,t}$.

The change in the aggregate share of currency C between t_1 and t_2 can be decomposed into two meaningful components by adding and subtracting the counterfactual term $\sum_i s^C_{i,t_1} r_{i,t_2}$. This counterfactual represents the scenario in which economies maintain their initial currency shares (s^C_{i,t_1}) while their weights in global reserves ($r_{i,t}$) are updated to reflect the distribution at t_2. This yields the following decomposition:

$$
\begin{aligned}
(1) \qquad \bar{s}^C_{t_2} - \bar{s}^C_{t_1} &= \sum_{i=1}^{N} s^C_{i,t_2}\, r_{i,t_2} - \sum_{i=1}^{N} s^C_{i,t_1}\, r_{i,t_1} \\
&= \sum_{i=1}^{N} s^C_{i,t_2}\, r_{i,t_2} - \sum_{i=1}^{N} s^C_{i,t_1}\, r_{i,t_1} + \sum_{i=1}^{N} s^C_{i,t_1}\, r_{i,t_2} - \sum_{i=1}^{N} s^C_{i,t_1}\, r_{i,t_2} \\
&= \underbrace{\sum_{i=1}^{N} (s^C_{i,t_2} - s^C_{i,t_1})\, r_{i,t_2}}_{\substack{\text{Component 1 (preference shifts):} \\ \text{active diversification/change} \\ \text{due to change in currency shares}}} + \underbrace{\sum_{i=1}^{N} s^C_{i,t_1}\, (r_{i,t_2} - r_{i,t_1})}_{\substack{\text{Component 2 (volume shifts):} \\ \text{changes in country shares stemming from changes in the} \\ \text{relative size of FX reserves, given stable preferences.}}}
\end{aligned}
$$

In Equation 1 above, Component 1 captures active diversification, which refers to shifts in preferences that are reflected in changes in economies' currency shares. Component 2, on the other hand, captures volume shifts, which arise from changes in currency shares driven by shifts in the relative size of foreign exchange reserves across economies, given stable preferences.

[24] Goldberg and Hannaoui (2026) propose a similar decomposition that includes a second-order interaction term capturing the joint variation in economies' reserve portfolio size and preferences. As this interaction term is quantitatively small, and given that we later further decompose preference shifts into movements between and within the Big-Four currencies, we rely here on the simpler two-component framework.

Figure 12 presents the decomposition over the sample period from 2000 to 2024 for each of the Big Four currencies and the aggregate of NRCs. Figure 13 further reports the decomposition for USD, EUR, and NRCs across five subperiods: 2000–2004 (euro launch), 2004–2008 (pre-GFC period), 2008–2015 (post-GFC and euro area sovereign debt crisis), 2015–2021 (QE in G4 and rising trade tensions), and 2021–2024 (the war in Ukraine and renewed geopolitical tensions).

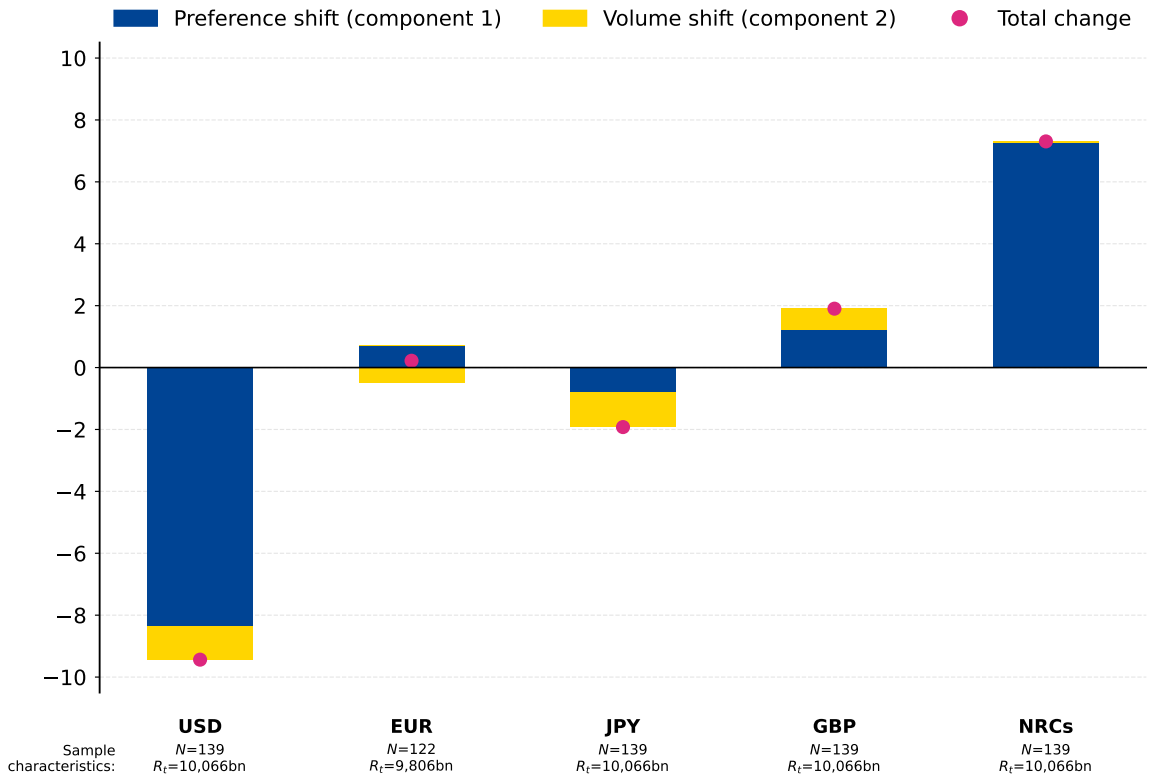
Before turning to the results, we clarify that, throughout this section, we focus on explaining changes in currency shares within our sample of economies with available currency composition data.[25] Accordingly, weights $r_{i,t}$ are normalized within our sample rather than relative to global FX reserves. Using global weights would introduce a residual term capturing the contribution of unobserved economies. This residual could, in principle, be inferred using aggregate COFER currency shares. However, we refrain from doing so as it would conflate the contribution of unobserved economies with measurement issues and differences in imputation and coverage across our dataset and COFER, whose composition over time is not fully observable and which, like ours, partly relies on imputation. Moreover, although global weights anchor the analysis to the evolution of aggregate reserves, they complicate the interpretation of Component 2 by blurring the distinction between genuine within-sample volume shifts and changes in the relative importance of observed and unobserved economies. This coverage effect could be addressed through further adjustments, but doing so would make the decomposition less intuitive. Given our focus on dynamics within our observed sample, we rely on within-sample weights, which provide a more tractable framework.

Using within-sample weights nonetheless makes the analysis more sensitive to changes in country coverage over time. This is particularly relevant for Component 2 and subperiod analyses, especially before the 2010s, when country entry and exit can blur cross-period comparisons. In such cases, Component 2 would partly reflect mechanical changes in coverage rather than shifts in reserve distribution across a stable set of economies. To mitigate this concern, we rely on our extended dataset to define a more stable country universe, combining raw data with interpolation and back- and forward-extrapolated constant currency shares. This has little impact on the preference component (Component 1), as it does not introduce artificial changes in currency shares, but is essential for the volume component, whose interpretation is particularly sensitive to changes in country coverage and reserve weights. We also use both raw and imputed data for China over 2000–2024 to account for its substantial reserve accumulation in the early 2000s. In addition, we include Japan and India, whose currency shares are fully estimated, as well as country-specific

[25] We restrict the sample to central banks with non-missing shares for all Big Four currencies and the non-traditional aggregate. This stricter criterion has only a limited impact on coverage relative to a looser requirement based on USD, EUR, and NRC. It ensures a consistent definition of the non-traditional currency aggregate and alignment across all decomposition exercises, particularly those focusing on flows within and between the Big Four currencies and the non-traditional aggregate. Moreover, for economies that joined the euro area after 1999, the assessment starts from the first year of entry to avoid structural breaks (i.e., when reserve holdings in EUR fall to zero by statistical definition).

imputations for Taiwan, Korea, and Hong Kong, further reducing coverage effects and improving the identification of Component 2 over time. Hence, both the decomposition results and the aggregate (reserve-weighted) currency shares shown in Figure 3 are based on the same extended dataset, facilitating direct comparisons between the two. Overall, these choices improve the consistency of the analysis while having limited impact on the main results, particularly for the preference component and its further decomposition, which remain the primary focus of this section. [26]

Figure 12. Preference and volume shifts in reserve currency shares, 2000–2024 period
(changes in percentage points)



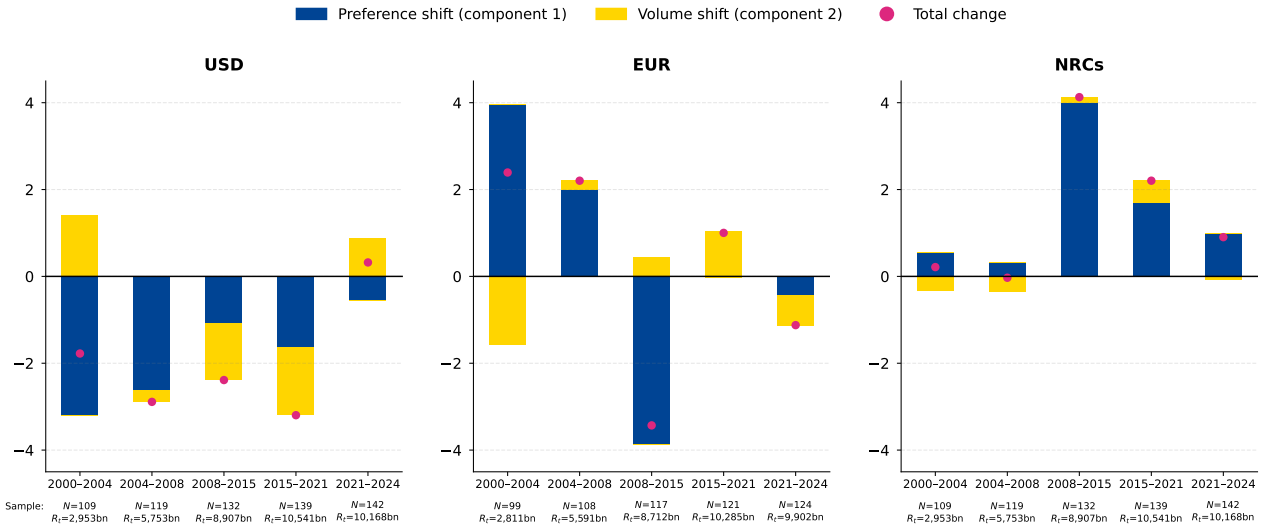
Note: The figure shows, for 2000-2024, the decomposition in Eq. 1 of changes in the aggregate share of currency C (USD, EUR, JPY, GBP, and NRCs), computed across all economies in our sample. For this exercise, we rely on an extended dataset combining raw data with interpolated and back- and forward-extrapolated constant currency shares, as well as imputations for CHN, JPN, IND, TWN, HKG, and KOR, to improve the interpretability of the volume component and facilitate comparison with aggregate reserve-weighted currency shares.

Turning now to the results, Figure 12 clearly indicates that shifts in currency preferences were the primary driver of changes in reserve currency shares since 2000. Of the 9.4 percentage point

[26] Appendix Figure B.32 shows results excluding estimated or imputed observations for Japan, India, Taiwan, Hong Kong, and Korea. The results remain qualitatively robust, particularly with respect to the preference component. However, as discussed in the main text, Component 2 is less precisely identified because coverage effects play a more important role. We also present additional robustness checks related to the evidence on diversification flows in Subsection 4.4.4.

decline in the aggregate USD share within our sample, nearly the entire change is attributable to such shifts in currency preferences (-8.3pp). Volume shifts contributed only modestly, reflecting offsetting changes in reserve weights across central banks—gains associated primarily with China's reserve accumulation, and to a lesser extent Switzerland and Russia, were slightly more than offset by declines in the reserve weights of Japan, Hong Kong, Germany, and many others. The results for NRCs are almost the mirror image of those for the USD. Of the 7.3 percentage point increase in their share, the bulk is also driven by active diversification. For the EUR, by contrast, preference and volume effects are much smaller and almost offset one another, with the former supporting the EUR's share and the latter weighing it down. As a result, the EUR's share of global foreign exchange reserves in 2024 remains close to its inception level, at around 20%. However, this apparent stability masks substantial variation over the past two decades.

Figure 13. Preference and volume shifts in reserve currency shares across sub-periods
(changes in percentage points)



Note: The figure shows, for selected periods, the decomposition outlined in Eq.1 of changes in the aggregate share of currency C (USD, EUR, and the aggregate of NRCs) between t_1 and t_2, computed across all economies in our sample. Four sub-periods are considered: 2000–2004 (euro launch), 2004–2008 (pre-GFC period), 2008–2015 (post-GFC and euro area sovereign debt crisis), 2015–2021 (QE in advanced economies and rising trade tensions), and 2021–2024 (the war in Ukraine and renewed geopolitical tensions). We rely on the same extended sample used in Figure 12.

Despite these overarching patterns, Figure 13 reveals significant heterogeneity in the drivers of currency share shifts across subperiods. For instance, the 3.2 percentage point decline in the USD share between 2015 and 2021—a period marked by renewed trade tensions and Russia's annexation of Crimea—is roughly equally attributable to active diversification and volume shifts, the latter reflecting in part China's reserve decumulation between mid-2014 and early 2017. In the subsequent period (2021–2024), characterized by heightened geopolitical tensions, preference shifts continued to weigh on the USD, while volume effects more than compensated.

While the preference component is negative for the USD in every subperiod, the EUR exhibits a clear break at the onset of the euro area sovereign debt crisis. Strong preference-driven inflows into the EUR following its launch and before the GFC gave way to a sharp reversal thereafter: the 3.4 percentage point decline in the EUR's share between 2008 and 2015 was driven predominantly by active diversification away from the currency (-3.9pp). Since 2015, however, preference shifts have played only a limited role. In particular, the increase in the EUR's share between 2015 and 2021 is not driven by stronger preferences but rather by volume shifts in EUR reserves, such as those associated with the foreign exchange accumulation of the Swiss National Bank.[27] These same volume effects appear to have weighed on the EUR in the most recent period (2021–2024). Finally, active diversification toward NRCs gained particular traction after the GFC.

4.3. Behind preference changes: shifts within and from Big Four

Given the central role of preference shifts, we introduce a novel decomposition of the active diversification component aimed at isolating the channels through which changes in currency shares occur, distinguishing between reallocations across the "Big Four" and NRCs, and substitutions within the Big Four bloc itself.

To do so, we decompose changes in currency-C share, $s^C_{i,t_2} - s^C_{i,t_1}$, into shifts in the overall size of the Big Four block and shifts in its internal composition. Let, for country i, the total reserves held in Big Four currencies be $R^{\text{BIG4}}_{i,t} = \sum_{C \in \text{BIG4}} R^C_{i,t}$, with corresponding share $s^{\text{BIG4}}_{i,t} = \frac{R^{\text{BIG4}}_{i,t}}{R_{i,t}}$. Within the Big Four portfolio, the share of currency C is given by $s^{C|\text{BIG4}}_{i,t} = \frac{R^C_{i,t}}{R^{\text{BIG4}}_{i,t}}$. We can therefore write currency-C share as $s^C_{i,t} = s^{\text{BIG4}}_{i,t} s^{C|\text{BIG4}}_{i,t}$. Substituting this identity into Component 1 yields:

$$\sum_{i=1}^{N} (s^C_{i,t_2} - s^C_{i,t_1}) r_{i,t_2} = \sum_{i=1}^{N} \left(s^{\text{BIG4}}_{i,t_2} s^{C|\text{BIG4}}_{i,t_2} - s^{\text{BIG4}}_{i,t_1} s^{C|\text{BIG4}}_{i,t_1} \right) r_{i,t_2}.$$

We then add and subtract the counterfactual term $s^{\text{BIG4}}_{i,t_1} s^{C|\text{BIG4}}_{i,t_2}$, corresponding to the portfolio that country i would hold at time t_2 if the overall size of its Big Four portfolio were fixed at its initial level (s^{BIG4}_{i,t_1}), while allowing its internal composition ($s^{C|BIG4}_{i,t_2}$) to adjust. This isolates reallocations within the Big Four block from shifts between Big-4 and NRC. This yields the following

[27] The Swiss National Bank—one of the largest official holders of EUR reserves—intervened repeatedly over this period to weaken the Swiss franc, purchasing EUR and selling CHF to counter safe-haven demand for its currency fueled by global uncertainty shocks, such as the Covid-19 pandemic. Earlier interventions under the EUR exchange-rate floor (2011–2015) likewise contributed positively to the volume component. By contrast, the contribution turned negative in the most recent period (2021–2024).

decomposition:

$$(2) \quad = \underbrace{\sum_{i=1}^{N} \left(s_{i,t_2}^{C|\text{BIG4}} (s_{i,t_2}^{\text{BIG4}} - s_{i,t_1}^{\text{BIG4}}) r_{i,t_2} \right)}_{\text{Component 1a: preference shifts } \textit{between} \text{ Big-4 and NRC}} + \underbrace{\sum_{i=1}^{N} \left(s_{i,t_1}^{\text{BIG4}} (s_{i,t_2}^{C|\text{BIG4}} - s_{i,t_1}^{C|\text{BIG4}}) r_{i,t_2} \right)}_{\text{Component 1b: preference shifts } \textit{within} \text{ Big-4}}.$$

This decomposition of active changes in currency C's share allows us to distinguish between two meaningful margins of diversification. First, diversification along the *extensive margin* captures active changes in currency C arising from overall Big Four exposure, reflecting movements between Big Four currencies and NRCs. Component 1a thus captures the extent to which declines in currency C's share are driven by economies' preference shifts toward NRCs, i.e. diversification out of the Big Four block entirely: when central banks reduce their aggregate exposure to Big Four currencies in favor of NRCs, the share of each Big Four currency—including C—declines mechanically. Second, diversification along the *intensive margin* captures the extent to which active changes in currency C arise from shifts within the Big Four currencies, isolating them from changes in the overall scale of Big Four holdings. Component 1b thus reflects substitution within the Big Four block, that is, economies' preference shifts across USD, EUR, JPY, and GBP.

Figure 14 presents this decomposition for all economies in our sample over the full period from 2000 to 2024. For consistency, the sample is constructed analogously to the previous exercise.[28] An appealing feature of this approach is that each margin of adjustment—whether shifts within Big Four or shifts from Big Four—sums to zero across currencies.

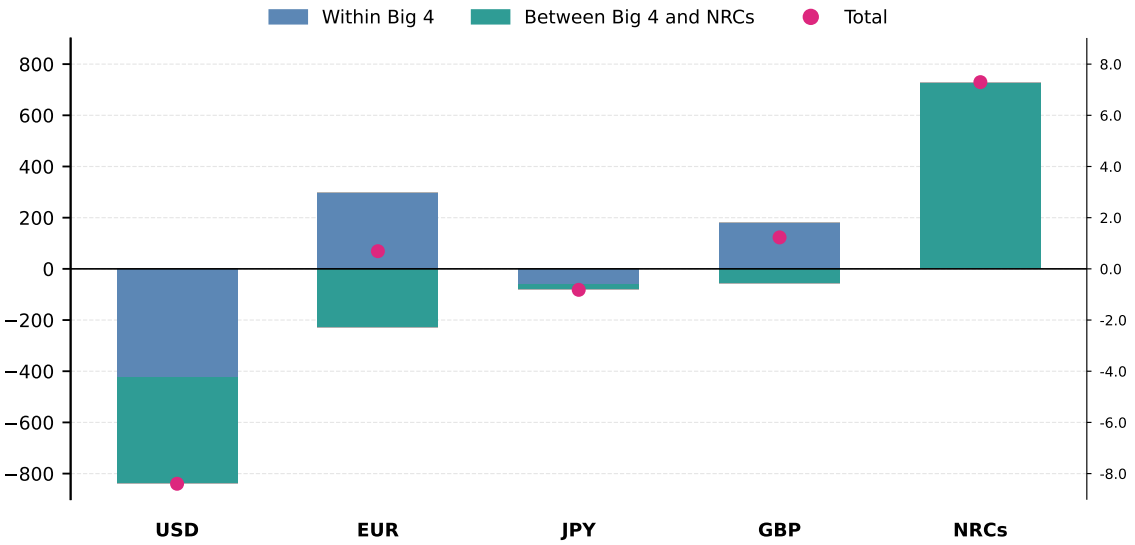
This decomposition uncovers two distinct long-run diversification patterns shaping currency composition across our sample. The first, widely recognized, is diversification toward NRCs. Preference shifts toward NRCs account for roughly half of the decline in the USD's share and also exert downward pressure on the EUR. Consistent with this, the rise in NRC holdings is driven primarily by reallocations away from the USD (accounting for almost 60%) and, to a lesser extent, from the EUR (over 30%). The second margin of adjustment, which has received less attention in the literature, is reallocation within the Big Four currencies. Holding constant aggregate exposure to the Big Four bloc, preference shifts across the major reserve currencies also account for a sizeable share of the decline in the USD's share, reflecting substitution away from the dollar within the Big Four. While also weighing modestly on the JPY, this intra-Big Four rebalancing provides strong support to the EUR and, to a lesser extent, the GBP.

Taken together, the USD is affected negatively on both margins, whereas for the EUR the two margins work in opposite directions, as the downward pressure from diversification toward NRCs

[28] Since the focus is on decomposing Component 1 over the full sample period, the need for an extended dataset is less critical. Importantly, unreported results, available upon request, are qualitatively similar when using the raw sample instead of the extended one. The same conclusion holds when restricting the analysis to China's data for 2000–2019, when USD shares are directly observed and other currency shares are imputed.

is more than offset by gains from within–Big Four reallocation. The question then arises whether these two diversification trends are broad-based or reflect the behavior of a few large central banks, a question our data can uniquely address.

Figure 14. Preference changes: shifts within and away from the Big Four currencies, 2000–2024
(left axis: net flows, USD billions; right axis: share changes, percentage points)



Note: The figure shows, for the full sample period 2000–2024, the decomposition outlined in Eq.2 of active changes (preference-led) in the aggregate share of currency C (USD, EUR, JPY, GBP, and the aggregate of NRCs) between t_1 and t_2, computed across all economies in our sample. We rely on the same extended sample used in Figure 12.

4.4. Delving into gross diversification flows: broad-based or concentrated?

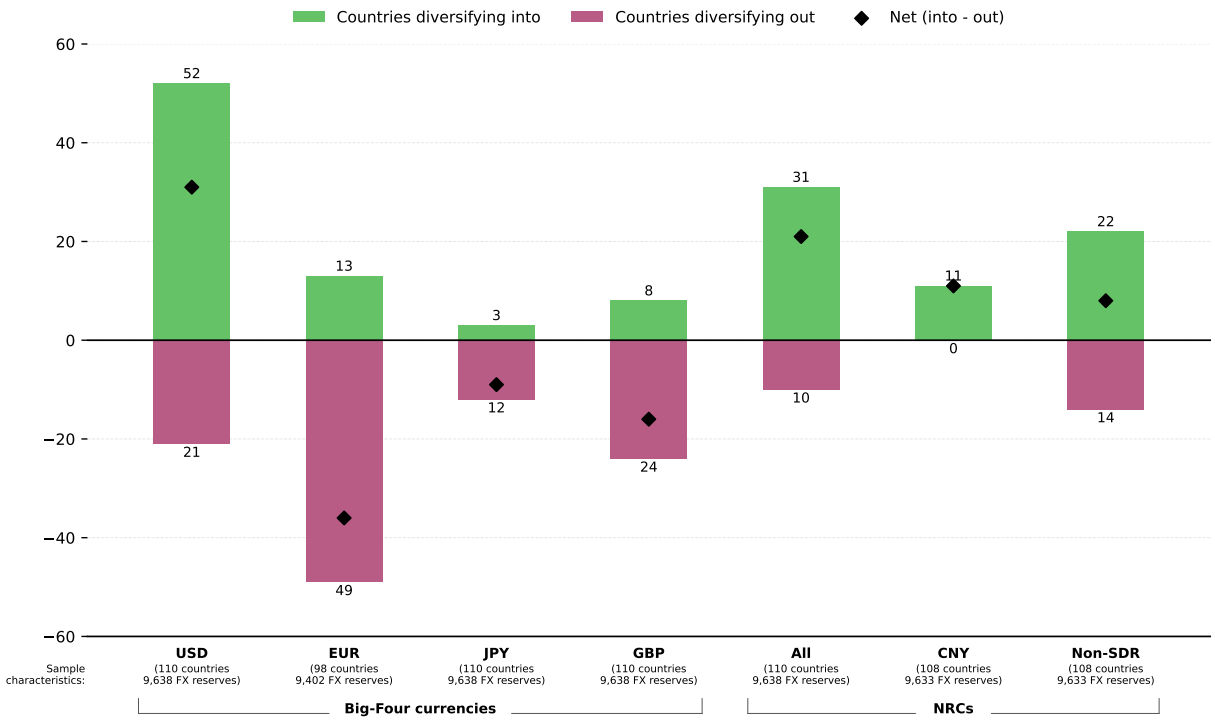
We leverage our unique dataset to provide a more granular and nuanced view of long-term trends in reserve diversification. In contrast to previous exercises, which focus on net currency changes, we now analyze gross diversification flows for each currency separately. We identify the number of central banks actively diversifying into and out of each currency, quantify inflows and outflows, assess whether these shifts are broad-based or concentrated, and determine whether they occur at the expense or to the benefit of other Big Four currencies or NRCs.

As in the previous analysis, the assessment for each country is conducted using the earliest and latest years for which data on all Big Four currencies and NRCs are available. However, in contrast to the previous analysis, we do not rely on the extended dataset with constant shares.[29] Since our goal is to capture long-run diversification trends and identify active diversifiers, we instead impose

[29]Unlike the previous decomposition analysis, we do not use back- and forward-extrapolated constant currency shares, as our focus is exclusively on active diversification flows rather than the volume component, for which these extensions were mainly introduced. We retain the raw and imputed data for China over 2000–2024 and the estimated/imputed currency shares for Japan, India, Taiwan, Korea, and Hong Kong. As shown in the robustness analysis, these choices have limited impact on the qualitative conclusions.

a minimum sample length of ten years for each country and currency to ensure that long-term dynamics are properly captured. In line with Arslanalp et al. (2022), we define *active diversifiers* as central banks that adjust the share of their FX reserves held in a given currency by at least 5 percentage points over the assessment period.

Figure 15. Active diversification across Big Four currencies and NRCs, 2000–2024
(number of active diversifiers)



Note: The figure shows the number of economies actively diversifying their FX reserves into or out of a specific reserve currency. Active diversifiers are defined as central banks that adjust the share of their FX reserves held in a particular currency by at least 5 percentage points over the sample period, provided the data span a minimum of 10 years.

Figure 15 shows the number of economies actively diversifying into or out of each reserve currency. Between 2000 and 2024, significantly more economies actively diversified into the USD and NRCs than away from them. By contrast, for the EUR, GBP, and JPY, active divestors outnumbered diversifiers. For the USD, 52 economies, collectively holding $1.7 trillion in total FX reserves, diversified into the currency, while 21 economies, with a combined $5.3tr in FX reserves, reduced their holdings. In other words, smaller reserve holders increased their exposures to the USD, while larger, fewer reserve holders reduced theirs. For the EUR, 13 economies, representing $4.9tr in FX reserves, increased their allocations to the currency, whereas 49 economies, with $3tr, diversified out of it. This reflects a pattern opposite to the USD, where larger reserve holders increased their exposures to the EUR, while smaller, more numerous reserve holders reduced

theirs.[30] Diversification into NRCs was fairly widespread: 31 economies, accounting for $5.6tr in FX reserves, diversified into these currencies, while 10 economies, with $0.03tr, shifted out of them.

Where exactly did the money go? Figure 16 reports reserve flows associated with economies that diversified into and out of the USD, EUR, and NRCs since the turn of the millennium. For each country, diversification flows are computed as the difference between actual reserve holdings and the level that would prevail had the country maintained its initial currency C share s^C_{i,t_1} throughout the period, given by $\left(s^C_{i,t_2} - s^C_{i,t_1}\right) R_{i,t_2}$. This corresponds to the preference component in Equation 1, expressed in value terms. The first bar in the figure aggregates these implied flows across all economies contributing positively or negatively to the preference component, with the three largest contributors highlighted to illustrate the degree of concentration.[31]

Moreover, we provide a raw-flow (destination-based) decomposition that describes where changes in the share of currency C come from or go to. Specifically, the second bar decomposes these inflows and outflows across other major reserve currencies (the remaining Big Four) and NRCs. This breakdown indicates whether inflows into currency C occurred at the expense of these two groups, or whether outflows from C accrued to their benefit.[32] This approach complements the earlier decomposition but differs in focus, examining for each currency individually where diversification originates and where it is directed.

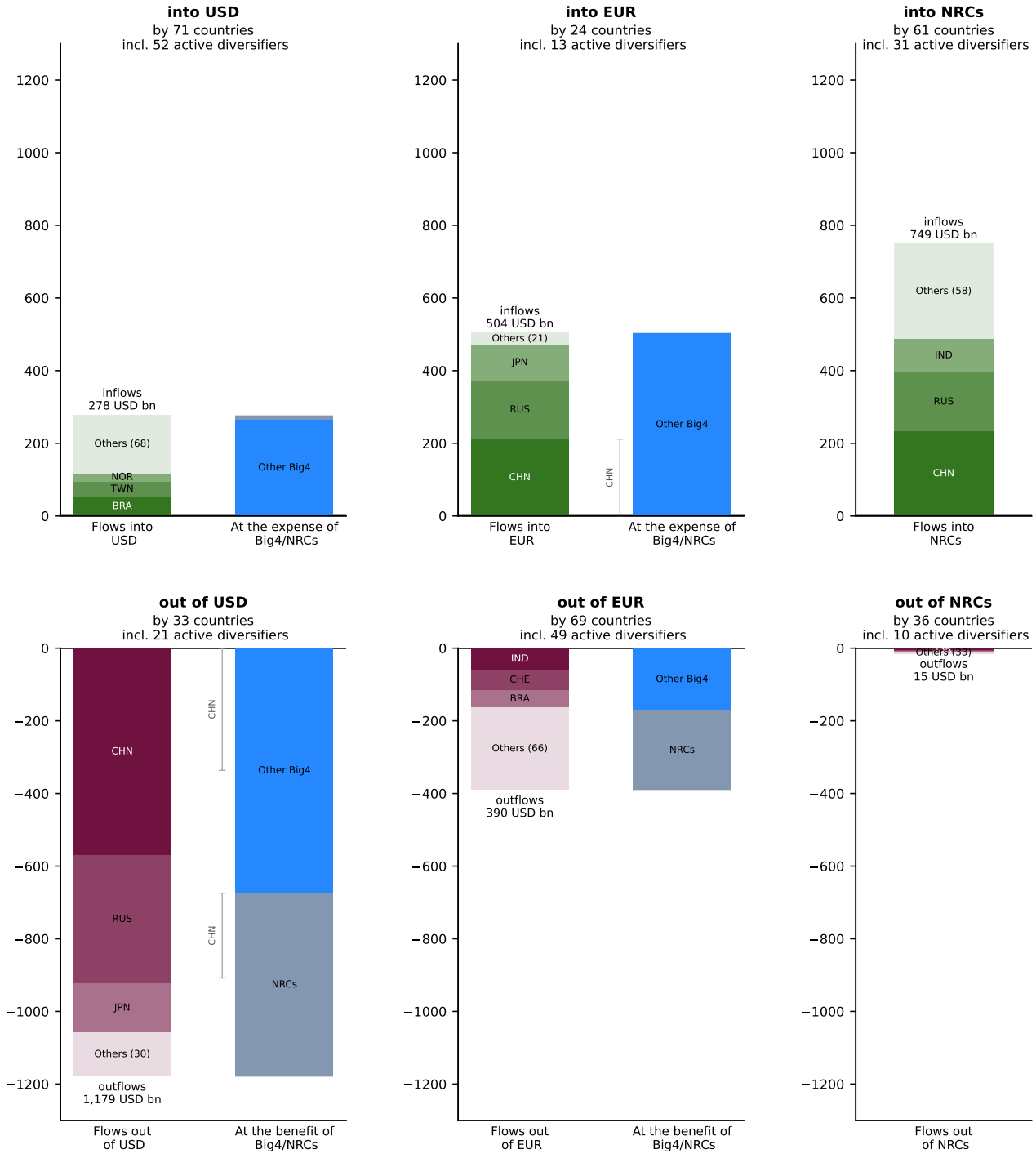
Turning to the evidence, the top-left panel of Figure 16 clearly shows that diversification flows into the USD (about $278 billion) were distributed across a wide range of 68 central banks, among which 38 actively diversifying into it. These flows occurred primarily at the expense of other Big Four currencies. The panel below shows that outflows from the USD were significantly larger, totaling $ 1.18 trillion, which explains the decline in the USD's (reserve-weighted) aggregate share

[30] Fewer economies diversified into/out of the JPY and GBP: for the JPY, 3 economies ($0.1tr in FX reserves) diversified in and 12 ($1.3tr) out; for the GBP, the corresponding figures were 8 ($0.7tr) and 24 ($0.8tr).

[31] Alternatively, we could restrict the analysis to diversification flows attributable only to economies classified as active diversifiers, rather than to all economies. Results are nevertheless very similar over the full sample period, as active diversifiers account for most of the variation in the preference component, while other economies contribute only marginally (see Appendix Figure B.33b). We therefore report flows for all economies, both for completeness and to maintain consistency with the subsequent analysis of shorter subperiods, where active diversifiers may account for a smaller share of total variation.

[32] Because currency shares must sum to one, an increase in the share of currency C must be matched by declines elsewhere in the FX reserve portfolio, and vice versa. The data, however, identify only net changes in currency shares and not the underlying directional (gross) reallocations between individual currencies. As a result, the mapping from observed share changes to bilateral flows is not unique when more than two counterpart currency groups are involved. We therefore group counterpart currencies into two broad categories, other Big Four currencies and NRCs. In this setting, gains (losses) in the share of currency C must be matched by net outflows from (inflows into) these two groups. Flows are allocated proportionally across the adjusting groups, yielding a sign-consistent decomposition that exactly reconciles with the observed changes in currency shares. A finer decomposition is generally not possible, as the same observed net changes can be consistent with multiple underlying patterns of bilateral reallocation.

Figure 16. Gross diversification flows into and out of USD, EUR, and NRCs, 2000–2024 (in USD billions)



Note: The figure shows the gross reserve flows of economies that diversified into and out of the USD (left panel), the EUR (middle panel), and NRCs (right panel) over 2000–2024 (or the earliest and latest available years).

over 2000-2024. However, these outflows originated from mainly two economies, China (accounting for roughly half) and, to a lesser extent, Russia (accounting for a third). These full-sample flow estimates are complementary to the rolling analysis in Figure 5, which shows that the role of these two economies has diminished over time. This helps explain why the USD share among median reserve holders has increased over the 2000-2020 period but has leveled off since then. Overall, those USD outflows benefited both other Big Four currencies ($674 billion), including the EUR, and NRCs ($505 billion).

The top-middle panel of the figure highlights that, among the 24 economies diversifying into the EUR (13 of them active diversifiers), China and Russia were by far the largest contributors. Of the $503 billion of inflows into the EUR, around 40% are likely to have originated from China, primarily at the expense of other major reserve currencies, especially the USD. China's diversification into the EUR appears to have begun around the euro's launch, gathered pace in the mid-2000s, and accelerated markedly after the GFC up until end-2011 (see the yellow and light blue lines in Appendix Figure A.21). As for Russia, which accounts for roughly one-third of total inflows, diversification into the EUR mainly took place in the 2000s. The EUR's share in Russia's reserves rose from about 8% in 2001 to nearly 48% in 2008, largely at the expense of the USD. By contrast, diversification out of the EUR, totaling $390 billion, was spread across a larger number of central banks, including Brazil and Switzerland, with no single country making a dominant contribution. These outflows benefited NRCs ($218 billion) and other Big Four currencies ($172 billion), including the USD. This helps explain why the EUR share among median reserve holders has decreased over the full period. In other words, the relative stability of the EUR's aggregate share in COFER can largely be attributed to China and Russia's rebalancing away from the USD into the EUR, even as many other central banks reduced their EUR holdings.

Last but not least, the top-right panel of the figure shows that diversification into NRCs, totalling roughly $750 billion, was fairly widespread among central banks. While China and Russia again accounted for a sizeable share of inflows (31% and 21%, respectively), diversification into NRCs was far from confined to these two economies, with India, Poland, Switzerland, Turkey, and 29 other active diversifiers also contributing. By definition, this diversification occurred at the expense of other Big Four currencies, notably the USD, followed by the EUR.

To assess the robustness of these findings, it is useful to distinguish between results that are directly supported by reported data and those that rely more heavily on imputation. First, the inclusion of estimated or imputed currency shares for Japan, India, Taiwan, Korea, and Hong Kong has little effect on the main results. Appendix Figure B.33c shows that the findings remain largely unchanged when these economies are excluded. Second, and more importantly, the key conclusions regarding the USD and NRCs do not depend materially on the imputed observations for China. China's diversification away from the USD, and its resulting drag on the reserve-weighted global USD share, is directly supported by official SAFE data, which indicate a decline in the dollar share

from around 80% in 1995 to 58% already in 2014 and 55% in 2019. Likewise, the growing importance of the other Big Four reserve currencies and of NRCs in China's FX reserve portfolio is also established using reported data. As a result, imputations beyond 2019 have only a limited effect on the overall findings. Appendix Figures B.33d and B.33f show that the results remain qualitatively similar when China's currency composition is observed only through 2019, and when the 2000-2019 sample period is applied to all economies.[33]

China imputations are more consequential for the allocation of diversification across the other Big Four currencies. While we provide a plausible allocation of reserve shifts across the EUR, GBP, and JPY when direct information is unavailable, the precise distribution across these currencies, and therefore the estimated contribution of the EUR, remains subject to a degree of uncertainty. Nevertheless, the assumptions underlying our allocation receive support from contemporary statements by Chinese officials and press reports, which indicate that, between 2009 and 2012, China diversified its foreign exchange reserves by reducing its reliance on the USD and increasing its holdings of the EUR.[34] Most notably, in June 2011, Chinese Premier Wen Jiabao said that China had "in recent years [. . .] increased by a quite big margin holdings of euro bonds", while in March 2012, Yi Gang, vice-governor of the People's Bank of China (PBOC), and head of the State Administration of Foreign Exchange (SAFE), stressed that China would "continue to be a 'long-term and responsible' investor in Europe." [35]

All in all, our new country-level data reveal two diversification patterns: a shift away from the Big Four currencies (notably USD and EUR) into NRCs, and reallocations within the Big Four. The latter, previously hidden in aggregate data, actually reflects two opposing trends: one involving a move away from the EUR, GBP, and JPY toward the USD, driven primarily by numerous smaller reserve holders, and another reflecting a shift away from the USD toward the EUR, in large part driven by China and a lesser extent, Russia; excluding them, the pattern reverses in favor of the

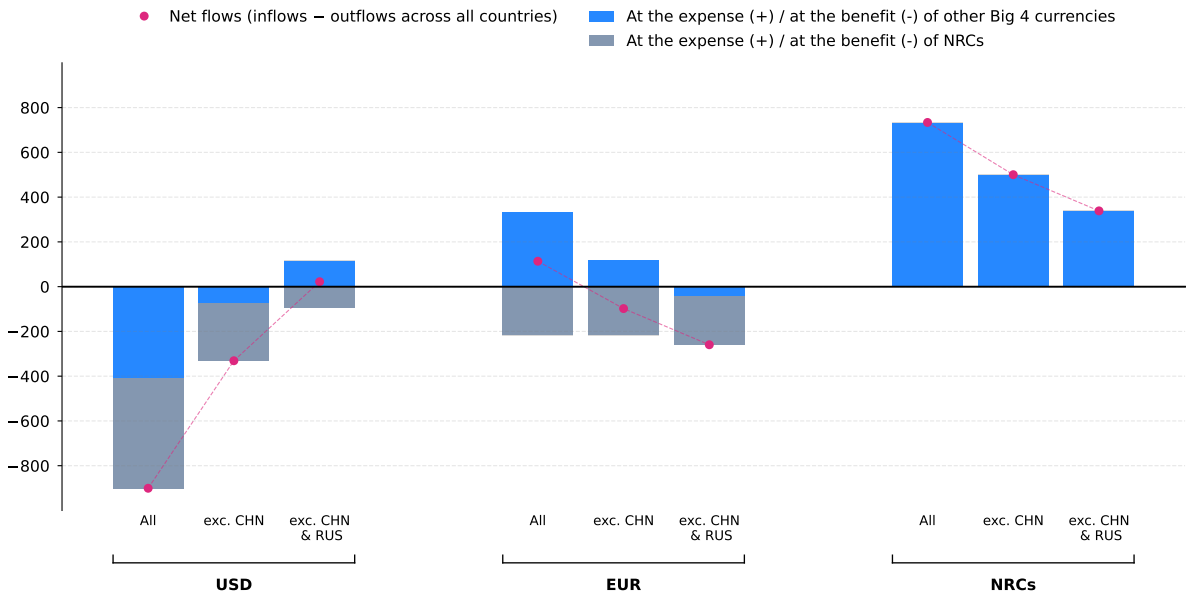
[33] In addition, Appendix Figure A.32 provides an informative breakdown of gross and net diversification flows across the 2000–2014, 2014–2019, and 2019–2024 subperiods. These cutoffs are chosen so that the first two subperiods rely primarily on reported observations for China's USD share and aggregate Big Four and NRC shares, whereas the final subperiod relies predominantly on imputed observations for China's USD and other Big Four currency shares.

[34] According to our imputations, over this period the EUR share is estimated to have increased from approximately 25% to more than 30%, while the USD share declined from around 65% to well below 60%, as shown in Appendix Figure A.21.

[35] See Reuters (2011) and China Daily (2012a). On 26 May 2010, in the midst of the Greek debt crisis, a report disclosed that China's SAFE was "reviewing its holdings of eurozone debt in the wake of the crisis" (Financial Times, 2010) while noting that China had tried to diversify away from the USD in recent years by buying a greater proportion of assets denominated in other currencies. SAFE dismissed immediately the report as "groundless" (Bloomberg, 2010). Moreover, as stressed above, Chinese Premier Wen Jiabao indicated in June 2011 that China was "a long-term investor in Europe's sovereign debt market" and that it had "in recent years [. . .] increased by a quite big margin holdings of euro bonds." Moreover, on 13 March 2012, Yi Gang (Vice-Governor of the PBoC and Head of SAFE) stressed that China would "continue to be a 'long-term and responsible' investor in Europe." In October 2012 he added that "China never stopped investing in the European Union market even during the crises" (China Daily, 2012b).

USD, although this contribution has declined in recent years (see Figure 17 and Figure 5 that summarize this finding). These two diversification trends help reconcile the otherwise puzzling differences between the evolution of the aggregate (reserve-weighted) COFER shares of the USD and EUR in global FX reserves and the corresponding simple-average and median currency shares across central banks.

Figure 17. Net diversification flows across reserve currencies, 2000–2024
(net flows attributable to active diversifiers, USD billions)



Note: The figure shows net active diversification flows across USD, EUR and NRCs for the period 2000–2024. The blue segments of the bars represent net flows driven by gains or losses among the Big Four currencies, while the gray segments reflect net flows resulting from shifts involving NRCs. For each currency, the first bar shows net reserve flows across all economies, the second excludes flows attributable to China, and the third excludes flows attributable to China and Russia.

5. New security premium estimates

5.1. Empirical model

To further illustrate the usefulness of our new dataset on the currency composition of FX reserves, we revisit estimates of the security premium on the USD—the fact that its dominance as an international reserve currency is buttressed by the country's role as a global power guaranteeing the security of allied nations (Eichengreen et al., 2019). This may shed light on current discussions about the implications of a potential US retrenchment from military alliances.

Central banks prefer to hold, and other agents prefer to use, the currencies of their alliance partners in cross-border transactions for several reasons. First, military forces that annex or subdue

foreign lands can expand the reach of a currency directly (Eichengreen, 2026).[36] Second, alliance partners are regarded as reliable stewards of foreign reserves. Their interests are often aligned with those of the foreign government, which reduces the risk of financial sanctions or other actions that could negatively impact those reserves (Weiss, 2022; Arslanalp et al., 2025). Third, holding reserves in the currency of an alliance partner is also seen as a gesture of good faith. Supporting the reserve currency of an alliance partner can be viewed as a form of quid pro quo for the security guarantees provided by a powerful ally (Cohen, 1998; Williamson, 2012; Kirshner, 2020). A final reason is grounded in the concept of commitment, as articulated by Kindleberger (1970) and Farhi and Maggiori (2018) and Kim (2025). A nation deeply engaged with the global economy may incur costs to signal its commitment to global stability. In turn, the global community perceives the debt of such a country as safer, as it is less likely to be eroded by inflation. This perception encourages a tilt in the composition of global reserves toward the currency of that country.[37]

The size of the security premium remains a topic of debate in the literature. Eichengreen et al. (2019) find significant effects in a sample of 19 economies before World War I, showing that military alliances increase the share of a currency in the partner's foreign reserve holdings by about 30 percentage points. Similarly, Arslanalp et al. (2025) provide evidence using the panel data of 80 economies based on Chinn et al. (2022) and the IMF IRFCL, updated to 2023, showing that geopolitical alignment with the US—proxied by the existence of a defense pact with the US—boosts USD reserves. Weiss (2022) found that around three-quarters of foreign government holdings of safe US assets are by economies with some military tie to the US. In contrast, Goldberg and Hannaoui (2026) offer more nuanced findings: low geopolitical alignment with the US, based on UN voting, does not typically result in a lower USD share in official reserve portfolios. In fact, economies with lower voting alignment (or those under financial sanctions) often hold a higher USD share, all else equal. However, this relationship shifts when economies accumulate sufficient reserves to cover short-term external debt and have larger investment tranches in their portfolios.

We contribute to this debate by analyzing the empirical determinants of the shares of the USD, providing new estimates of the security premium. On top of that, we also provide estimates for the EUR,CNY, JPY, GBP, AUD and CAD. To this end, we estimate the following model equation:

$$y_{i,t} = \alpha + \Phi' \mathbf{X_{i,t}} + \sigma s_{i,t} + \varepsilon_{i,t} \tag{3}$$

[36] For instance, Eichengreen observes that American soldiers that were stationed in Europe after World War II were paid in dollars that were sought after by residents that doubted the stability of local currencies (ibid.)

[37] In Kim's model, the US security umbrella underwrites the safety and liquidity of dollar-denominated assets, generating a security-based convenience yield that expands US fiscal capacity and sustains the USD's reserve-currency role.

where $y_{i,t}$ represents the share of the USD (alternatively, the EUR or the CNY) in the FX reserves of country i in year t. The vector $\mathbf{X_{i,t}}$ includes standard explanatory variables commonly used in previous studies (see e.g., Eichengreen and Mathieson, 2000; Arslanalp et al., 2022, 2025; Goldberg and Hannaoui, 2026), while $s_{i,t}$ captures a measure of the security premium. The residual term, $\varepsilon_{i,t}$, is clustered by country to account for within-country correlation over time, while α is a constant term. While our baseline estimates are obtained by pooled OLS, as in previous studies, we report in robustness checks estimates obtained with tobit.

We include in vector $\mathbf{X}$ the exchange rate regime, incorporating dummy variables that equal 1 if a country pegs its exchange rate to the USD and the EUR, respectively, using data from Ilzetzki, Reinhart, and Rogoff (2019). Moreover, we add the currency composition of external debt, measured as the shares of external debt service payments denominated in USD or EUR, with data sourced from the World Bank. Lastly, we consider the direction of trade, captured by the shares of each country's external trade (exports plus imports, scaled by total trade) with the US, the euro area, the UK and Japan, using data from the IMF's Direction of Trade Statistics. The variables are standardized to compare more easily the coefficient estimates.

We examine alternative proxies of geopolitical distance—also standardized—to measure the security premium. One widely used measure (see e.g., Gopinath et al., 2025; Boz et al., 2025; Minesso, Mehl, Bagur, and Vansteenkiste, 2025) is the ideal point distance developed by Bailey, Strezhnev, and Voeten (2017), which quantifies the distance between two economies based on their positions (ideal points) in international voting space, derived from United Nations General Assembly voting patterns. However, whether this measure serves as a reliable proxy for geopolitical alignment remains debatable. It incorporates a large number of symbolic or nonbinding votes, which may hold little substantive meaning. Additionally, some votes are purely transactional, responding to implicit promises of increased foreign aid or investment, rather than reflecting genuine geopolitical alignment. Furthermore, states frequently use abstention or absence strategically to avoid taking sides or antagonizing major powers. We use military alliances as an alternative measure of geopolitical proximity (the opposite of geopolitical distance), defined here as the weighted pi-score computed with data from the Alliance Treaty Obligations and Provisions (ATOP) project (see Chiba, Johnson, and Leeds, 2015). economies geopolitically closer have higher pi-scores. We also use data on trade and financial sanctions imposed by the US, Europe, and China as another alternative measure of geopolitical distance, drawing on data from Yalcin, Felbermayr, Kariem, Kirilakha, Kwon, Syropoulos, and Yotov (2025). Our final measure is the total number of US troops deployed by country, as compiled by Kane (2024) and available online at www.UStroopDeployments.com.[38] While this measure has been less commonly used in the economic literature, it offers a strong proxy

[38] In the regression, we use the logarithm of one plus the total number of troops to account for the variable's highly right-skewed distribution, together with a mass point at zero.

for geopolitical influence.[39] Moreover, as emphasized above, throughout history, victorious powers have often stationed troops abroad and paid them in their currency, thereby promoting international adoption of the unit directly.

5.2. Baseline estimates for the USD

Table 1 reports estimates for the USD share. The results indicate that a currency peg to the USD is associated with an increase of approximately 50–60 percentage points in the share of the dollar in a country's foreign exchange reserves (see columns (1) to (5)). This finding aligns with the view that using a currency as an exchange rate anchor serves as a broad, albeit imperfect, measure of its global role, including its function as a reserve currency (Ilzetzki et al., 2019; Rogoff, 2025). Similarly, trade with the US is positively correlated with a higher USD share: a one-standard deviation increase in the share of trade with the US corresponds to an approximately 15 percentage points rise in the share of the USD in foreign exchange reserves. This result is consistent with recent theoretical models suggesting that currency patterns in international trade drive its use in other international dimensions, such as foreign exchange reserves (Gopinath and Stein, 2021). Furthermore, a one-standard deviation increase in the USD share of external debt is associated with a more than 20 percentage points increase in USD reserves. This supports theoretical predictions that a higher share of USD-denominated debt mechanically and optimally increases demand for USD reserves due to hedging and insurance motives—providing protection against financial crises triggered by exchange rate depreciation (ibid.).

Turning to estimates of the security premium, we replicate the finding of Goldberg and Hannaoui (2026) that economies more geopolitically distant to the US tend to have higher USD shares in their reserve portfolios (see columns (3) to (5)). However, this finding may stem from measurement issues associated with using UN voting patterns as a proxy for geopolitical alignment, as discussed earlier. When we instead use the total number of US troops deployed by country as an alternative measure, the narrative shifts: greater US military presence significantly increases the share of the USD (see columns (2) to (5)). A one-standard deviation increase in the number of US troops in a given country is associated with about a 20 percentage points increase in the USD share of reserves.[40] Importantly, this effect remains robust when additional measures, such as financial and trade sanctions (column (4)) or military alliances (column (5)), are included. Overall, the results provide strong, statistically significant, and robust evidence that the US's military umbrella is a key determinant of the USD's role in global FX reserves. Looking ahead, while we do not as-

[39] Large-scale deployments often indicate deep and enduring alliances, granting the US sustained strategic leverage. Unlike symbolic or diplomatic alignment, this measure captures material, security-based influence.

[40] More precisely, a one-standard deviation in the standardized log transform in the number of US troops.

sert causality, the findings indicate that a potential US retrenchment from military alliances could weaken the USD's role as a global reserve currency.

Table 1. Baseline estimates - Determinants of USD shares of FX reserves

	(1)	(2)	(3)	(4)	(5)
USD peg	0.593	0.624	0.559	0.537	0.520
	(0.106)***	(0.118)***	(0.126)***	(0.130)***	(0.140)***
EUR peg	-1.465	-1.43	-1.398	-1.301	-1.306
	(0.197)***	(0.208)***	(0.212)***	(0.194)***	(0.197)***
Trade with the US	0.154	0.117	0.153	0.158	0.149
	(0.059)***	(0.062)*	(0.056)***	(0.056)***	(0.063)**
Trade with the euro area	0.07	0.029	0.096	0.119	0.112
	(0.095)	(0.097)	(0.108)	(0.105)	(0.106)
Trade with the UK	-0.013	-0.018	0.004	-0.01	-0.010
	(0.069)	(0.073)	(0.076)	(0.074)	(0.075)
Trade with Japan	-0.100	-0.172	-0.144	-0.127	-0.130
	(0.112)	(0.125)	(0.115)	(0.119)	(0.118)
USD debt	0.240	0.252	0.228	0.224	0.221
	(0.063)***	(0.062)***	(0.066)***	(0.067)***	(0.067)***
US troops		0.191	0.230	0.240	0.237
		(0.098)*	(0.098)**	(0.098)**	(0.098)**
Geopolitical distance from the US			0.174	0.210	0.222
			(0.074)**	(0.071)***	(0.078)***
US financial sanctions				-0.211	-0.199
				(0.149)	(0.153)
US trade sanctions				0.199	0.19
				(0.222)	(0.228)
Military alliance with the US					0.023
					(0.070)
N	1,701	1,661	1,531	1,531	1,531
Adj. R2	0.42	0.44	0.47	0.47	0.47
No. of economies	117	115	111	111	111
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports OLS estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

5.3. Other reserve currencies and robustness checks

Table 2 presents the estimates for the EUR. The findings are consistent: EUR pegs raise the share of the EUR in foreign exchange reserves, as do trade ties with the euro area and a higher proportion of the EUR in external debt. Geopolitical factors also play a role for the EUR: economies that are geopolitically distant from the euro area, as indicated by UN voting patterns, tend to have lower shares of the EUR in their foreign exchange reserves. What is remarkable is that presence of US troops also increase the share of the EUR: a one-standard deviation increase in the number of US troops in a given country is associated with about a 20 percentage points increase in the EUR share of reserves. One possible explanation for this finding is the "friend of a friend" effect, as

posited in recent theoretical work (Liu, Redding, Smith-Worthington, and Yang (2026)): a country's geopolitical relationships with its partners can give it influence over economies with which it has no direct relationship, because those partners transmit the effect through the geopolitical network.[41] The fact that some euro area economies belong to NATO and host US troops, an alliance led by the US, reinforces a geopolitical signal of security and stability. This signal can enhance investor confidence and encourage reserve diversification into the EUR alongside the USD.

Table 2. Baseline estimates - Determinants of EUR shares of FX reserves

	(1)	(2)	(3)	(4)	(5)	(6)
USD peg	-0.275	-0.218	-0.174	-0.184	-0.183	-0.208
	(0.088)***	(0.082)***	(0.086)**	(0.086)**	(0.086)**	(0.086)**
EUR peg	1.211	1.280	1.238	1.228	1.199	1.124
	(0.207)***	(0.206)***	(0.196)***	(0.200)***	(0.191)***	(0.180)***
Trade with the US	-0.024	-0.044	-0.066	-0.068	-0.071	-0.044
	(0.069)	(0.060)	(0.057)	(0.057)	(0.058)	(0.067)
Trade with the euro area	0.473	0.398	0.368	0.363	0.353	0.371
	(0.066)***	(0.056)***	(0.055)***	(0.054)***	(0.056)***	(0.060)***
Trade with the UK	0.022	0.048	0.012	0.013	0.017	0.005
	(0.041)	(0.037)	(0.041)	(0.040)	(0.041)	(0.040)
Trade with Japan	0.109	0.049	0.030	0.021	0.017	-0.005
	(0.081)	(0.065)	(0.065)	(0.064)	(0.066)	(0.060)
EUR debt	0.156	0.216	0.188	0.189	0.186	0.164
	(0.088)*	(0.083)**	(0.084)**	(0.084)**	(0.085)**	(0.086)*
US troops		0.193	0.196	0.199	0.200	0.056
		(0.079)**	(0.080)**	(0.081)**	(0.082)**	(0.061)
Geopolitical distance from euro area			-0.126	-0.124	-0.136	-0.160
			(0.048)***	(0.047)**	(0.051)***	(0.053)***
Financial sanctions from euro area				0.022	-0.031	0.062
				(0.142)	(0.142)	(0.131)
Trade sanctions from euro area				-0.249	-0.241	-0.234
				(0.171)	(0.172)	(0.169)
US financial sanctions					0.097	0.140
					(0.126)	(0.130)
US trade sanctions					-0.070	-0.118
					(0.166)	(0.168)
Military alliance with the US						0.021
						(0.047)
N	1412	1394	1292	1292	1292	1269
Adj. R2	0.690	0.720	0.750	0.760	0.760	0.770
No. of economies	106	104	100	100	100	99
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports OLS estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

[41] More formally, Liu et al. (2026) show that if country A is connected to country B and country B is connected to country C, then A and C can become strategically interdependent even in the absence of a direct A–C relationship. The empirical simulations suggest that these higher-order connections account for a substantial share of geopolitical influence.

The results for the CNY, presented in Table 3, suggest a more limited role for the standard explanatory variables. However, a key driver remains trade with China, which is positively associated with higher CNY shares.[42] Geopolitics also plays a significant role: economies facing financial sanctions from China tend to have lower shares of the CNY.[43] On the other hand, trade sanctions imposed by the US appear to be associated with increased use of the CNY.

Table 3. Baseline estimates - Determinants of CNY shares of FX reserves

	(1)	(2)	(3)	(4)	(5)	(6)
USD peg	0.093	0.077	0.083	0.082	0.043	0.012
	(0.090)	(0.091)	(0.084)	(0.083)	(0.075)	(0.077)
EUR peg	-0.218	-0.251	-0.124	-0.112	-0.089	-0.094
	(0.100)**	(0.111)**	(0.054)**	(0.053)**	(0.059)	(0.059)
Trade with the US	-0.025	-0.02	-0.028	-0.053	-0.058	-0.083
	(0.030)	(0.030)	(0.027)	(0.029)*	(0.031)*	(0.038)**
Trade with the euro area	0.104	0.115	0.047	0.042	0.038	0.017
	(0.075)	(0.078)	(0.049)	(0.049)	(0.048)	(0.053)
Trade with China	0.222	0.225	0.233	0.234	0.229	0.227
	(0.063)***	(0.063)***	(0.062)***	(0.060)***	(0.062)***	(0.057)***
USD debt	-0.016	-0.016	-0.037	-0.022	-0.033	-0.036
	(0.035)	(0.033)	(0.031)	(0.030)	(0.028)	(0.032)
US troops		-0.045	-0.03	-0.013	-0.008	-0.015
		(0.028)	(0.020)	(0.020)	(0.021)	(0.023)
Geopolitical distance from China			0.004	-0.024	-0.031	-0.051
			(0.032)	(0.034)	(0.034)	(0.047)
Financial sanctions from China				-0.478	-0.584	-0.595
				(0.143)***	(0.201)***	(0.195)***
Trade sanctions from China				0.32	0.295	0.306
				(0.160)**	(0.164)*	(0.168)*
US financial sanctions					-0.042	-0.018
					(0.056)	(0.055)
US trade sanctions					0.245	0.231
					(0.140)*	(0.135)*
Military alliance with the US						0.05
						(0.035)
N	1,391	1,382	1,270	1,270	1,270	1,247
Adj. R2	0.06	0.06	0.16	0.19	0.2	0.21
No. of economies	111	110	106	106	106	105
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports OLS estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Tables C.11–C.13 in the Appendix present Tobit estimates, demonstrating the robustness of our findings. Notably, the magnitude of the coefficients on US troops increases slightly and is estimated with greater precision.

[42] In contrast, pegging to the EUR is linked to lower CNY shares.

[43] Interestingly, trade sanctions imposed by China exhibit the opposite effect, though the statistical significance of this relationship is weaker.

Finally, Table C.14 in the Appendix shows OLS and Tobit estimates for other units (GBP, JPY, AUD and CAD). Estimates for the JPY provide additional support to the "friend of a friend" hypothesis: a one-standard deviation increase in the number of US troops in a given country is associated with a 5 percentage points increase in the JPY share of reserves. The effect for the GBP is negative but economically small (less than 1 percentage point). There is no effect for the AUD and the CAD.

6. Conclusions

This paper revisited the evidence on the dominance of the US dollar in global foreign exchange reserves, leveraging the most comprehensive and up-to-date panel dataset on the currency composition of official foreign exchange reserves. We uncovered key diversification trends that were previously obscured by aggregate data, particularly shifts within Big Four currencies. Our rolling analysis further shows that the contribution of China, Russia, and Switzerland to the decline in the aggregate USD share has diminished over time, cautioning against attributing the trend to a small set of economies alone. These findings reconcile discrepancies between publicly available aggregate data on global FX reserves and the median reserve shares revealed in our disaggregated dataset. We also revisited estimates of the security premium on the USD, shedding light on the geopolitical forces underpinning the USD's dominance as a global reserve currency.

The findings carry significant implications for both research and policy. They underscore the importance of assembling and analyzing disaggregated data to better capture country-level heterogeneity in reserve holding patterns across space and time. Furthermore, the dataset lays a foundation for future empirical research on trends in global foreign exchange reserve holdings. And for policymakers, it provides a valuable tool to monitor diversification dynamics that could potentially reshape the global monetary system. For this reason, we plan to make regular updates of the dataset publicly available.

References

Aiyar, S., D. Malacrino, and A. F. Presbitero. "Investing in friends: The role of geopolitical alignment in fdi flows." *European Journal of Political Economy*, 83 (2024), 102508.

Amiti, M., O. Itskhoki, and J. Konings. "Dominant currencies: How firms choose currency invoicing and why it matters." *The Quarterly Journal of Economics*, 137 (2022), 1435–1493.

Arslanalp, S., B. Eichengreen, and C. Simpson-Bell. "The stealth erosion of dollar dominance and the rise of nontraditional reserve currencies." *Journal of International Economics*, 138 (2022), 103656.

Arslanalp, S., B. Eichengreen, and C. Simpson-Bell. "Our Underappreciated International Reserve System." National Bureau of Economic Research (2025).

Avaro, M. "Zombie international currency: the pound sterling 1945–1971." *The Journal of Economic History*, 84 (2024), 917–952.

Bahaj, S. and R. Reis. "Jumpstarting an international currency." CEPR Discussion Paper, No. DP14793 (2020).

Bailey, M. A., A. Strezhnev, and E. Voeten. "Estimating Dynamic State Preferences from United Nations Voting Data." *Journal of Conflict Resolution*, 61 (2017), 430–456.

Beck, R. and E. Rahbari. "Optimal reserve composition in the presence of sudden stops." *Journal of International Money and Finance*, 30 (2011), 1107–1127. ISSN 0261-5606. doi:https://doi.org/10.1016/j.jimonfin.2011.02.006.

Benguria, F. and D. Novy. "How to grow an invoicing currency: Micro evidence from argentina."

Bianchi, J. and C. Sosa-Padilla. "International Sanctions and Dollar Dominance." *NBER Working Paper*, 31024.

Bloomberg. "China says reports on euro holdings review groundless." *Bloomberg*.

Boz, E., A. Brüggen, C. Casas, G. Georgiadis, G. Gopinath, and A. Mehl. "Patterns of invoicing currency in global trade in a fragmenting world economy."

Boz, E., C. Casas, G. Georgiadis, G. Gopinath, H. Le Mezo, A. Mehl, and T. Nguyen. "Patterns of invoicing currency in global trade: New evidence." *Journal of international economics*, 136 (2022), 103604.

Broner, F., A. Martin, J. Meyer, and C. Trebesch. "Hegemonic globalization." Working Paper (2024).

Chiba, D., J. C. Johnson, and B. A. Leeds. "Careful commitments: democratic states and alliance design." *Journal of Politics*, 77 (2015), 968—-982.

China Daily. "China has confidence on EU markets." *China Daily*.

China Daily. "Show of confidence in Europe." *China Daily*.

Chinn, M. D., H. Ito, and R. N. McCauley. "Do central banks rebalance their currency shares?" *Journal of International Money and Finance*, 122 (2022), 102557.

Clayton, C., M. Maggiori, and J. Schreger. "A framework for geoeconomics." National Bureau of Economic Research (2023).

Clayton, C., M. Maggiori, and J. Schreger. "The Political Economy of Geoeconomic Power." National Bureau of Economic Research (2025).

Cohen, B. "The geography of money Cornell University Press." *New York*.

Coppola, A., A. Krishnamurthy, and C. Xu. "Liquidity, debt denomination, and currency dominance." National Bureau of Economic Research (2023).

Dorbec, A. "Choice of substitution currency in Russia: How to explain the dollar's dominance." Bank of Finland, BOFIT (2005). Discussion Paper No. 15/2005.

ECB. "The international role of the euro." (2025). doi:10.2866/2357948. Catalogue number QB-01-25-143-EN-N; ISBN 978-92-899-7261-1; ISSN 1725-6593.

Eichengreen, B. *Exorbitant privilege: The rise and fall of the dollar and the future of the international monetary system*. Oxford University Press (2011).

Eichengreen, B. "Money Beyond Borders: Global Currencies from Croesus to Crypto." (2026).

Eichengreen, B., L. Chiţu, and A. Mehl. "Stability or upheaval? The currency composition of international reserves in the long run." *IMF Economic Review*, 64 (2016), 354–380.

Eichengreen, B. and M. Flandreau. "The rise and fall of the dollar (or when did the dollar replace sterling as the leading reserve currency?)." *European Review of Economic History*, 13 (2009), 377–411.

Eichengreen, B. and D. J. Mathieson. "The currency composition of foreign exchange reserves: retrospect and prospect." *IMF Working Paper*, No. 00/131.

Eichengreen, B., A. Mehl, and L. Chiţu. "Mars or Mercury? The geopolitics of international currency choice." *Economic Policy*, 34 (2019), 315–363.

Farhi, E., P.-O. Gourinchas, and H. Rey. *Reforming the international monetary system*. CEPR (2011).

Farhi, E. and M. Maggiori. "A model of the international monetary system." *The Quarterly Journal of Economics*, 133 (2018), 295–355.

Ferranti, M. "Estimating the Currency Composition of Foreign Exchange Reserves." Working Paper (2023).

Financial Times. "China reviews eurozone bond holdings." *Financial Times*.

Goldberg, L. S. and O. Z. Hannaoui. "Drivers of Dollar Share in Foreign Exchange Reserves." *Journal of International Economics*. Forthcoming.

Goldberg, L. S. and C. Tille. "Vehicle currency use in international trade." *Journal of international Economics*, 76 (2008), 177–192.

Goldberg, L. S. and C. Tille. "Micro, macro, and strategic forces in international trade invoicing: Synthesis and novel patterns." *Journal of International Economics*, 102 (2016), 173–187.

Gopinath, G. "The international price system." National Bureau of Economic Research (2015).

Gopinath, G., E. Boz, C. Casas, F. J. Díez, P.-O. Gourinchas, and M. Plagborg-Møller. "Dominant currency paradigm." *American Economic Review*, 110 (2020), 677–719.

Gopinath, G., P.-O. Gourinchas, A. F. Presbitero, and P. Topalova. "Changing global linkages: A new Cold War?" *Journal of International Economics*, 153 (2025), 104042.

Gopinath, G. and J. C. Stein. "Banking, trade, and the making of a dominant currency." *The Quarterly Journal of Economics*, 136 (2021), 783–830.

Herrador, J. J. A., M. Macovei, and M. Bizer. "The Role of the Euro in Southern Neighbourhood Countries." Directorate General Economic and Financial Affairs (DG ECFIN), European Commission (2022). Discussion Paper No. 163.

Ilzetzki, E., C. M. Reinhart, and K. S. Rogoff. "Exchange arrangements entering the twenty-first century: Which anchor will hold?" *The Quarterly Journal of Economics*, 134 (2019), 599–646.

Ilzetzki, E., C. M. Reinhart, and K. S. Rogoff. "Why is the euro punching below its weight?" *Economic Policy*, 35 (2020), 405–460.

IMF. "International Reserves and Foreign Currency Liquidity: Guidelines for a Data Template." (2013). Last accessed: December 2025.

IMF. *International Reserves and Foreign Currency Liquidity: Guidelines for a Data Template*. International Monetary Fund, Washington, D.C. (2013).

Ito, H. and R. N. McCauley. "Currency composition of foreign exchange reserves." *Journal of International Money and Finance*, 102 (2020), 102104.

Kane, T. "History of US Troop Deployments, 1950-2023." *Available at SSRN 5027690*.

Kempf, E., M. Luo, L. Schäfer, and M. Tsoutsoura. "Political ideology and international capital allocation." *Journal of Financial Economics*, 148 (2023), 150–173.

Keynes, J. M. *Essays in Persuasion*. McMillan and Co. (1931).

Kim, S. Y. "The Security Dividend: US Military Power, Dollar Dominance and Global Stability." SSRN Working Paper, last revised February 26, 2026.

Kindleberger, C. P. *Power and money*. Springer (1970).

Kirshner, J. *Currency and coercion: the political economy of international monetary power*. Princeton University Press (2020).

Krugman, P. R. "Vehicle currencies and the structure of international exchange." (1979).

Kwende, G. and E. Nephew. "Improving the Analytical Usefulness of the IMF's COFER Data." International Monetary Fund, Technical Notes and Manuals, 014 (2025).

Laser, F., A. Mihailov, and J. Weidner. "Currency and Gold Shares in International Reserves by Country: Insights from a New Dataset."

Lauwers, A. and Y. Mimir. In *Geoeconomic Fragmentation: Implications for the Euro Area and ASEAN+3 Regions*. "Chapter 3: Exploring euro area exposure to the risk of geoeconomic fragmentation.", ESM Discussion Paper No. 23 (2024).

Liao, G., E. Prasad, and T. Zhang. In *Jackson Hole Economic Policy Symposium, Federal Reserve Bank of Kansas City. url: https://www. kansascityfed. org/documents/18555/prasad. pdf*. "Financial Innovation and the International Monetary System." (2026).

Liu, E., S. J. Redding, B. Smith-Worthington, and D. Y. Yang. "A Network Approach to Geopolitics." Working paper, Princeton University and Stanford University (2026).

Maggiori, M., B. Neiman, and J. Schreger. "The rise of the dollar and fall of the euro as international currencies." In *AEA Papers and Proceedings*, Vol. 109, Vol. 109, 521–526 (2019).

McCauley, R., M. Chinn, and H. Ito. "The Russian sanctions and dollar foreign exchange reserves." *VOXEU/CEPR*.

Minesso, M. F., A. Mehl, O. T. Bagur, and I. Vansteenkiste. "Geopolitics and global interlinking of fast payment systems." CEPR Discussion Paper (2025).

Mohr, C. and C. Trebesch. "Geoeconomics." CESifo Working Paper (2024).

Mukhin, D. "An equilibrium model of the international price system." *American Economic Review*, 112 (2022), 650–688.

Neykov, R. and C. Robert. "The Role of the Euro in the Eastern Partnership Countries." Directorate General Economic and Financial Affairs (DG ECFIN), European Commission (2021). Discussion Paper No. 138.

Obstfeld, M. In *Globalization in an age of crisis: Multilateral economic cooperation in the twenty-first century*. "The international monetary system: living with asymmetry." University of Chicago Press (2013), 301–336.

Ouaret, S. and F. Yaici. "The management of foreign exchange reserves in Algeria." *Roa Iktissadia Review*, 10 (2020), 75–92.

Ouaret, S. and F. Yaici. "Examination of possible alternatives to the management of foreign exchange reserves by the Bank of Algeria." *Journal of North African Economies*, 19 (2023), 257–282.

Polanski, Z. and A. Winkler. "Russia, EU enlargement and the euro." European Central Bank (ECB) (2008). ECB Occasional Paper No. 93.

Prasad, E. *Gaining currency: The rise of the renminbi*. Oxford University Press (2017).

Reuters. "China to remain long-term investor in Europe's debt." *Reuters*.

Rey, H. "International trade and currency exchange." *The Review of Economic Studies*, 68 (2001), 443–464.

Rogoff, K. *Our dollar, your problem: an insider's view of seven turbulent decades of global finance, and the road ahead*. Yale University Press (2025).

Schnabl, G. "The Russian currency basket: The rising role of the Euro for Russia's exchange-rate policies." *Intereconomics*, 41 (2011), 135–141. ISSN 0020-5346. doi:https://doi.org/10.1007/s10272-006-0183-6.

Setser, B. W. "Finding China in the U.S. TIC Data." Council on Foreign Relations, link (2026).

Subramanian, A. *Eclipse: Living in the shadow of China's economic dominance*. Peterson Institute (2011).

Weiss, C. "Geopolitics and the US Dollar's Future as a Reserve Currency." *International Finance Discussion Paper*.

Williamson, J. "Currencies of Power and the Power of Currencies: The Geo-Politics of Currencies, Reserves and the Global Financial System." *Unpublished manuscript, International Institute for Strategic Studies, Washington, DC*.

Yalcin, E., G. Felbermayr, H. Kariem, A. Kirilakha, O. Kwon, C. Syropoulos, and Y. V. Yotov. "The Global Sanctions Data Base—release 4: the heterogeneous effects of the sanctions on Russia." *The World Economy*, 48 (2025), 2003–2017.

Appendix A. Compilation and harmonization of the database

A.1 Definition of foreign currency reserves

Data are compiled in accordance with the International Reserves and Foreign Currency Liquidity (IRFCL) Guidelines (IMF (2013)), ensuring maximum international comparability. These guidelines align with the Balance of Payments and International Investment Position Manual (BPM7) and offer additional detailed guidance on key aspects.

BPM7 defines a country's international reserves as: those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, intervening in exchange markets to influence the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, or serving as a basis for foreign borrowing). The following implications arise from this definition. First, reserves represent a gross concept, as they exclude the liabilities of the monetary authorities. Second, reserves must only comprise claims on non-residents. Third, reserve assets are required to be both readily available and fully controlled by the monetary authority.

The IRFCL guidelines operationalize the definition of official reserves. Notably, they specify certain assets that must be excluded from reserves. These include pledged assets that are not readily available, such as assets blocked as collateral for third-party loans or payments, assets lent to a third party that cannot be accessed until maturity, and assets lent to a third party that are not marketable before maturity. Similarly, lines of credit that could be drawn upon and foreign exchange resources obtainable under swap agreements are not classified as reserve assets, until they are drawn upon.

As our database focuses on the currency composition of reserves, the scope is narrowed to foreign currency reserves. According to the IRFCL guidelines, foreign currency reserves consist exclusively of reserve assets categorized as securities and total currency and deposits. All other types of reserve assets are excluded from foreign currency reserves. These excluded assets include the IMF reserve position, special drawing rights (SDRs), monetary gold, and other reserve assets (such as financial derivatives, loans to nonbank nonresidents, and other miscellaneous assets).

Securities should include only highly liquid, marketable debt and equity securities issued by non-resident entities. Securities not listed for public trading are generally excluded unless they are considered sufficiently liquid to qualify as reserve assets. To ensure availability under adverse circumstances, reserve assets are typically required to be of high quality (investment grade). Securities held under repurchase agreements and lending agreements should be recorded as follows: for a repo transaction, funds received should be recorded as an increase in deposits among reserve assets, while the securities should be excluded from the cash borrower's reserve assets. Conversely, for a reverse repo transaction, funds provided to the counterparty should be recorded as a decrease in deposits among reserve assets, unless the lender's domestic currency was used. However, the

securities collateral acquired in a reverse repo cannot be classified as reserve assets, as they fail to meet the economic ownership requirement.

Total currency and deposits include currency and deposits that are readily available upon demand. Term deposits that can be redeemed on demand or with very short notice, without significantly affecting the value of the deposit, may also be included. Additionally, short-term foreign currency loans, which are redeemable upon demand and made by monetary authorities to other central banks, the BIS, the IMF, or depository institutions, should be included within deposits.

A.2 Collection of data from the IMF members' Reserves Data templates

The primary data source that we use to construct our dataset is the IMF Data Template on IRFCL, which we refer to as the "IMF Reserve Data Template" for short. The IMF Reserve Data Template is required for all economies that subscribe to the IMF Special Data Dissemination Standard (SDDS) or adhere to the IMF Special Data Dissemination Standard Plus (SDDS Plus). Under these standards, reporters are required to disclose (under "memorandum items"), the currency composition of reserve assets, at least annually, by two groups of currencies: (i) "currencies in the SDR basket"; and (ii) "currencies not in the SDR basket." This is what we call the partial breakdown of reserve currencies in the paper. In addition, economies can voluntarily report what we call the full breakdown of reserve currencies by separately identifying the five currencies in the SDR basket (USD, EUR, JPY, GBP and CNY).

As of September 2026, there were 80 SDDS/SDDS Plus reporters and all report the IMF reserve data template. In addition, 15 reporters publish the template voluntarily.[44] In total, 95 reporters—making up nearly $11 trillion of global reserves as of end-2024—report the IMF reserve data template and thereby the partial breakdown of reserve currencies (see Appendix Table A.4). Among them, 37 reporters—making up nearly $2.5 trillion of global reserves as of end-2024—voluntarily provide the full breakdown. The partial breakdown is typically available from end-1999, and the full breakdown from end-2016. The data are available quarterly, except annually in a few cases.[45]

Currency classification of gold, SDR Holdings, and IMF reserve position. The IMF guidelines recommend that gold and claims denominated in SDRs (including SDR holdings and IMF reserve position) are denominated in "currencies in the SDR basket" when reporting the currency composition of reserve assets (IMF (2013), para 273). Most economies follow these guidelines, but country practices differ in a few cases (see Appendix Table A.5). We follow actual country

[44] Albania, Angola, Bolivia, Botswana, the ECB, Euro Area, Guatemala, Honduras, Jamaica, Kosovo, New Zealand, Nicaragua, Panama, Rwanda, and Serbia publish the IMF reserve data template voluntarily.

[45] China, Hong Kong SAR, Indonesia, Japan, Kosovo, Malaysia, Saudi Arabia, and Singapore report the currency composition of reserve assets annually in the IMF reserve data template, with a lag of no more than one year.

practices to remove gold, SDR holdings, and the IMF reserve position both from reserve assets and its currency composition, since our focus is on FX reserves.

Currency classification of other reserve assets (ORA). Similarly, we remove other reserve assets (ORA) from reserve assets (and its currency composition) to the extent possible. Other reserve assets include the market value of financial derivatives. In most cases, reserve managers use derivatives in major reserve currencies (e.g. the USD, EUR, JPY and GBP), and therefore, ORA is denominated in "currencies in the SDR basket." The only exceptions are Uruguay (which reports ORA under "currencies not in the SDR basket") and a few economies that report ORA in both the SDR and non-SDR categories.[46] For the latter category, we define FX reserves inclusive of ORA, since we cannot identify the distribution of ORA between SDR and non-SDR currencies. This leads to a slight deviation from our target definition of FX reserves but comes at a small cost as ORA is generally a negligible, small fraction thereof.

[46] Australia, Brazil, Chile, Costa Rica, Croatia, Estonia, Georgia, Hungary, Ireland, Israel, Mauritius, Mexico, Norway, Paraguay, Peru, Portugal, and Singapore report other reserve assets (ORA) in both SDR and non-SDR currencies.

Table A.4. IMF reserve data template reporters: currency composition of reserves

Note: The table lists the 95 reporters—making up nearly $11 trillion of global reserves as of end-2024—that report the IMF reserve data template and thereby the partial breakdown of reserve currecies. 1/ The data are available quarterly for all reporters, except annually for China, Hong Kong SAR, Indonesia, Japan, Kosovo, Malaysia, Saudi Arabia and Singapore. For Hong Kong SAR, Japan, Kosovo and Saudi Arabia, the end of the year is end-March, end-March, end-February and end-January, respectively. 2/ For Australia, Brazil, Chile, Costa Rica, Croatia, Estonia, Georgia, Hungary, Ireland, Israel, Mauritius, Mexico, Norway, Paraguay, Peru, Portugal, and Singapore, foreign exchange reserves include other reserve assets (ORA). ORA includes the market value of financial derivatives. 3/ The partial breakdown classifies reserve currencies into two groups: SDR currencies and non-SDR currencies. The full breakdown classifies them into six groups: USD, EUR, JPY, GBP, CNY, and non-SDR currencies.

Reporter	**FX Reserves** (2024,$ bn) 1/, 2/	**Breakdown** (Partial/Full) 3/	**Partial breakdown** (first obs.)	**Full breakdown** (first obs.)
All reporters	**10,737**			
Advanced economies	**4,209**			
Australia	43	Full	2000Q1	2016Q4
Austria	3	Partial	1999Q4	…
Belgium	6	Full	2000Q3	2016Q4
Bulgaria	38	Full	2003Q3	2016Q4
Canada	94	Full	2001Q1	2016Q4
Croatia	2	Full	2000Q1	2016Q4
Cyprus	0	Partial	2010Q1	…
Czech Republic	138	Partial	2000Q1	…
Denmark	54	Partial	1999Q4	…
ECB	58	Partial	1999Q4	…
Estonia	2	Full	2000Q1	2016Q4
Finland	9	Full	2000Q1	2016Q4
France	30	Partial	2000Q3	…
Germany	35	Full	1999Q4	2016Q4
Greece	4	Partial	2003Q2	…
Hong Kong SAR	408	Partial	2001Q1	…
Iceland	6	Partial	2000Q4	…
Ireland	5	Full	2001Q2	2016Q4
Israel	210	Full	2006Q3	2016Q4
Italy	50	Partial	2000Q3	…
Japan	1,077	Partial	2000Q2	…
Korea	391	Partial	2005Q1	…
Latvia	4	Partial	2000Q2	…
Lithuania	6	Partial	2004Q1	…
Luxembourg	0	Partial	2006Q1	…
Malta	1	Partial	2009Q4	…
Netherlands	6	Full	2000Q2	2016Q4
New Zealand	15	Partial	2000Q1	…
Norway	73	Full	2006Q1	2016Q4
Portugal	6	Full	2000Q2	2016Q4
Singapore	358	Partial	2000Q4	…
Slovak Republic	10	Partial	1999Q4	…
Slovenia	1	Partial	2000Q1	…
Spain	64	Partial	2000Q4	…
Sweden	42	Full	2000Q3	2016Q4
Switzerland	808	Full	2000Q3	2016Q4
United Kingdom	119	Partial	2000Q2	…
United States	35	Full	1999Q1	2016Q4
Euro Area	301	Partial	1999Q4	…

Table A.4 (continued)

Reporter	FX Reserves (2024,$ bn) 1/, 2/	Breakdown (Partial/Full) 3/	Partial breakdown (first obs.)	Full breakdown (first obs.)
Emerging markets and developing economies	**6,528**			
Albania	6	Partial	2014Q1	…
Angola	13	Partial	2021Q4	…
Argentina	24	Partial	2004Q3	…
Armenia	4	Partial	2003Q4	…
Belarus	3	Partial	2004Q4	…
Bolivia	0	Partial	2015Q1	…
Bosnia and Herzegovina	9	Full	2019Q3	2019Q3
Botswana	3	Full	2022Q1	2022Q1
Brazil	297	Full	2000Q4	2016Q4
Chile	40	Full	2000Q3	2016Q4
China	3,202	Partial	2015Q4	…
Colombia	58	Full	2006Q4	2016Q4
Costa Rica	14	Full	2009Q4	2016Q4
Dominican Republic	13	Partial	2012Q4	…
Ecuador	5	Full	2018Q4	2018Q4
Egypt	11	Partial	2009Q3	…
El Salvador	3	Partial	2000Q2	…
Georgia	3	Full	2007Q1	2016Q4
Guatemala	23	Partial	2008Q3	…
Honduras	8	Partial	2010Q4	…
Hungary	35	Partial	2000Q4	…
India	547	Partial	2010Q1	…
Indonesia	140	Partial	2006Q4	…
Jamaica	5	Full	2013Q3	2022Q2
Jordan	15	Partial	2006Q1	…
Kazakhstan	20	Partial	2003Q1	…
Kosovo	1	Full	2022Q4	2024Q1
Kyrgyz Republic	1	Partial	2004Q1	…
Malaysia	104	Partial	2005Q4	…
Mauritius	7	Full	2007Q2	2016Q4
Mexico	203	Full	2000Q1	2020Q2
Moldova	5	Full	2006Q2	2016Q4
Mongolia	5	Partial	2017Q4	…
Morocco	33	Full	2005Q4	2016Q4
Namibia	3	Partial	2020Q1	…
Nicaragua	6	Partial	2010Q4	…
North Macedonia	5	Partial	2011Q1	…
Panama	6	Partial	2021Q3	…
Paraguay	9	Full	2018Q4	2018Q4
Peru	73	Full	2001Q3	2016Q4
Philippines	84	Partial	2000Q4	…
Poland	179	Full	2006Q1	2024Q3
Romania	61	Partial	2007Q1	…
Russia	385	Partial	2004Q4	…
Rwanda	2	Partial	2022Q2	…
Saudi Arabia	413	Partial	2014Q1	…
Serbia	26	Partial	2017Q2	…
Seychelles	1	Full	2011Q1	2016Q4
South Africa	48	Partial	2000Q3	…
Sri Lanka	6	Partial	2015Q4	…
Thailand	210	Partial	2000Q2	…
Tunisia	9	Partial	2007Q4	…
Türkiye	84	Partial	2006Q4	…
Ukraine	40	Full	2002Q4	2016Q4
Uruguay	16	Full	2003Q3	2016Q4
West Bank and Gaza	1	Full	2012Q3	2016Q4

Table A.5. Currency classification of selected reserve instruments in the IMF reserve data template

Note: The table provides an overview of the practices adopted by selected reporters in classifying gold, SDR holdings, and IMF reserve positions within the IMF reserve data template. 1/ Distributed to the five SDR currencies based on their weight in the SDR basket.

Reporter	Gold	SDR holdings	IMF reserve positions
Partial breakdown			
Angola	Non-SDR	SDR	SDR
Chile	Non-SDR	SDR	SDR
China	Non-SDR	SDR	SDR
Hungary	Non-SDR	SDR	SDR
Mauritius	Non-SDR	Non-SDR	Non-SDR
Morocco	Non-SDR	Non-SDR	Non-SDR
Norway	SDR	Non-SDR	Non-SDR
Uruguay	Non-SDR	SDR	SDR
All other reporters	SDR	SDR	SDR
Full breakdown			
Bosnia and Herzegovina	EUR	All 1/	All 1/
Botswana	USD	USD	USD
Chile	Not included	All 1/	All 1/
Colombia	USD	USD	USD
Costa Rica	USD	USD	USD
Ecuador	USD	USD	USD
Israel	USD	USD	USD
Jamaica	Not included	All 1/	All 1/
Kosovo	Not included	EUR	EUR
Mexico	USD	All 1/	All 1/
Moldova	Not included	All 1/	All 1/
Peru	USD	USD	USD
Ukraine	All 1/	All 1/	All 1/
All other reporters	Not included	Not included	Not included

A.3 Collection of data from national sources

Manual data collection from official documents published by national authorities forms the core of our dataset and was the most resource-intensive task—involving the review of around 1,000 documents typically available on monetary authorities' websites.[47]

For some economies, central banks report the currency composition of foreign exchange reserves directly, often within annual reports or sections on international reserves management. Currency shares are explicitly disclosed, either in text or graphically. While accessible, these disclosures require scrutiny regarding the denominator used. It is not always clear if shares refer to gross or net reserves, include derivatives or reverse repurchase agreements, or are based solely on foreign exchange reserves versus broader international reserves, where "other currencies" may include SDRs or gold.

For most economies in our dataset, information on the currency composition of reserves is indirectly embedded in central banks' annual financial statements. Reporting practices vary, but currency decomposition data is typically found in the notes to financial statements, often under risk management sections—commonly labeled market, currency, or foreign exchange risk. When no dedicated risk section is available, a currency breakdown may be found in the notes for specific balance sheet items.[48]

Unlike earlier cases, the currency breakdown is often reported for broader foreign currency or total assets rather than strictly for foreign exchange or international reserves. While foreign currency assets primarily consist of reserves, they also include non-reserve assets, requiring careful adjustments. First, domestic currency assets are excluded. Second, within reserve assets, IMF-related assets (i.e., SDRs and the IMF reserve tranche, sometimes reported under "other currencies") and monetary gold (occasionally classified under US dollars or "other currencies") are consistently excluded to focus solely on FX reserves.

Foreign currency reserve assets not part of FX reserves, such as reverse repos and derivatives, are addressed where possible. Reverse repurchase agreements recorded as foreign-denominated assets are excluded from the currency-level breakdown whenever feasible. As stressed above, claims arising from reverse repos (e.g., cash, deposits, or securities lent) and collateral received, which are temporarily encumbered, cannot be considered freely usable FX reserves. When currency-level

[47] Historical disclosures are not always fully archived, and broken links to earlier vintages are common. In such cases, the Internet Archive's archived versions of central bank websites proved invaluable.

[48] Foreign exchange currency shares for euro area economies and the ECB are typically identified in financial statements under "Claims on non-euro area residents denominated in foreign currency, other than euro." Excluding "Receivables from the IMF," key components include "Balances with banks and security investments, external loans, and other external assets," covering balances with credit institutions, deposits, investments in debt and equity securities, reverse repurchase agreements, and other foreign currency investments. "Claims on euro area residents denominated in foreign currency" are excluded, as they represent non-reserve assets. Euro area member states transfer their foreign reserves to the ECB based on their capital shares, while remaining reserves are managed by national central banks.

data for reverse repos is unavailable, aggregate positions are compiled to assess deviations from the denominator definition. For instance, in Denmark, reverse repo positions can exceed 30% of the denominator in certain years. Assets temporarily received under repo transactions are included in the denominator from the borrower's perspective.

Derivative instruments, such as foreign currency forwards, swaps, and futures, are increasingly used by central banks to manage FX exposure. These tools help hedge non-pegged currency positions, convert funding between currencies, and mitigate portfolio currency risks. While FX derivatives are considered reserve assets, they are excluded from foreign exchange reserves and thus omitted from our currency composition calculations. When available, financial statements provide currency-level details on net derivative positions, enabling adjustments for specific currencies (e.g., Colombia, Argentina, Uganda, and Australia). In other cases, derivatives are excluded and reported off-balance-sheet (e.g., BEAC, Kyrgyz Republic). For some economies, derivatives are included in the denominator (e.g., Armenia, Brazil, South Africa, Hong Kong), while for others, their inclusion or magnitude is unclear. For IRFCL-reporting economies, certain definitions include derivatives (e.g., Peru, Israel, Norway). To ensure consistency, we prioritize temporal alignment within economies over cross-country comparability, aligning manual collection with IRFCL definitions when applicable. Appendix Table A.8 illustrates discrepancies between versions and IRFCL reporting for selected economies.

Other foreign-currency assets that are not reserve holdings are generally excluded. These include non-marketable equity investments, such as capital contributions to international institutions (e.g., BIS, SWIFT, Afrexim Bank, FLAR, and the Stabilization and Cooperation Fund). Although sometimes listed under foreign-currency securities, these unlisted instruments are not reserve assets. This approach was applied for economies like Turkey, Nigeria, Tanzania, Uganda, ECCB, Ecuador, Malawi, and Lesotho. Additionally, other non-reserve assets include pending receivables, payables, and accounts unrelated to reserve holdings, such as advances to suppliers, travel allowances, or staff loans.

Consequently, the currency shares we collect consistently exclude monetary gold and IMF-related assets. The inclusion of other foreign-currency assets—such as reverse repos, FX derivatives, or non-reserve holdings—is determined by data availability and prioritizes temporal consistency within each country, implemented on a case-by-case basis. [49] Whenever available, currency-level or aggregate information is systematically documented through detailed metadata, improving transparency in data construction and distinguishing our dataset from prior work. Appendix Table A.6 summarizes data availability by country and flags deviations from the baseline definition.

[49] To minimize data-entry errors, redundancy procedures are applied throughout the collection process. The denominator is first derived by subtracting non-FX reserve components, such as gold, IMF-related assets, and other non-reserve foreign-currency holdings. Currency-level data are then collected individually, ensuring the sum matches the overall denominator. For clarity, currency shares are calculated from raw data rather than relying on reported shares.

When available, currency denomination data by instrument type is recorded comprehensively, distinguishing between FX deposits and FX security investments. This level of detail, now collected for up to 92 economies (based on USD coverage alone for at least one year), represents a key feature of our dataset and has not been consistently documented in prior research.

We systematically collect all reported currencies, including pegged foreign-currency holdings, with residuals recorded under 'OTHC' (Other Currencies), reflecting country- and time-specific changes. The dataset includes SDR currencies (USD, EUR, JPY, GBP, CNY) and over 20 non-traditional reserve currencies reported by central banks (see Figure A.18). Currency coverage varies widely across economies and time. Where feasible, we combine multiple sources, including annual reports, financial statements and reserve management reports, to identify currencies that may appear in one source but not another.[50] Data are collected in the reporting month and year, in the original units and currencies from financial statements, and converted to USD millions using the exchange rate at the end of the accounting period. Currency composition data reflect valuation effects, meaning changes in currency shares capture both official foreign exchange transactions and fluctuations in exchange rates and asset prices.

For a few economies lacking official data, we supplement information from unofficial public sources. For Taiwan, India, Qatar, and the UAE, reserve currency composition is inferred from press reports, typically statements from central bank officials. Similar news-based evidence is used

[50]We implement a series of light imputations that remain part of the raw data. First, if the residual category "Other Currencies" (OTHC) is negligible (less than 0.1% of FX reserves), it is set to zero and missing currency shares are likewise replaced with zero. Second, to facilitate comparisons with the IMF's IRFCL SDR-basket aggregate, we make small adjustments to our compiled SDR currency shares whenever feasible so that their sum matches the corresponding IRFCL aggregate. No adjustment is applied to a limited set of economies and country-years where discrepancies likely reflect coverage or definition differences, or where the reliability of the IRFCL aggregate is uncertain (e.g. LKA, LUX and BRN, where our compilation primarily covers FX securities; or COL, BOL, URY, KGZ and ARG before 2016, where the treatment of CNY within the IRFCL SDR aggregate may not be consistent over time). In these cases, we rely on our compiled SDR share. For economies with no currency composition data, we use the IRFCL SDR aggregate whenever available. For all other economies, we compare our compiled SDR share with the IRFCL aggregate. If the difference is negligible, we retain the IRFCL aggregate. If it is below 1 percentage point, SDR currency shares are proportionally adjusted to match the IRFCL aggregate, with offsetting changes to OTHC and, where necessary, other non-SDR currencies. By contrast, when the discrepancy exceeds 1 percentage point, we generally retain our compiled SDR share, as larger discrepancies are unlikely to reflect minor measurement differences and proportional adjustments may introduce distortions in the currency composition. The only exception is when our compiled SDR share falls short of the IRFCL aggregate by more than 1 percentage point and only a partial SDR breakdown is available; in this case, we rely on the IRFCL aggregate provided the overall currency composition remains broadly consistent with summing to one. In addition, for country-years with no currency decomposition but where surrounding observations rely on the IRFCL SDR aggregate, we likewise rely on the IRFCL aggregate whenever available. This ensures consistency over time and avoids artificial breaks in the series when constructing the interpolated version of the dataset. Finally, in a very limited number of cases, some missing currency shares are set to zero. Missing SDR currencies are set to zero when the observed SDR currencies already sum to the final SDR aggregate; if only one SDR currency is missing, it is imputed as the residual. Small negative shares are set to zero, larger negative values are treated as missing, and currency shares are rescaled whenever their sum lies sufficiently close to one. This ensures that the final currency composition is non-negative and sums to one.

for Russia prior to 2007. For China, official reserve data are available for 2014–2019, complemented by observations from 2010 based on news sources. For Belarus (2018), Jordan (2020), and Lebanon (2020), data from European Commission surveys supported by national central banks are used (see Neykov and Robert, 2021; Herrador, Macovei, and Bizer, 2022). Algeria's reserve currency shares (1999–2022) are based on Ouaret and Yaici (2023, 2020), derived from internal Bank of Algeria documents. While not standard disclosures, these sources provide valuable benchmarks superior to model-based estimates. Appendix Table A.7 details metadata for these cases.

Additional notes regarding the treatment of ARG-CHN swap line

Argentina has access to a large currency-swap facility with the People's Bank of China (PBoC), originally established in 2009 and renewed repeatedly since then. Most recently, the agreement was extended to 2031 and currently amounts to RMB 130 billion (roughly USD 18 billion).

Between 2014 and 2024, the BCRA made extensive use of the facility (Vincient, 2023), with outstanding balances rising from USD 2.6 billion in 2014 to 10.8bn in 2015, 18.9bn in 2018, 20.5bn in 2021, and 18bn in 2022, before declining thereafter. By end-2024, the outstanding balance had fallen to roughly USD 4.7bn, indicating that a large share of the previously drawn funds had been repaid.

According to BPM7, foreign-currency deposits received under a central-bank swap arrangement may be recorded as reserve assets provided they are denominated and settled in a reserve (convertible) currency and satisfy the standard reserve-asset criteria regarding liquidity, availability, and control. Conversely, undrawn swap lines do not qualify as reserve assets because they represent contingent rather than existing claims. Once activated, the corresponding obligation vis-à-vis the counterpart central bank is recorded separately as a foreign liability. Hence, under BPM7 definition, only activated swap positions should be included in gross official reserve assets.

In practice, however, both the BCRA and the IMF's IRFCL template appear to treat the PBoC swap arrangement more broadly. The BCRA reports funds obtained under its RMB swap arrangement with the PBoC as part of "International Reserves" on the asset side of its balance sheet, while recording the corresponding obligation to return those RMB funds to the PBoC under other liabilities as a "Currency Swap Deposit". Similarly, IMF staff have continued to accept Argentina's classification of the full PBoC swap line within gross reserves, while separately excluding non-activated or otherwise unusable portions when assessing foreign-exchange liquidity or reserve adequacy. For example, Argentina reported USD 29.6 billion of official reserves in the IRFCL template for 2024, whereas the IMF's 2025 foreign-exchange liquidity assessment excluded approximately USD 13 billion corresponding to the non-activated portion of the PBoC swap, retaining only the activated tranche. Hence, the IRFCL measure includes the full USD 17.8 billion swap line in Argentina's reported reserves, consistent with the treatment adopted in the BCRA's 2024 financial statements. Because the IMF IRFCL template forms the basis of our reserve dataset, we follow the IRFCL reporting convention and therefore include the full value of the PBoC swap line in Argentina's reported CNY reserve holdings.

Additional notes regarding the treatment of EGY swap lines with CHN and UAE

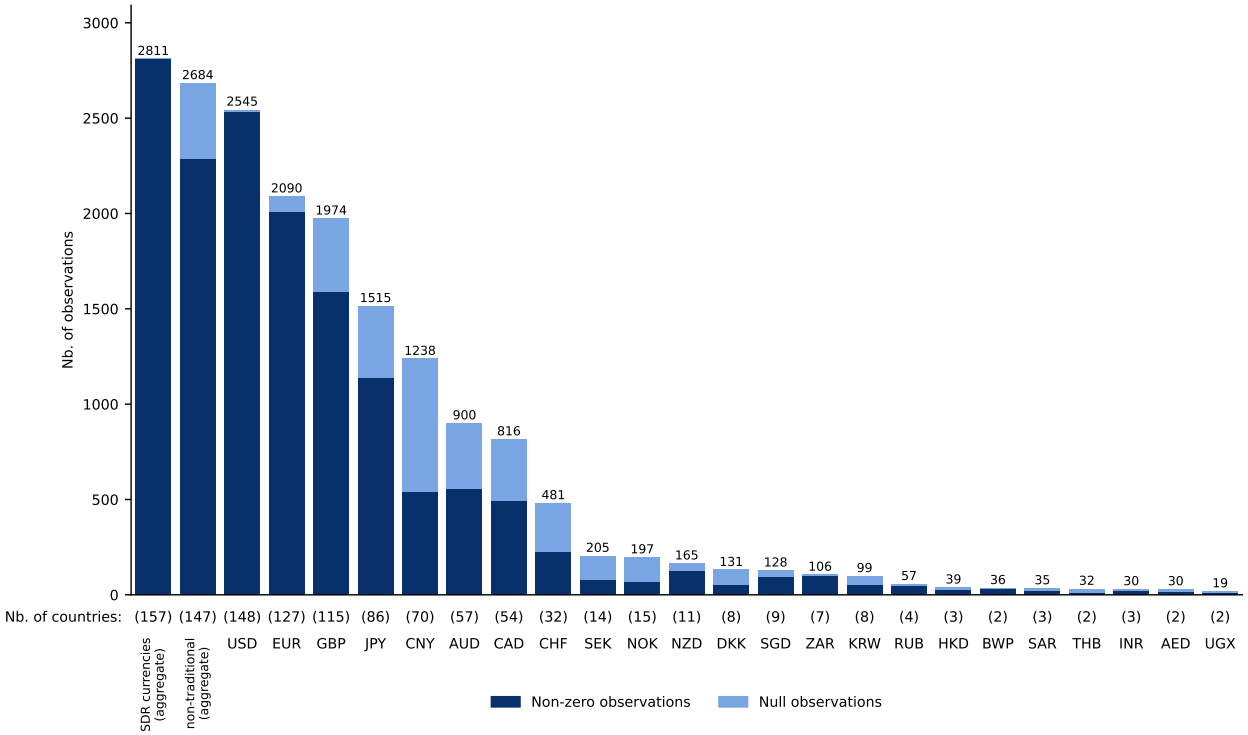
Egypt has maintained a bilateral currency-swap arrangement with the People's Bank of China since December 2016. The RMB 18 billion facility has been renewed repeatedly and appears to have remained fully activated throughout the period since 2017. Under the arrangement, the CBE receives RMB deposits

that are recorded as reserve assets (reported under non-interest-bearing current accounts), alongside a corresponding future repayment obligation. We therefore allocate the RMB 18 billion position to CNY reserve holdings from 2017 onward, with an offsetting reduction in OTHC. In June 2026, the agreement was renewed and expanded to RMB 30 billion, although this falls outside our sample period.

Similarly, from 2024 onward, we allocate the AED 5 billion swap arrangement with the Central Bank of the United Arab Emirates to dirham (AED) reserve holdings, with an offsetting reduction in OTHC. This position accounts for almost all of Egypt's identified non-traditional currency exposure.

Beyond the identified swap positions, sizeable increases in reserve assets not directly attributable to reported currency allocations are observed particularly in 2019 and 2025. Financial-statement disclosures suggest that most of these increases occurred in currencies other than USD, EUR and GBP, while also not appearing to belong to the non-SDR category. This effectively narrows the set of plausible candidates to CNY or JPY, neither of which is directly reported in the underlying disclosures. At the same time, these additional assets were recorded primarily as interest-bearing current-account balances held with foreign banks rather than foreign central banks. For example, the increase in OTHC between 2018Q2 and 2019Q2 cannot be explained by swap-line operations, as the IRFCL category "due from other central banks" remained broadly unchanged over the same period. Financial-statement disclosures on the geographical and credit-risk composition of foreign-currency assets indicate that the increase was concentrated in exposures to counterparties located in the Asia-Pacific region and largely associated with the A2 rating bucket. This pattern appears more consistent with placements at Chinese state-owned banks than with placements in Japan, whose counterparties would typically fall into higher-rated categories. For this reason, we allocate the unexplained gap between the IRFCL SDR aggregate and the identified SDR currencies to CNY, up to the amount available in OTHC. This allocation should be interpreted as an informed attribution rather than directly reported currency information.

Figure A.18. Observations coverage across currencies



Note: For each currency, the figure shows the number of non-missing observations (broken down into non-zero and zero values) and the number of economies reporting at least one year of non-missing, non-null observations. Currencies reported by only a single country (BHD, AWG, PKR, KES, IDR, CZK, BND, XAF) are omitted.

Table A.6. Sample metadata

Table A.6 presents our country sample coverage, along with metadata information. The *first* column shows a plain • if our sample includes at least one year of data on the country's central bank currency composition of FX reserves. A * indicates that the country was not covered in previous datasets, while a † marks the few cases where, for at least one year, the source is a news article or other unofficial disclosure rather than official central bank information (see Table A.7 for further details). The *Source* column identifies the data origin—typically central bank annual reports or financial statements (AR/FS), where shares may be either *computed* or directly *reported*. Other sources include the IMF's IRFCL template and FLAR confidential data. The *Currency shares denominator definition* column summarizes how the denominator used to compute currency shares is defined—either based on *gross* foreign-currency-denominated financial assets (baseline) or on *net* assets (assets minus liabilities). Gold holdings and IMF-related assets (SDRs and reserve positions) are excluded for all countries covered. Moreover, in our baseline definition, other reserve assets (ORA, such as derivatives and reverse repos), and non-reserve assets are excluded unless otherwise indicated. The final column reports the mean and standard deviation of the ratio between our compiled denominator and official FX reserves from the IMF's International Liquidity/IRFCL data.

Table A.6 (continued)

	Reference area ● covered, ○ not covered * new country † can rely on unofficial sources	FX reserves (2024,$ bn)	Year span	Currency shares (non-missing years)							Source(s)	Currency shares denominator definition	Denominator ratio consistency (avg. & std)
				USD	EUR	JPY	GBP	CNY	CAD	AUD			
Europe —Euro area													
●	Spain[ADV]	69	1999-2025	26	27	26	26	26	26	26	AR/FS (rep. shares)	gross assets (baseline)	0.98 (0.177)
●	European Central Bank[ADV]	64	1998-2025	19	28	19	19	20	19	19	AR/FS	gross assets (baseline, but based on net assets prior to 2013)	1.11 (0.165)
●	Italy[ADV]	53	2000-2025	20	26	20	20	20	20	20	AR/FS (rep. shares)	gross assets (incl. reverse repos)	1.0 (0.0)
●	Germany[ADV]	37	1998-2025	26	28	26	26	26	25	25	; AR/FS (until 2015); IRFCL	gross assets (incl. reverse repos); gross assets (baseline)	1.03 (0.069)
●	France[ADV]	33	1999-2025	7	27	0	0	0	7	7	AR/FS (rep. shares)	gross assets (baseline)	1.18 (0.13)
●	Slovakia[ADV]	12	2000-2025	17	26	17	17	17	17	17	AR/FS	gross assets (baseline)	1.15 (0.325)
●	Finland[ADV]	10	2000-2025	25	26	25	25	25	25	25	; AR/FS (until 2015); IRFCL	gross assets (definition under review); gross assets (baseline)	1.0 (0.0)
●	Portugal[ADV]	10	1999-2025	11	27	11	11	11	10	10	IRFCL	gross assets (baseline)	0.93 (0.224)
●	Netherlands[ADV]	8.4	1999-2025	27	27	27	27	27	22	22	AR/FS (until 2015, rep. shares); IRFCL	gross assets (incl. reverse repos); gross assets (baseline)	1.0 (0.0)
●	Belgium[ADV]	6.48	1999-2025	27	27	27	27	27	22	22	AR/FS (until 2015); IRFCL	gross assets (incl. reverse repos); gross assets (baseline)	1.01 (0.081)
●	Lithuania[ADV]	5.19	2000-2025	25	26	25	24	25	25	23	AR/FS	gross assets (baseline)	1.1 (0.178)
●	Ireland[ADV]	4.83	2000-2025	10	26	10	10	10	1	5	IRFCL	gross assets (incl. ORA, o/w derivatives)	1.01 (0.026)
●	Latvia[ADV]	4.47	2000-2025	25	26	23	25	23	16	4	AR/FS	gross assets (incl. reverse repos and non reserve assets)	1.01 (0.025)
●*	Greece[ADV]	4.13	2002-2025	3	24	3	3	3	3	2	AR/FS	gross assets (baseline)	1.01 (0.014)
●	Croatia[ADV]	2.14	2000-2025	26	26	24	24	24	26	26	AR/FS (until 2015, rep. shares); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.14 (0.107)
●	Estonia[ADV]	1.91	2010-2025	14	16	14	14	14	1	1	IRFCL	gross assets (incl. ORA, o/w derivatives)	1.01 (0.036)
●	Slovenia[ADV]	1.59	2000-2025	24	26	19	19	19	17	17	AR/FS	gross assets (baseline)	1.02 (0.065)
●*	Malta[ADV]	1.11	2002-2025	23	24	23	23	23	13	13	AR/FS	gross assets (baseline)	0.98 (0.042)
●*	Cyprus[ADV]	0.3	2009-2025	3	17	3	3	3	3	3	AR/FS	gross assets (baseline)	2.53 (0.395)
●	Luxembourg[ADV]	0.05	2003-2025	22	23	20	20	22	19	19	AR/FS	gross assets (based only on FX securities)	0.81 (0.194)
○	Austria[ADV]	4.84	N/A										
Europe —Others													
●	Switzerland[ADV]	915	1998-2025	28	28	28	28	28	28	22	AR/FS	gross assets (baseline, but included reserve repos until 2016)	1.0 (0.043)
●	Russian Federation[EMDE]	398	2007-2021	15	15	15	15	15	15	15	AR/FS (rep. shares)	gross assets (incl. reverse repos)	0.99 (0.072)
●	Poland[EMDE]	187	2001-2025	25	25	25	25	25	21	23	AR/FS (until 2023, rep. shares); IRFCL	gross assets (incl. derivatives and reverse repos); gross assets (baseline)	0.97 (0.082)
●	Czechia[ADV]	159	2002-2024	23	23	23	23	23	23	23	AR/FS (rep. shares)	gross assets (baseline)	1.05 (0.058)
●	United Kingdom[ADV]	155	1998-2025	28	28	28	28	27	12	12	AR/FS	gross assets (incl. reverse repos)	1.23 (0.214)
●	Romania[EMDE]	72	1999-2024	26	26	3	4	3	10	10	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.031)
●	Norway[ADV]	68	2000-2025	26	26	26	26	26	16	1	AR/FS (until 2015, rep. shares); IRFCL	gross assets (incl. reverse repos); gross assets (incl. ORA, o/w derivatives)	1.19 (0.177)
●	Turkiye[EMDE]	64	2003-2024	22	22	22	22	22	22	22	AR/FS	gross assets (incl. reverse repos)	0.99 (0.024)
●	Denmark[ADV]	59	2000-2024	23	23	23	22	22	7	7	AR/FS	gross assets (incl. reverse repos and non reserve assets)	1.14 (0.17)
●	Ukraine[EMDE]	53	2015-2025	11	11	11	11	11	7	7	IRFCL	gross assets (baseline)	0.99 (0.018)
●	Sweden[ADV]	45	1999-2025	27	27	27	27	27	17	17	AR/FS (until 2015, rep. shares); IRFCL	gross assets (incl. reverse repos); gross assets (baseline)	1.0 (0.0)
●	Bulgaria[EMDE]	39	1999-2025	27	27	26	26	26	26	26	AR/FS (until 2015, rep. shares); IRFCL	gross assets (baseline)	1.0 (0.0)
●	Serbia[EMDE]	27	2003-2024	21	21	21	21	21	21	7	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.0)
●	Bosnia and Herzegovina[EMDE]	10	2000-2025	26	26	26	26	26	26	26	AR/FS (until 2018); IRFCL	gross assets (baseline)	1.02 (0.014)
●*	Albania[EMDE]	7.81	2003-2024	22	22	22	22	22	22	22	AR/FS	gross assets (baseline)	1.0 (0.008)
●	Iceland[ADV]	6.77	2008-2024	17	17	15	17	14	10	10	AR/FS	gross assets (baseline)	1.02 (0.029)
●	Moldova, Republic of[EMDE]	5.99	2011-2025	15	15	14	15	14	15	15	AR/FS (until 2015, rep. shares); IRFCL	gross assets (baseline)	0.99 (0.031)
●* †	Belarus[EMDE]	5.54	2018	1	1	1	1	1	0	0	Neykov and Robert (2021, EC survey) (rep. shares)	gross assets (baseline)	1.0 (nan)
●	North Macedonia[EMDE]	4.84	2004-2024	21	21	14	14	14	11	11	AR/FS	gross assets (baseline)	1.0 (0.012)
●*	Montenegro[EMDE]	2.08	2004-2023	19	19	19	19	19	19	19	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.065)
●*	Kosovo[EMDE]	1.33	2006-2024	19	19	19	19	19	19	19	AR/FS	gross assets (baseline)	1.73 (0.364)
○	Hungary[EMDE]	38	N/A										
○	San Marino[EMDE]	0.69	N/A										
○	Andorra[ADV]	0.31	N/A										

	Reference area ● covered, ○ not covered * new country † can rely on news source	FX reserves (2024,$ bn)	Year span	Currency shares (non-missing years)							Source(s)	Currency shares denominator definition	Denominator ratio consistency (avg. & std)
				USD	EUR	JPY	GBP	CNY	CAD	AUD			
Western Hemisphere													
●	Brazil^{EMDE}	298	2002-2025	24	24	24	24	23	18	18	AR/FS (until 2015, rep. shares); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.02 (0.029)
●	Mexico^{EMDE}	219	2003-2025	23	23	23	23	23	17	17	confidential FLAR (until 2019); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.01 (0.02)
●	Canada^{ADV}	98	2003-2025	23	23	23	23	23	23	23	AR/FS (until 2015, rep. shares); IRFCL	gross assets (baseline)	1.03 (0.04)
●	Peru^{EMDE}	82	2000-2025	26	26	25	24	24	14	18	AR/FS (until 2015); IRFCL	net assets (incl. derivatives, reverse repos, and non reserve assets); gross assets (incl. ORA, o/w derivatives)	1.03 (0.027)
●	Colombia^{EMDE}	61	2001-2025	22	22	22	17	22	14	14	AR/FS (until 2024); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	0.98 (0.051)
●	Chile^{EMDE}	45	2005-2025	21	21	19	18	18	12	12	AR/FS (until 2015); IRFCL	gross assets (baseline)	1.0 (0.0)
●	United States^{ADV}	39	2000-2026	27	27	27	27	27	27	27	AR/FS	gross assets (baseline)	0.98 (0.041)
●	Argentina^{EMDE}	32	2004-2024	19	19	18	18	19	19	19	confidential FLAR (until 2018); AR/FS	gross assets (baseline); gross assets (incl. derivatives, reverse repos, and non reserve assets)	1.0 (0.003)
●*	Guatemala^{EMDE}	30	2012-2025	14	14	14	14	14	14	14	AR/FS	gross assets (baseline)	1.01 (0.027)
●	Uruguay^{EMDE}	17	2004-2025	22	22	22	22	22	21	21	AR/FS (until 2015); IRFCL	gross assets (baseline)	1.02 (0.052)
●	Costa Rica^{EMDE}	16	2008-2025	18	18	18	18	18	8	8	AR/FS (until 2015); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.01 (0.033)
●*	Dominican Republic^{EMDE}	13	2009-2024	16	16	16	16	16	16	16	AR/FS	gross assets (baseline)	1.0 (0.006)
●*	Honduras^{EMDE}	9.94	2019-2024	6	6	6	6	6	6	6	AR/FS	gross assets (baseline)	1.05 (0.036)
●	Paraguay^{EMDE}	8.67	2000-2025	26	19	19	19	19	19	19	AR/FS (until 2017, rep. shares); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.01 (0.014)
●	Ecuador^{EMDE}	6.06	1999-2025	27	27	27	27	27	27	27	confidential FLAR (until 2009); AR/FS (until 2017); IRFCL	gross assets (baseline)	1.01 (0.272)
●*	Jamaica^{EMDE}	5.96	2021-2025	5	5	5	5	5	3	3	IRFCL	gross assets (baseline)	1.01 (0.019)
●*	Panama^{EMDE}	5.64	2000-2024	25	25	25	25	25	25	25	AR/FS	gross assets (based on the state-owned Banco Nacional de Panama)	1.0 (0.0)
●*	El Salvador^{EMDE}	4.35	2000-2024	25	25	25	25	25	25	25	AR/FS (rep. shares)	gross assets (incl. derivatives)	1.0 (0.0)
●*	Trinidad and Tobago^{EMDE}	3.44	2023;2024	2	2	2	2	2	2	0	AR/FS	gross assets (baseline)	1.18 (0.044)
●*	Haiti^{EMDE}	2.81	2007-2018	12	12	12	12	12	12	12	AR/FS	gross assets (baseline)	1.09 (0.286)
●*	Bahamas^{EMDE}	2.64	2011-2024	14	14	14	14	14	14	14	AR/FS	gross assets (baseline)	0.94 (0.068)
●*	Curacao and Sint Marteens^{EMDE}	2.12	2020-2024	5	5	5	5	5	5	5	AR/FS	gross assets (baseline)	1.0 (0.002)
●*	E. Caribbean (ECCB)^{EMDE}	2.06	2003-2024	22	22	14	22	6	6	6	AR/FS	gross assets (baseline)	1.03 (0.041)
●*	Barbados^{EMDE}	1.94	2017-2024	8	8	8	8	8	8	3	AR/FS	gross assets (baseline)	1.9 (0.063)
●*	Aruba^{EMDE}	1.79	2012-2024	13	13	13	13	13	13	13	AR/FS (rep. shares)	gross assets (based only on FX securities, forming bulk of FX reserves)	1.0 (0.002)
●	Venezuela^{EMDE}	1.48	1999-2018	20	20	19	20	20	20	19	confidential FLAR	net assets	1.0 (0.016)
●*	Suriname^{EMDE}	1.34	2019-2024	5	5	5	5	5	5	5	AR/FS (rep. shares)	gross assets (incl. reverse repos)	1.25 (0.373)
●*	Guyana^{EMDE}	0.97	2006-2024	19	19	17	19	17	19	17	AR/FS	gross assets (baseline)	1.03 (0.112)
●*	Belize^{EMDE}	0.52	2008-2024	17	17	17	17	17	17	17	AR/FS	gross assets (baseline)	0.98 (0.023)
●*	Cayman Islands^{EMDE}	0.25	2000-2024	25	25	25	25	25	25	25	AR/FS	gross assets (baseline)	1.0 (0.008)
●*	Bermuda^{EMDE}	0.23	2000-2024	25	25	25	25	25	25	25	AR/FS	gross assets (baseline)	1.0 (0.014)
●	Bolivia^{EMDE}	0.1	2005-2024	20	20	20	20	20	20	20	AR/FS (rep. shares)	gross assets (incl. derivatives, reverse repos, and non reserve assets)	2.81 (8.093)
○	Nicaragua^{EMDE}	7.91	N/A										

	Reference area ● covered, ○ not covered * new country † can rely on news source	FX reserves (2024,$ bn)	Year span	Currency shares (non-missing years)							Source(s)	Currency shares denominator definition	Denominator ratio consistency (avg. & std)
				USD	EUR	JPY	GBP	CNY	CAD	AUD			
Asia & Pacific													
●†	China[EMDE]	3358	1995-2019	9	2	2	2	9	2	2	AR/FS (news sources in 2006 and 2010)	gross assets (baseline)	2.0 (3.001)
●*†	Taiwan, Province of China[ADV]	603	2015;2024	2	1	1	1	1	1	1	news sources (rep. shares)	gross assets (baseline)	1.0 (0.002)
●†	India[EMDE]	579	2015	1	1	1	1	1	1	1	news sources (rep. shares)	gross assets (baseline)	1.0 (nan)
●	Hong Kong[ADV]	404	2000-2024	25	3	3	3	3	0	0	AR/FS	gross assets (baseline)	1.11 (0.072)
●	Korea, Republic of[ADV]	402	2007-2024	18	0	0	0	0	0	0	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.005)
●	Philippines[EMDE]	82	2005-2024	20	20	20	20	20	20	18	AR/FS	gross assets (incl. derivatives and non reserve assets)	1.3 (0.674)
●	Australia[ADV]	45	2012-2025	14	14	14	14	14	12	14	AR/FS (until 2015); IRFCL	gross assets (baseline)	0.92 (0.148)
●*	Macao[ADV]	30	2018-2024	7	7	7	7	7	4	4	AR/FS (rep. shares)	gross assets (based only on FX currency and deposits holdings)	0.65 (0.069)
●	Bangladesh[EMDE]	22	2006-2025	20	20	20	20	20	20	20	AR/FS	gross assets (baseline)	1.03 (0.193)
●	Nepal[EMDE]	20	2012-2023	12	12	7	12	12	12	12	AR/FS	gross assets (baseline)	1.08 (0.1)
●	New Zealand[ADV]	19	2008-2025	18	18	18	18	18	18	18	AR/FS (rep. shares)	net assets (incl. derivatives and reverse repos)	1.1 (0.28)
●	Sri Lanka[EMDE]	6.18	2008-2024	17	17	17	17	17	11	17	AR/FS	gross assets (based only on FX securities)	0.48 (0.236)
●	Mongolia[EMDE]	5.81	2010-2024	15	15	0	0	13	7	7	AR/FS	gross assets (baseline)	0.83 (0.218)
●	Brunei Darussalam[EMDE]	3.32	2011-2024	14	14	14	14	14	14	14	AR/FS	gross assets (based only on FX securities)	0.35 (0.099)
●	Papua New Guinea[EMDE]	3.29	2006-2024	19	19	19	19	19	11	19	AR/FS	gross assets (baseline)	1.0 (0.032)
●*	Fiji[EMDE]	1.47	2006-2023	18	18	18	18	18	18	18	AR/FS	gross assets (baseline)	1.13 (0.234)
●*	Maldives[EMDE]	0.98	2008-2024	17	17	17	17	17	17	17	AR/FS	gross assets (baseline)	1.05 (0.092)
●*	Bhutan[EMDE]	0.92	2019-2024	6	6	2	6	2	2	2	AR/FS	gross assets (baseline)	1.33 (0.393)
●*	Solomon Islands[EMDE]	0.76	2005-2024	20	20	20	20	20	20	20	AR/FS	gross assets (baseline)	1.0 (0.021)
●*	Timor-Leste[EMDE]	0.72	2003-2024	21	20	20	20	20	20	20	AR/FS	gross assets (baseline)	1.16 (0.588)
●*	Vanuatu[EMDE]	0.64	2000-2024	19	19	19	19	19	12	13	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.041)
●*	Samoa[EMDE]	0.54	2002-2024	23	23	23	23	23	23	23	AR/FS	gross assets (baseline)	0.89 (0.212)
●*	Tonga[EMDE]	0.37	2010-2025	16	16	16	16	16	16	16	AR/FS	gross assets (baseline)	0.91 (0.093)
○	Japan[ADV]	1164	N/A										
○	Singapore[ADV]	380	N/A										
○	Thailand[EMDE]	242	N/A										
○	Indonesia[EMDE]	135	N/A										
○	Malaysia[EMDE]	111	N/A										
○	Viet Nam[EMDE]	82	N/A										
○	Cambodia[EMDE]	21	N/A										
○	Myanmar[EMDE]	6.47	N/A										
○	Lao PDR[EMDE]	2.64	N/A										
○	Kiribati[EMDE]	1.15	N/A										
○	Micronesia[EMDE]	0.48	N/A										
Middle East & Central Asia													
●*†	United Arab Emirates[EMDE]	257	2005-2010	3	3	3	3	3	3	3	news sources (rep. shares)	gross assets (baseline)	1.0 (0.0)
●	Israel[ADV]	222	2012-2025	14	14	14	14	14	7	7	AR/FS (until 2015); IRFCL	gross assets (baseline); gross assets (incl. ORA, o/w derivatives)	1.01 (0.044)
●*	Iraq[EMDE]	77	2007-2024	18	18	3	13	7	3	6	AR/FS	gross assets (baseline)	0.97 (0.055)
●*†	Algeria[EMDE]	50	1999-2022	24	24	24	24	24	24	24	AR/FS (rep. shares)	gross assets (baseline)	1.0 (0.0)
●	Morocco[EMDE]	43	2015-2025	11	11	11	11	11	7	7	IRFCL	gross assets (baseline)	1.0 (0.037)
●*†	Qatar[EMDE]	38	2005	1	0	0	0	1	1	1	news sources (rep. shares)	gross assets (baseline)	1.0 (nan)
●	Kazakhstan[EMDE]	16	2001-2024	23	23	23	23	21	17	17	AR/FS	gross assets (incl. derivatives)	1.06 (0.08)
●*†	Jordan[EMDE]	15	2020	1	1	1	1	1	1	1	Herrador et al. (2022, EC survey)	gross assets (baseline)	1.0 (nan)
●	Azerbaijan[EMDE]	13	2002-2024	23	23	23	23	23	21	21	AR/FS	gross assets (baseline)	1.03 (0.057)
●*	Egypt[EMDE]	11	2013-2025	13	13	2	13	2	0	0	AR/FS	gross assets (approx, assuming FX deposits with local banks are netted from USD holdings)	1.01 (0.213)
●*	Uzbekistan[EMDE]	10	2017-2024	7	6	6	6	7	6	6	AR/FS (rep. shares)	gross assets (baseline)	1.04 (0.027)
●*†	Lebanon[EMDE]	9.65	2017-2020	3	3	2	2	2	2	2	Herrador et al. (2022, EC survey); BDL's FS 2018	gross assets (baseline, assuming time deposits in non-USD currencies follows the same currency breakdown as cash at banks)	1.0 (0.0)
●	Afghanistan[EMDE]	7.86	2002-2022	20	20	20	20	20	12	12	AR/FS	gross assets (baseline)	1.02 (0.047)
●	Tunisia[EMDE]	7.3	2009-2024	16	16	16	16	16	2	0	AR/FS (rep. shares)	gross assets (baseline)	0.97 (0.035)
●*	Armenia[EMDE]	5.08	2004-2024	21	21	21	21	19	18	18	AR/FS	net assets (incl. derivatives and non reserve assets)	0.7 (0.154)
●	Georgia[EMDE]	4.68	2000-2025	26	26	22	22	26	16	16	AR/FS (until 2014); IRFCL	gross assets (incl. derivatives and non reserve assets); gross assets (incl. ORA, o/w derivatives)	1.0 (0.019)
●	Tajikistan[EMDE]	3.49	2008-2024	17	17	13	16	13	8	8	AR/FS	gross assets (baseline)	1.07 (0.177)
●*	Bahrain[EMDE]	3.25	2002-2024	23	6	6	6	6	6	6	AR/FS (rep. shares)	gross assets (baseline)	1.21 (0.125)
●	Palestine, State of[EMDE]	1.83	2015-2025	11	11	11	11	11	8	8	IRFCL	gross assets (baseline)	0.94 (0.116)
●	Kyrgyzstan[EMDE]	1.43	2003-2024	22	22	4	20	22	21	20	AR/FS	gross assets (baseline)	1.22 (0.122)
●*	Somalia[EMDE]	0.22	2013-2024	12	12	12	12	12	12	12	AR/FS	gross assets (baseline)	1.0 (0.0)
●	South Sudan[EMDE]	0.08	2012-2020	9	9	9	9	9	9	9	AR/FS	gross assets (baseline)	0.78 (0.356)

	Reference area ● covered, ○ not covered * new country † can rely on news source	FX reserves (2024,$ bn)	Year span	Currency shares (non-missing years)							Source(s)	Currency shares denominator definition	Denominator ratio consistency (avg. & std)
				USD	EUR	JPY	GBP	CNY	CAD	AUD			
Middle East & Central Asia (continued													
○	Saudi Arabia[EMDE]	393	N/A										
○	Libya[EMDE]	79	N/A										
○	Kuwait[EMDE]	37	N/A										
○	Oman[EMDE]	17	N/A										
○	Pakistan[EMDE]	17	N/A										
○	Syrian Arab Republic[EMDE]	16	N/A										
○	Yemen[EMDE]	1.77	N/A										
○	Turkmenistan[EMDE]	1.53	N/A										
○	Djibouti[EMDE]	0.38	N/A										
○	Sudan[EMDE]	0	N/A										
Sub-Saharan Africa													
●	South Africa[EMDE]	51	2004-2024	21	21	17	21	17	3	3	AR/FS	gross assets (baseline)	1.04 (0.071)
●	Nigeria[EMDE]	36	2005-2022	18	18	18	18	18	10	10	AR/FS (rep. shares)	gross assets (baseline)	1.1 (0.094)
●*	W. African States (BCEAO)[EMDE]	17	2002-2024	22	22	6	6	6	6	6	AR/FS	gross assets (baseline)	1.0 (0.002)
●	Angola[EMDE]	12	2012-2024	13	13	13	13	13	8	8	AR/FS	gross assets (baseline)	1.09 (0.027)
●	Kenya[EMDE]	12	2002-2025	24	24	11	24	11	9	9	AR/FS	gross assets (baseline)	1.01 (0.126)
●*	C. African States (BEAC)[EMDE]	11	2008-2024	17	17	17	17	17	17	17	AR/FS	gross assets (baseline)	1.0 (0.0)
●	Mauritius[EMDE]	8.21	2015-2025	11	11	11	11	11	0	0	IRFCL	gross assets (incl. ORA, o/w derivatives)	1.02 (0.044)
●	Ghana[EMDE]	7.54	2003-2024	22	22	4	22	4	2	2	AR/FS	gross assets (baseline)	1.14 (0.227)
●	Tanzania[EMDE]	5.31	2002-2024	23	23	11	23	23	10	23	AR/FS	gross assets (baseline)	0.93 (0.095)
●	Uganda[EMDE]	4.98	2006-2025	20	20	7	20	7	7	7	AR/FS	gross assets (baseline)	1.05 (0.117)
●	Congo, DR[EMDE]	4.87	2015-2023	9	9	9	9	9	9	9	AR/FS (rep. shares)	gross assets (incl. derivatives, reverse repos, and non reserve assets)	1.19 (0.194)
●*	Ethiopia[EMDE]	3.77	2019-2024	6	6	6	6	3	3	3	AR/FS	gross assets (baseline)	1.0 (0.507)
●	Mozambique[EMDE]	3.57	2007-2024	18	18	8	18	8	4	4	AR/FS	gross assets (baseline)	0.98 (0.044)
●	Botswana[EMDE]	3.38	2019-2025	7	7	7	7	5	5	5	AR/FS (until 2020); IRFCL	gross assets (baseline)	0.99 (0.017)
●*	Madagascar[EMDE]	3.05	2013-2024	12	12	12	12	12	12	12	AR/FS	gross assets (baseline)	0.85 (0.226)
●	Namibia[EMDE]	2.87	2003-2024	22	22	20	20	21	21	21	AR/FS	gross assets (baseline)	1.0 (0.05)
●*	Rwanda[EMDE]	1.91	2008-2024	12	12	6	12	6	6	6	AR/FS	gross assets (incl. derivatives)	0.94 (0.282)
●*	Mauritania[EMDE]	1.57	2006-2024	18	18	18	18	18	18	18	AR/FS	gross assets (baseline)	0.97 (0.067)
●*	Guinea[EMDE]	1.5	2013-2022	7	7	3	3	3	3	3	AR/FS	gross assets (baseline)	0.79 (0.09)
●	Zambia[EMDE]	1.47	2004-2024	21	21	10	21	10	10	10	AR/FS	gross assets (baseline)	0.99 (0.063)
●*	Cabo Verde[EMDE]	1.11	2008-2024	17	17	17	17	17	17	17	AR/FS	gross assets (baseline)	0.99 (0.045)
●	Lesotho[EMDE]	0.94	2007-2024	18	18	18	18	18	18	18	AR/FS	gross assets (baseline)	0.97 (0.126)
●	Seychelles[EMDE]	0.85	2009-2025	17	17	17	17	17	14	14	AR/FS (until 2015, rep. shares); IRFCL	gross assets (incl. reverse repos); gross assets (baseline)	1.0 (0.003)
●*	Eswatini[EMDE]	0.61	2007-2024	18	18	18	18	18	18	18	AR/FS	gross assets (baseline)	0.89 (0.111)
●*	Gambia[EMDE]	0.5	2012-2023	12	12	12	12	12	0	0	AR/FS	gross assets (baseline)	0.74 (0.107)
●*	Comoros[EMDE]	0.33	2010-2024	15	15	15	15	15	15	15	AR/FS	gross assets (baseline)	1.0 (0.007)
●*	Sierra Leone[EMDE]	0.14	2006-2024	19	19	11	19	12	11	11	AR/FS	gross assets (baseline)	0.97 (0.159)
●*	Burundi[EMDE]	0.11	2012-2021	9	9	3	9	2	3	5	AR/FS	gross assets (baseline)	0.85 (0.332)
●	Malawi[EMDE]	0.11	2008-2024	17	17	17	17	17	17	17	AR/FS	gross assets (baseline)	0.92 (0.083)
●*	Sao Tome and Principe[EMDE]	0.08	2002-2023	22	22	22	22	22	22	22	AR/FS	gross assets (baseline)	0.95 (0.058)
●*	Liberia[EMDE]	0.02	2007-2024	18	18	18	18	18	18	18	AR/FS	gross assets (baseline)	1.95 (2.017)
○	Zimbabwe[EMDE]	0.41	N/A										
○	Eritrea[EMDE]	0.19	N/A										

Table A.7. Specific cases: FX reserve currency shares data based on unofficial sources

Table A.7 lists the eighth countries for which foreign exchange reserve currency share estimates are derived exclusively from news articles or other non-official sources, rather than from publicly available central bank disclosures such as annual reports or financial statements. The table also identifies the years for China and Russia in which similar unofficial sources are used in place of official data.

Country	Year	Currency shares estimates (in %)								Further details on unofficial sources
		USD	EUR	JPY	GBP	CNY	CAD	AUD	OTH	
United Arab Emirates	2005	98	2	0	0	0	0	0	0	News report based on statements from Central Bank Governor Sultan Bin Nasser Al-Suwaidi. Sources: *Khaleej Times*, 26 Jul 2006, *UAE watching market to convert reserves to euro*; *Gulf News*, *Euro reserve plan put off*; *The Independent*, *Arab central banks move assets out of dollar*; *Financial Times*, *UAE shifts 10% of its reserves into euros*.
United Arab Emirates	2007	97	3	0	0	0	0	0	0	News report based on a statement from Central Bank Governor Sultan Bin Nasser Al-Suwaidi. Source: *Khaleej Times*, 11 Jan 2007, *UAE cbank euro buying on hold until dip vs dollar*.
United Arab Emirates	2010	100	0	0	0	0	0	0	0	News report based on a statement from Mohammad Al Tamimi, Deputy Executive Director at the Central Bank's Treasury Department. Sources: Reuters (June 2010, *Nearly all UAE's $33bn forex reserves 'in dollars'*); Gulf News (*UAE holds no euros in forex reserves*).
India	2014	57.8	13.3	0	13.4	0	7.7	7.7	0	News report based on notes from a High-Level Strategy Committee meeting prepared by Deputy Governor H. R. Khan. Source: *Indian Express*, 9 Jan 2015, *RBI: Raise share of dollar in foreign exchange reserves*.
Qatar	2005	90	.	.	.	0	0	0	10	News report based on a statement from Central Bank Governor Abdullah bin Khaled Al-Attiyah. Sources: *L.A. Times Archives*, 5 Apr 2006, *Dollar off on talk of shift in reserves*; *Gulf Times*, *Qatar mulls converting some foreign reserves to EUR.*
Taiwan, Province of China	2015	89.8	8	0.2	2	0	0	0	0	News report based on a statement by Lin Tsu-shun, specialist in the Central Bank's Foreign Exchange Department. Source: *China Post*, 11 Jul 2016, *Taiwan's foreign exchange reserves set new record in June*. The article mentions EUR (8%) and GBP (2%) shares. JPY not specified. Japan's portfolio debt liabilities held by Taiwan (official and private) were only $1bn in 2016. AUD estimated as 0 based on IIP data. No data available from IIP/CPIS for CAD, GBP, or EUR.
Taiwan, Province of China	2025	92	.	.	.	.	.	.	8	News report based on remarks by Deputy Governor Zhu Mei-Lie before legislators. Source: *Economic Daily News*, 28 Mar 2025, *The central bank revealed that more than 90% of foreign exchange reserves have become U.S. bonds*. Note: A few days later, Central Bank President Yang Jinlong revised this figure, stating that "the correct proportion should be more than 80%. Because exchange rates fluctuate, the share also changes over time." Valuation effects alone cannot explain the 12% discrepancy; the first statement likely referred to 92% of reserves held in USD, while the revision referred to over 80% held in U.S. Treasuries.
Belarus	2018	72	16	0	0	11.8	.	.	0.2	Source: *Neykov and Robert (2021)*. The European Commission conducted a survey in 2019, with the support of Central Banks and Ministries of Finance, on the use of the euro and other currencies in the Eastern Partnership, including their use in FX reserves. From the data reported (USD, EUR, GBP, OTH) and the information on the share of FX reserves held in SDR currencies (99.78%), the residual—representing 11.78% of total FX reserves (12% "OTH" share after subtracting the portion held in non-SDR currencies)—is likely denominated in CNY and/or JPY. Since Belarus's FX reserve requirements in 2020 were primarily driven by repayments to Chinese creditors, and the emergency RMB 3.5 billion ($536 million) loan from China Development Bank explicitly aimed to support FX reserves (Horn et al., 2023), we attribute the entire residual (roughly $500 million) to CNY.
Jordan	2020	98	2	0	0	0	0	0	0	Source: *Herrador, Macovei and Bizer (2022)*. The European Commission conducted a survey in 2021 with the support of Central Banks and Ministries of Finance on the use of the euro and other currencies in the Southern Neighbourhood countries, including their use in FX reserves.
Lebanon	2020	81	18						1	
Algeria	2022	42.6	22.6	0	21.8	12.9	0	0	0	Source: *Ouaret and Yaici (2020, 2023)*, wherein currency shares from 1999-2022 are based on internal documents from the Bank of Algeria. The original internal documents the authors relied upon were not accessible. The only publicly available document referring to the currency breakdown of FX reserves is the Bank of Algeria's Note de conjoncture, 2ème semestre 2009, which is consistent with the 2009 currency shares reported by the authors.

(continued on next page)

Table A.7 (continued)

Country	Year	Currency shares estimates (in %)								Further details on unofficial sources
		USD	EUR	JPY	GBP	CNY	CAD	AUD	OTH	
China	2010	65	26	3	5	0	.	.	1	News report from the *China Securities Journal* (an official newspaper, Sep 3, 2010), citing unnamed reserve managers. The original article is no longer available, but it was relayed the same day by Reuters, BBC, and the Telegraph. This source is used e.g. in Gourinchas et al. (2011) and Zucman (2013).
Russia	2001	90	8.3	0	1.7	0	0	0	0	Source: Dorbec (2005) state that "[...] the share of currencies other than USD (including DM, pound, Yen) never attained 10%, while the euro's share reached 25% in mid-2003 and 30–35% in 2004 [...]". Polanski and Winkler (2008) also note that "Since 2001 the CBR increased euro-denominated reserves from about 10% to one-third in 2005 and 42.4% at end-2007." Neither paper reports underlying sources. Based on 2006 statements (see below), we assume a zero JPY share for 2001–2005, and allocate the remaining 10% between EUR and GBP using 2003-2004 weights.
Russia	2003	70	25	0	5	0	0	0	0	Source: EUR share from Dorbec (2005), consistent with 2004 statements (see below); USD and GBP backcast from 2004 statements.
Russia	2004	70	25	0	5	0	0	0	0	Source: News report based on statement of Central Bank Governor Sergei Ignatyev in front of parliament,"At the moment dollars made up 70%, euros 25% and other currencies 5% of the forex portion", *Wall Street Journal*, 8 Dec. 2004.
Russia	2005	60	33	0	7	0	0	0	0	Source: Konstantin Korishchenko, then Deputy Chairman of the Central Bank of Russia, stated that the bank "keeps about 60% of its $150 billion in reserves in U.S.-dollar assets", as reported by *the Wall Street Journal* on 5 Oct 2005. Further statements by Korishchenko reported in *Central Banking*, 8 Feb 2005 indicate that the euro accounts for about one-third of Russia's foreign exchange reserves. See also *Banki*, 8 Feb 2005, reporting that the euro share would remain in the range of 30–35%. These figures are consistent with Polanski and Winkler (2008) and Beck and Rahbari (2011). The remaining share (7%) is allocated to GBP. Schnabl (2011) report similar figures (USD 60%, EUR 33%, GBP 7%), attributed to Alexei Ulyukayev, then First Deputy Chairman of the Central Bank of Russia, on 13 September 2005. While consistent with the above statements, this specific Ulyukayev source could not be independently verified.
Russia	2006	49.6	40.93	0.4	9.06	0	0	0	0	Source: News report based on a public statement by Sergei Ignatyev indicating that the approximate structure of Russia's foreign exchange reserves was 50% U.S. dollars, 40% euros, 10% pounds sterling, and 1% yen, as reported in *Reuters*, 26 January 2007. See also *Reuters*, 18 May 2009, reporting a 49 percent USD share at the start of 2007. In Oct 2006, Alexei Ulyukayev told a conference in Moscow that "Recently we have included the yen." He added that the amount held in yen was currently close to zero, but that the bank would aim to increase it to several percent, as reported by *the Financial Times*, 16 October 2006. According to the Bank of Russia 2007 Annual Report, in 2006 and 2007 yen holdings were in currency and deposits rather than securities. The 2007 yen share of total FX reserves is reported at 0.8%. Since purchases began in October 2006, we interpolate the yen share between 0 (in 2005) and 0.8% (in 2007), yielding an estimated share of 0.4% for 2006. The reported USD share of 50% from press statements is adjusted to 49.6% after subtracting the imputed yen share. The remaining 50% is allocated between EUR and GBP using interpolated weights between 2005 and 2007 values.

Table A.8. Gross Assets, derivatives, and IRFCL currency shares: selected examples

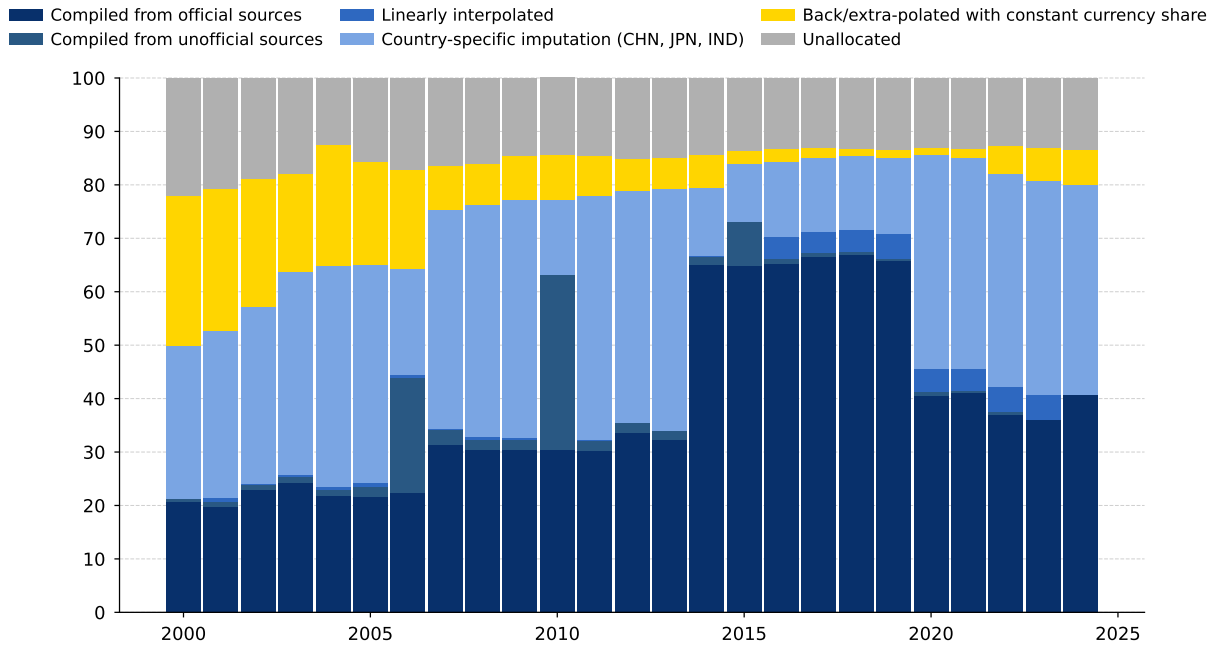
Table A.8 compares reserve currency shares for Australia, Israel and Peru over 2012–2025 across three alternative measures: gross reserve assets, gross reserve assets including derivatives, both derived from central bank financial statements, and currency shares reported in the IMF's IRFCL database. For Australia, the baseline gross-assets measure most closely matches the IRFCL figures and is therefore retained. For Israel and Peru, the gross-assets-inclusive-of-derivatives measure provides the closest match and is preferred. Of note, a small inconsistency arises in the case of Peru. For 2020 and 2021, the IRFCL database reports non-zero shares for the Japanese yen, whereas our collected currency composition under the same definition (inclusive of derivatives) indicates that JPY exposure should be effectively zero. The financial statements explicitly state that any underlying JPY-denominated exposure was fully hedged through forward operations in those years, implying no JPY exposure net of derivatives.

Country	Time	Currency shares 2012–2025 (in %) gross assets | gross assets incl. derivatives | IRFCL														
		USD			EUR			JPY			GBP			OTHC		
AUS	2012-06	34.5	45		36	45		22.8	5		0	0		0	0	
	2013-06	45.5	55		33.4	35		15.8	5		0	0		0	0	
	2014-06	34.5	50.9		17.3	35.5		42.5	5.3		0	0		0	0	
	2015-06	26.4	56.6		12.3	24.9		54.8	2.3		0	5.4		0	0	
	2016-06	23	54.9	15.9	6.9	20.7	7.2	58.8	4.2	63.7	0.5	4.8	0.4	0	0	12.8
	2016-12			19.6			7.4			61.2			1.4			6.9
	2017-12			11.6			6.7			70.3			3.1			5.2
	2018-12			13.3			10.1			63.1			3.6			6.1
	2019-12			13.3			9.1			64.6			3.4			6.2
	2020-12			15.4			16.1			47			5.3			10.9
	2021-12			25.5			6			50.3			4.5			8.9
	2022-12			24.9			6.3			53.3			1			10.3
	2023-12			24.2			8			50.2			1.3			12.4
	2024-12			14.6			5.5			60.8			2.4			12.7
	2025-12			12.9			11.3			58.6			2.7			10.7
ISR	2012-12		61.3			25.3			0			3.9			0	
	2013-12		63.5			27.3			0			2.8			0	
	2014-12		65.7			29			0			3			0	
	2015-12		68.4			27.2			0			3			0.1	
	2016-12	68.7	69.1	69.2	27.5	27.8	27.7	0	0	0	2.4	2.4	2.4	0.8	0.7	0.1
	2017-12	66.4	66.3	66.3	30.2	30.2	30.1	0		0	2.5	2.5	2.5	0.6	1	0.7
	2018-12	67.3	67.1	67.1	29.2	29.2	29.1	0		0	2.5	2.5	2.5	0.7	1.2	0.9
	2019-12	68.4	67.7	68.1	27	26.9	26.8	0		0	2.6	2.6	2.6	1.6	2.8	2.1
	2020-12	44.3	66.6	66.1	35.3	28.4	28.3			0			2.6	20.4	5.1	2.1
	2021-12	46.4	65.3	65.4	35.7	28.3	28.3			1.9			2.6	17.9	5.6	1.2
	2022-12	45.5	62.7	62.6	21.4	19.6	19.6			4.7			4.7	33.1	17.7	6.5
	2023-12	51	61.9	61.9	19.3	20.2	20.2			4.7			5.2	29.7	17.9	7.1
	2024-12	55.8	63	63	19.7	20	20			5			5	24.5	17	7
	2025-12			62.9			20			5			5			7
PER	2012-12	77.3	78.5		9.6	8.7		5	0					2.9	7.8	
	2013-12	77.6	83		8.3	8.8		6.4	0.4		0	0		2.4	2.4	
	2014-12	81.3	86.5		7.9	7.2		4.2	0		0.3	0		1.8	1.8	
	2015-12	90.9	97.8		0	0		1.1	0		3.9	0.9		1.2	0.9	
	2016-12	88.6	98.6	98.6	0	0	0	0	0	0	10.4	0.8	0.8	0	0	0
	2017-12	88.9	98.6	98.6	3.6	0	0	5.1	0	0	0.7	0.8	0.8	1.2	0	0
	2018-12	74.7	94.1	93.9	8.8	0	0	6.8	0	0.1	2.6	0.8	0.8	4.5	2.5	2.5
	2019-12	76.9	94.6	94.6	3.2	0	0	14.6	0	0	1.1	0.7	0.8	2	2.4	2.4
	2020-12	78.2	94.7	92	0.8	0	0	14.6	0	2.3	2	0.7	1	2.1	2.3	2.4
	2021-12	78.7	94.7	89.5	0.4	0	0.4	11.6	0	3.2	1.1	0.7	0.8	5.8	2.4	3.7
	2022-12	77.5	94.9	94.6	8.2	0	0	0.4	0	0	2.5	0.6	0.7	9	2.1	2.3
	2023-12	80.5	95	94.1	1.5	0	0.1	1.5	0	0.1	0.7	0.7	0.7	13.4	1.8	2.5
	2024-12	86.8	94	93.6	3.2	0.6	0.6	0.6	0	0.1	1.3	1.3	1.3	6.6	2.7	2.9
	2025-12			93.8			0.7			0			1.3			2.8

A.4 Imputed data

Figure A.19 consolidates all sources used to construct the *extended* dataset and reports their contributions as percentages of global foreign exchange reserves. Official disclosures—national sources and IMF IRFCL templates—account for the largest share throughout the sample, contributing between 20% and 60% of global reserves.

Figure A.19. Contributions of various data sources to the construction of the dataset



Note: The figure consolidates all the information and illustrates the contributions of various data sources used to construct our dataset, expressed as percentages of global foreign exchange reserves.

While the raw data on the currency composition of reserves are extensive, a small number of country–currency series contain isolated missing observations within otherwise continuous reporting spans. These cases are addressed through linear interpolation between observed values. As shown in Figure A.19, this affects very few observations and has negligible aggregate impact, becoming noticeable only after 2015, largely reflecting interpolated observations for Taiwan between the two available raw data points in 2015 and 2024.

For comparisons with COFER aggregate currency shares—and only for this purpose—we additionally rely on backward and forward extrapolation with constant shares to construct weighted average series in order to obtain a balanced panel. This affects a larger set of economies, as many reserve holders begin reporting detailed currency composition data after the mid 2000s and a few exhibit end of sample gaps (see Table A.6). Extrapolated observations account for roughly 30% of weighted average reserves in the early years of the sample, reflecting limited initial coverage, but

their contribution declines rapidly over time and becomes small in later years as coverage expands (Figure A.19).

Both linear interpolation and backward/forward extrapolation with constant shares are implemented in a manner that respects available aggregate information. When aggregate SDR basket shares are available, and likewise when information on residual ("other currency") shares exists, interpolated and extrapolated currency shares are adjusted proportionally to match the reported aggregates. In all cases, currency shares sum to one.

For three major reserve holders—China, India, and Japan—the currency composition of foreign exchange reserves is either fragmented or not publicly disclosed. Given their outsized role in global reserves, we apply country-specific imputation procedures rather than relying on generic linear interpolation or constant back- or extrapolation. Imputations for these three economies play a quantitatively important role, with imputed observations accounting for up to 40% of the overall sample during the early part of the sample period.

China

Official information on China's reserve currency composition is limited. Partial disclosure began only recently, when the State Administration of Foreign Exchange (SAFE) reported for the first time, in its 2018 annual report published in 2019, the share of foreign exchange reserves held in US dollars, without providing any breakdown for assets denominated in other currencies. According to SAFE, dollar denominated assets accounted for 79 percent of China's FX reserves in 1995, declining to 58 percent in 2014. Subsequent SAFE reports continued to disclose the USD share with a five year reporting lag for the period 2015–2019, with the latest reported observation indicating a USD share of 55 percent in 2019. However, SAFE's latest 2024 and 2025 annual reports discontinued this disclosure, reversing the previous practice in terms of reserve transparency and leaving the post-2019 period without official data on the currency composition of China's reserves.[51]

To complement the limited official disclosures, we rely on a widely cited unofficial news-based estimate for 2010 that provides a currency breakdown of China's reserves across the US dollar and other major reserve currencies (see Table A.7). The estimate originates from the *China Securities Journal* (September 3, 2010),[52] an official newspaper that cited unnamed SAFE reserve managers and reported a reserve composition not far from the global average: 65% in U.S. dollars,

[51] As regards the IMF's IRFCL Reserves Data Template, China also ceased in 2025 to report the memorandum item on the currency composition of reserves by SDR-basket and non-SDR-basket currencies, despite having reported this information annually since 2015 under its IMF SDDS subscription.

[52] The estimate was reported by the *China Securities Journal*, a subsidiary of the state-owned Xinhua News Agency that operates under the oversight of the Chinese Communist Party. The original article is no longer available, but its content was relayed on the same day by Reuters, BBC, and The Telegraph.

26% in euros, 5% in pounds sterling, and 3% in Japanese yen. Although unofficial, we regard these figures as more informative than purely model-based imputations and are therefore treated as an additional benchmark year. For periods between benchmark observations, and for non-USD currencies, we apply tailored imputation procedures, as detailed below.

We begin by imputing the US dollar share. For the period *1995–2000*, we estimate the USD share using the linear trend implied by the 1995 SAFE benchmark and the 2010 unofficial benchmark estimate. For *2000–2004*, we extrapolate from the 2000 value using changes in the global average USD reserve share reported in the IMF's COFER database (Denton-like benchmarking).[53] For years with missing information thereafter *(2005–2009, 2011–2013, and 2020 onward)*, we use US Treasury International Capital (TIC) data as a proxy for China's holdings of US dollar-denominated assets, and use its growth rate to interpolate the USD share between benchmark observations. Following Setser and related work, we construct China's US asset portfolio by aggregating TIC-reported positions in US Treasury securities, agency securities, corporate debt securities, equity securities, and short-term deposits (Figure A.20).

This approach has two well-known limitations. First, TIC data do not distinguish between official reserve holdings and other Chinese holdings of US assets. Reported positions may therefore include assets held by state-owned financial institutions, sovereign wealth funds, and private Chinese residents in addition to the People's Bank of China and SAFE. Second, a more fundamental limitation is that TIC liability surveys do not fully capture cross-border custodial arrangements. While the surveys can generally look through US-based custodians to identify the country of the ultimate foreign owner, securities held through non-US custodians are typically attributed to the custodian's jurisdiction rather than to the ultimate beneficial owner. This custodial bias is particularly relevant for China (Prasad, 2019). For example, US securities acquired by Chinese official institutions and held through Belgian custodians would be reported as Belgian rather than Chinese holdings. Consequently, China's true exposure to US securities cannot be inferred solely from the TIC positions reported under China.

To partially address this second issue, we follow the adjustments proposed by Setser (2026). Between 2010 and 2019, China's offshore Treasury holdings are proxied by Belgium's reported holdings of long-term U.S. Treasury securities, reflecting the long-standing role of Euroclear as a major custodian for Chinese reserve assets. Setser (2026) argues, however, that Chinese official investors have increasingly diversified their custodial arrangements beyond Belgium. We therefore

[53] Relative to a simple linear interpolation, this approach captures fluctuations in the USD share arising from both valuation effects and portfolio reallocation. This is particularly important in 2002, when the US dollar depreciated sharply against the euro, mechanically reducing the dollar's share of global reserves as non-dollar assets gained value in dollar terms. While reserve managers continued to accumulate US dollar assets, these purchases were insufficient to offset these valuation effects. Reserve diversification into other currencies, particularly the euro, further amplified the decline in the dollar's share reported in COFER, which fell from 71.5% in 2001 to 66.5% in 2002.

switch, from 2020 onward, to 20 percent of the combined long-term Treasury holdings reported for Belgium, France, Luxembourg, and the United Kingdom (excluding Ireland).

In addition, following Setser's most recent recommendations, we also adjust China's TIC-reported holdings of US agency securities. China's reported agency holdings peaked at roughly USD 271 billion at end-2023 and subsequently declined to USD 143 billion by April 2026. Over the same period, several other jurisdictions recorded unusually large increases in agency holdings. In particular, reported agency holdings in Canada, Luxembourg, and France rose from roughly USD 60 billion in 2021 to USD 281 billion by April 2026. This divergence suggests that part of China's agency portfolio may no longer be recorded under China in the TIC data. Following Setser (2026), we therefore attribute the increase in agency holdings reported by these jurisdictions since 2021 to Chinese official investors.

For years with missing data, year-to-year changes in the USD reserve share are assumed to be proportional to changes in these TIC-adjusted holdings (Denton-like benchmarking). As Figure A.20 shows, while unadjusted TIC data suggest a decline in China's US asset holdings after 2019, accounting for custodial centers implies a much more gradual adjustment. Under this approach, the USD share remains broadly stable relative to the last officially reported value of 55% in 2019 through 2023, rising modestly to 57.6% in 2024 before declining to 53.8% by end-2025. More broadly, our estimates suggest that most of China's diversification away from the US dollar occurred before 2012, with three distinct phases: an initial decline in the early 2000s, a more pronounced adjustment following the mid-2000s exchange-rate reforms, and a further acceleration after the GFC.[54]

Turning to other major reserve currencies, apart from the unofficial benchmark year 2010, no direct information is available on China's reserve shares denominated in euro, Japanese yen, or pound sterling. We first recover their combined share as the difference between the reported aggregate SDR-currency share and the partly estimated USD share. Starting from the 2010 benchmark allocation of this residual across the euro, yen, and pound sterling, we extrapolate the corresponding currency shares forward and backward using the year-to-year evolution of the global COFER

[54]This pattern is consistent with contemporaneous statements by Chinese authorities regarding reserve diversification. In 2004, SAFE Chairman Guo Shuqing indicated that reserve allocations were being adjusted toward a broader range of European and Asian assets. Following China's July 2005 exchange-rate reform (from a de facto dollar peg to a managed basket regime), the authorities reiterated their intention to diversify reserve holdings and emphasized improvements in the currency and asset composition of foreign exchange reserves. Diversification also appears to have accelerated after the Global Financial Crisis. Even after adjusting for custodial holdings recorded through Belgium, China's US asset holdings grew much more slowly than its total official foreign assets between 2009 and 2012, suggesting that a significant share of reserve accumulation during this period was allocated to non-US-dollar assets. Consistent with this interpretation, Orlik and Davis (WSJ, 2012) estimate that only 15% of China's reserve accumulation was invested in US securities in the year to June 2011, compared with 45% in 2010 and an average of 63% over the preceding five years.

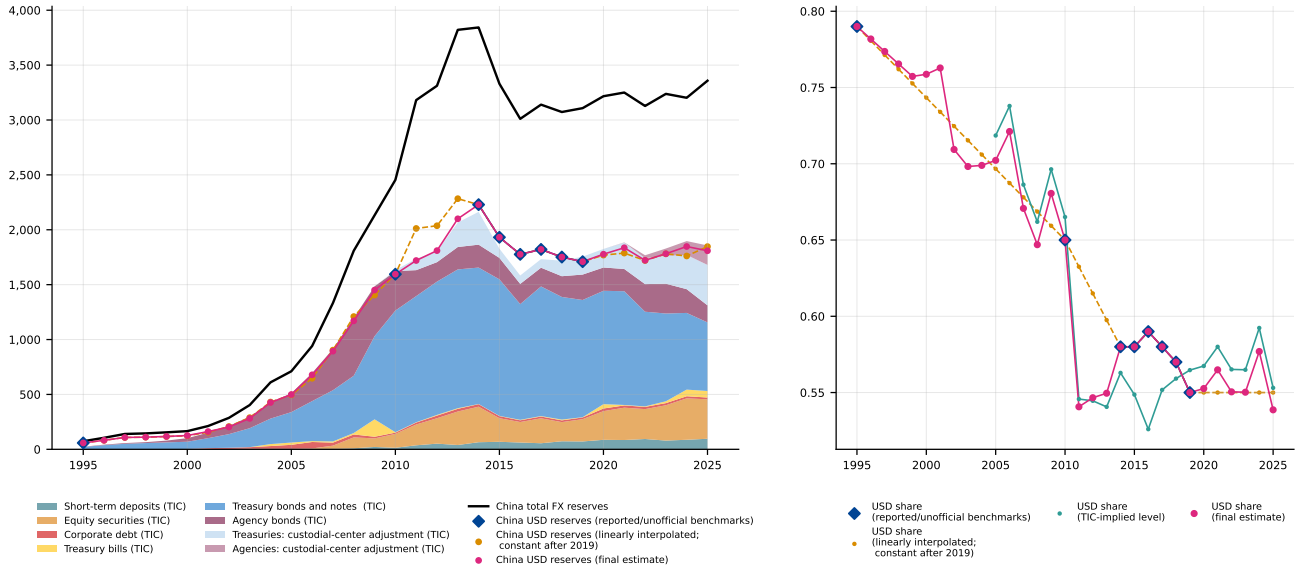
aggregate currency composition.[55] At all stages, currency shares are adjusted to ensure that they sum to one. Figure A.21 summarizes the currency composition of China's FX reserves, combining raw data with imputation.

This approach should naturally be interpreted with caution. Nevertheless, we believe that the resulting estimates provide a useful approximation of China's reserve currency composition during periods for which no direct information is available, particularly relative to the alternative of assuming constant currency shares between benchmark years. More importantly, our main findings do not depend on the imputed observations for China. One of the key stylized fact documented in this paper—namely, the substantial diversification of China's reserves away from the US dollar and its drag on the COFER world-weighted USD share —is directly supported by official SAFE data, which indicate a decline in the dollar share from 70 percent in 1995 to 55 percent in 2019. Likewise, the growing importance of the other Big Four reserve currencies and of non-traditional reserve currencies is established using reported data. The imputation procedure primarily serves to provide an indication of China's reserve currency composition at end-2024, which is used in the reserve-currency pie charts for the world's largest reserve holder, and to provide a plausible allocation across the other Big Four reserve currencies when direct information is unavailable. While the precise distribution across the euro, yen, and pound should therefore be interpreted with caution,[56] the broader trends highlighted in this paper are directly supported by the available data and do not depend on the imputation procedure.

[55]China was not included in the COFER reporting sample before 2015. Nevertheless, the composition of China's non-dollar reserve portfolio in the 2010 benchmark was broadly comparable to the contemporaneous COFER aggregate. Among the other Big Four reserve currencies, the unofficial 2010 benchmark allocates 76.5% to the euro, 14.7% to sterling, and 8.8% to the yen, compared with 72.1%, 15% percent, and 12.9%, respectively, in the global COFER aggregate. We therefore view COFER as a reasonable guide for the evolution of China's holdings of the euro, yen, and sterling. Importantly, the levels of these currency shares are anchored by the 2010 benchmark observations; COFER is used only to interpolate their evolution between benchmark years, subject to the constraint imposed by the reported aggregate SDR-currency share and the reported or, where unavailable, TIC-imputed USD share.

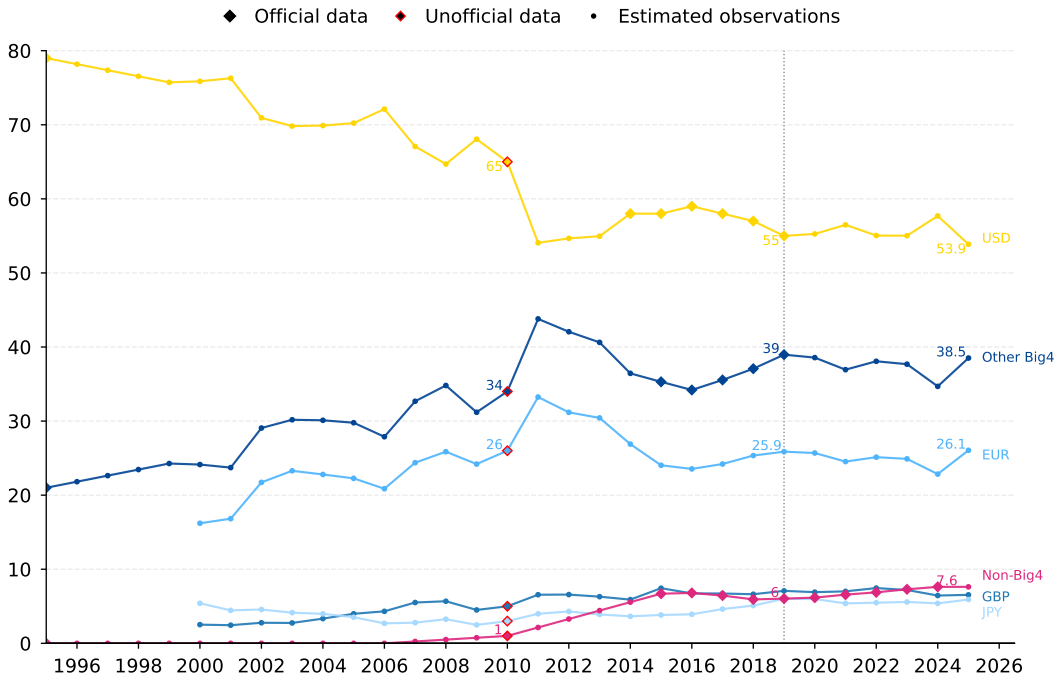
[56]We checked the plausibility of the implied euro holdings using ECB internal information.

Figure A.20. China FX reserves and TIC-imputed US assets



Note: The left panel compares China's TIC-reported holdings of US assets with the TIC-adjusted series used in the paper, which accounts for custodial-center Treasury holdings and potential underreporting of agency securities. Prior to 2012, TIC data are based on the annual end-June benchmark surveys; from 2012 onward, end-December observations from monthly TIC Form SLT are used. Foreign exchange reserves are aligned to the same dates. The right panel shows the resulting implied USD share in China's foreign exchange reserves.

Figure A.21. Currency composition of China's FX reserves, raw and imputed data



Note: The figure depicts the evolution of currency shares in China's foreign exchange reserves over 1995–2025. Observed values are obtained from SAFE annual reports and, for the aggregate share of non-Big Four currencies, from the IMF's IRFCL database. The 2010 currency breakdown is based on unofficial sources. All remaining currency shares are estimated as described in the text.

Additional notes specific to China

1. An additional unofficial news-based estimate of China's reserve composition was reported in 2006, but is not retained as a benchmark observation in our imputations. On August 25, 2006, the *People's Daily Overseas Edition* (archived version), an official state media outlet under the direct oversight of the Chinese Communist Party, reported that approximately 70 percent of China's USD 941 billion in foreign exchange reserves were invested in US dollar-denominated assets.

   Although the article did not disclose its source, it was broadly consistent with contemporaneous market calculations. Using TIC data on China's holdings of US securities, Setser estimated a USD share of approximately 72% in mid-2005 (May 2006) and around 70% in mid-2006 (June 2007 testimony before the US House Budget Committee. Both estimates were calculated using a broader measure of China's foreign exchange assets that included roughly USD 66 billion transferred through Central Huijin to recapitalize state-owned financial institutions in 2003 and 2005. Dividing China's estimated holdings of US securities (USD 694 billion at end-June 2006) by officially reported foreign exchange reserves (USD 941 billion) yields a USD share of 73.8% (see Figure A.20); accounting for these transferred assets lowers the implied share to 69%, close to the figure reported by the *People's Daily*; see also Morrison and Labonte's (2008) Congressional Research Service report. Setser (2006) viewed the reported figure as broadly confirming his earlier TIC-based estimates and concluded that "the mystery is gone."

   As regards non-dollar currencies, the evidence is considerably less certain. Contemporary sources generally suggested a composition of roughly 70% US dollars, 20% euros, and 10% other currencies (Browne, WSJ, 2006); Sibert (2009) likewise cites the *Beijing Review* as reporting a 70/20 dollar-euro split. Liu Pan and Zhu Junbo (2008) allocate the residual 10% entirely to yen holdings, citing statements attributed to Zhou Maoqing in comments to *Xinhua News Agency*. However, we were unable to verify the original sources underlying these non-dollar allocations. Moreover, some widely cited 70/20/10 currency decompositions appear to stem from illustrative scenarios employed by Setser when analyzing reserve accumulation and valuation effects (see, e.g., Setser, 2005 and Setser, 2006), rather than from disclosures reported in the Chinese press. We therefore do not treat the 2006 news-based estimates as a benchmark observation, although our estimated reserve composition for 2006 remains broadly consistent with the contemporaneous evidence discussed above.

2. While China-US TIC data understate China's true holdings of US debt securities and therefore require upward adjustments, they may overstate SAFE's US equity holdings because part of the reported equity position likely reflects assets managed by the China Investment Corporation (CIC). Established in 2007 and funded through transfers from China's foreign exchange reserves, CIC's overseas portfolio (excluding Central Huijin's domestic assets) is not classified as official reserves under the IMF reserve asset framework. Coinciding with CIC's creation, equity holdings begin to appear in the China-US TIC data around 2007. Using information from CIC annual reports, we estimate that its US equity holdings increased from roughly USD 27 billion at end-2010 to 85 billion at end-2023, potentially exceeding 130 billion in recent years. However, these amounts cannot simply be subtracted from the TIC data because TIC positions reflect reporting and custodial arrangements rather than ultimate ownership. Internally managed CIC positions should, in principle, be reported in the China-US TIC row, whereas positions held through external asset managers, custodians, or investment vehicles located outside mainland China generally will not. This distinction is potentially important, as external managers oversaw a large share of CIC's overall investment portfolio (e.g., 52 percent in 2019). However, no comparable information is available for CIC's equity portfolio specifically. Consequently, it is not possible to determine precisely how much of the observed TIC equity position reflects CIC rather than SAFE-managed reserve assets.

India

India does not publish official data on the detailed currency composition of its foreign exchange reserves. As of end-2025, the Reserve Bank of India (RBI) held approximately USD 553 billion in reserves, making it the fifth-largest reserve holder globally, yet official communications, including Annual Reports and Foreign Exchange Management reports, state only that reserves are managed as a diversified multi-currency portfolio comprising major currencies such as the US dollar, the euro, pound sterling, and the Japanese yen, among others, without disclosing their respective shares. The only publicly available quantitative benchmark derives from a note prepared by a former RBI Deputy Governor in December 2014, reported by the press in January 2015, indicating that at end-2014 the US dollar accounted for about 58 percent of FX reserves, the euro and pound sterling each for roughly 13.3 percent, and the Australian and Canadian dollars for about 7.7 percent each (see Table A.7).

Although the RBI does not disclose its currency basket, it nonetheless provides other publicly available data on the management of its foreign exchange reserves, allowing us to move beyond the overly simplified assumption of a constant end-2014 currency composition over the full sample period. In particular, alongside quarterly balance-of-payments data on aggregate net purchases of foreign currency reserves, the RBI publishes monthly data on its net US dollar purchases associated with foreign exchange interventions. These U.S. dollar interventions account for the bulk of net reserve accumulation (see Figure A.22, bottom panel).[57] Moreover, under the IMF's SDDS template, the RBI discloses the instrument composition of its reserves. As of end-March 2026, 84 percent of its foreign currency assets were invested in securities, with the remainder held as currency and deposits with other central banks, the BIS, and commercial banks abroad.[58] Finally, as part of this dissemination, the RBI also discloses the aggregate share of FX reserves held in SDR versus non-SDR currencies, available from national sources since 2001 and through the IMF template since 2010, providing direct evidence of active currency diversification. While at end-2001 reserves were almost exclusively denominated in SDR currencies (99.8 percent), the RBI began diversifying into non-SDR currencies in the early 2000s, with their share increasing to 18.9 percent by June 2013. This trend subsequently reversed, with the share declining to 9.6 percent by June 2020, before rising again to 22.7 percent in March 2026, its highest level (see Figure A.22). [59]

[57] Since the early 1990s transition to a managed floating exchange rate regime, the RBI has relied primarily on the U.S. dollar as its intervention currency, replacing the pound sterling. The central bank actively buys and sells U.S. dollars in the spot market (also via forward and swap instruments) to curb rupee volatility, resulting in a predominantly dollar-denominated reserve portfolio and facilitating such regular interventions.

[58] Governed by the Reserve Bank of India Act, 1934, investments in securities are concentrated in sovereign and sovereign-guaranteed debt instruments with residual maturities not exceeding ten years, reflecting a liquidity- and safety-oriented approach.

[59] This recent shift is consistent with RBI communication emphasizing diversification across currencies and assets while maintaining liquidity. Statements by former RBI Governor Shaktikanta Das in 2022 con-

We leverage this information and data, together with an empirical framework building on Ferranti (2023), to estimate the time-varying currency composition of India's foreign exchange reserves. Ferranti's framework begins from a decomposition of total changes in reserves into aggregate net purchases of foreign currencies and a non-purchase component. After subtracting observed aggregate net purchases, the remaining non-purchase rate of change in reserves is modeled as a function of beginning-of-period currency shares, exchange-rate-induced valuation effects during the period, and assumed currency-specific returns on reserve assets (observation equation). The currency shares are then treated as latent state variables and estimated using a Hidden Markov Model. Identification comes from the fact that different currency compositions generate different predictions for the non-purchase rate of reserve growth, given observed exchange-rate movements and assumed asset returns, allowing the latent currency shares to be inferred from the fit of the observation equation to the data. The evolution of the latent currency shares over time is governed by a Dirichlet state equation, which ensures positivity and the adding-up constraint, with next period's shares centered on the previous period's composition and hence evolving only gradually over time. The model is estimated in a Bayesian framework, with a prior imposed on the initial currency composition at the beginning of the sample, whose influence naturally declines over time. The Hidden Markov Model is solved numerically using a particle filter.[60] We refer the reader to Ferranti (2023) for further details on the underlying methodology and estimation procedure.

For India, we adapt Ferranti's flexible framework in several ways to incorporate country-specific information. We restrict the currency universe to those with non-zero shares in the end-2014 benchmark, namely the U.S. dollar, euro, pound sterling, Australian dollar, and Canadian dollar. Consistent with the RBI's emphasis on liquidity and limited interest-rate risk, we proxy returns on reserve assets using 2-year sovereign bonds. We also modify the observation equation to account for the share of reserves held in currency and deposits, which we assume earn a 1-year rate. Unlike Ferranti's baseline framework, in which aggregate net reserve purchases are removed prior to estimation and therefore do not directly affect the state transition of currency shares, we exploit India-specific information on the RBI's net U.S. dollar purchases to inform the evolution of the latent state. In practice, the Dirichlet transition is centered not only on the previous period's currency composition, but is also shifted toward the accounting-implied path for the U.S. dollar share,

firm a move into other currencies to reduce concentration in USD, even as it remains the dominant reserve currency (*The Times of India*, March 2022).

[60] At each time step (quarter), candidate currency-share vectors (i.e., particles) are propagated forward using the Dirichlet state equation, which centers the predictive distribution on the previous period's composition while allowing for a controlled perturbation around it. Each drawn particle is then assigned a weight proportional to the likelihood of the observed non-purchase reserve change under the observation equation, so that particles that better match the data receive greater weight. The weighted particles are then resampled to approximate the filtered posterior distribution, and the procedure is iterated over time. Because the full particle cloud is retained at each date, the method also delivers a natural measure of posterior uncertainty around the estimated currency shares.

net of valuation effects, with the remaining shares rescaled proportionally. The strength of this adjustment is state-dependent: when the U.S. dollar intervention signal is strong relative to other flows and valuation changes, the transition distribution is tightened around this adjusted mean, whereas weaker signals allow greater dispersion in the latent shares. In addition, the latent state is anchored to the reported end-2014 currency shares at the benchmark date. Finally, at each date, the simulated shares are constrained to satisfy the reported aggregate SDR versus non-SDR allocation. These modifications allow the filter to incorporate information from both valuation effects and observed net U.S. dollar purchases, while ensuring consistency with the reported aggregate SDR share. The resulting posterior distribution, and the associated credible intervals, are therefore conditional on these additional India-specific restrictions and mechanically tighter than under the baseline Ferranti framework, so they may understate uncertainty relative to that baseline.

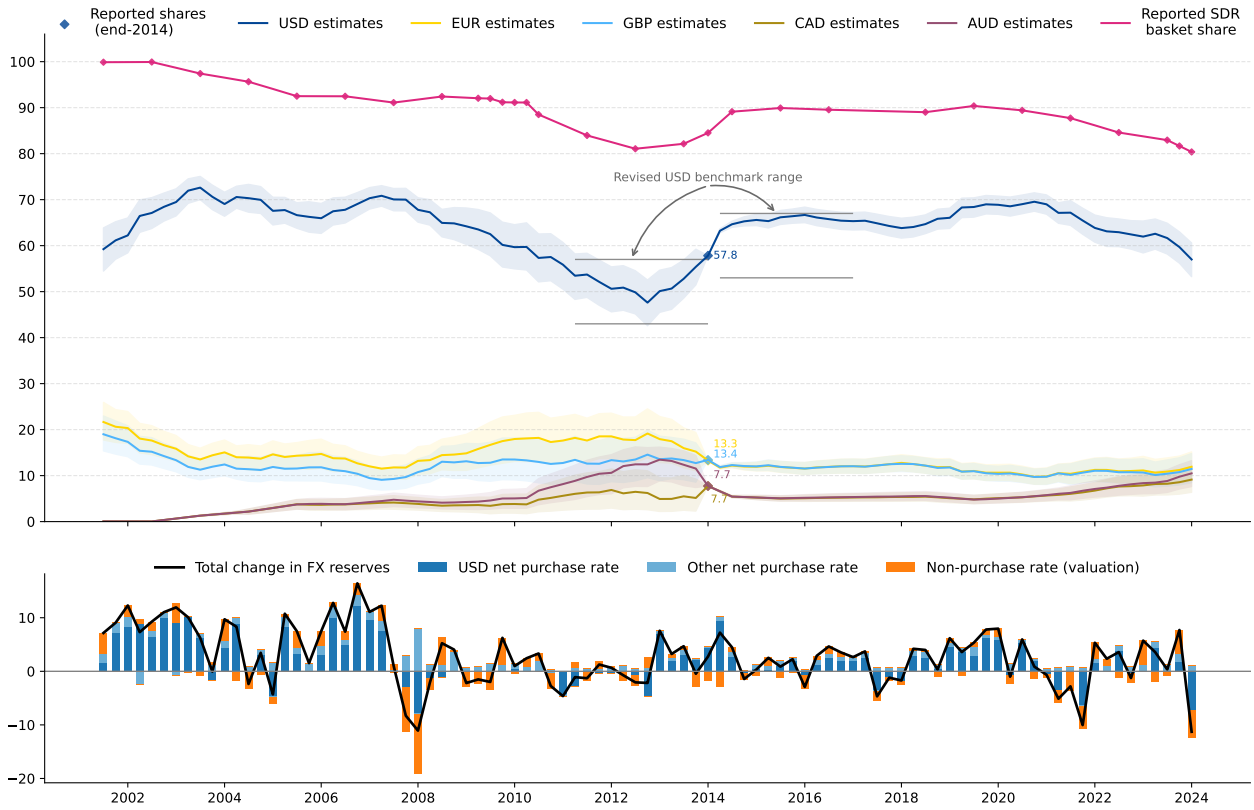
The filter estimates are presented in Figure A.22. The top panel plots the estimated median reserve currency shares together with the revised RBI internal U.S. dollar benchmark range implemented at end-2014. The bottom panel decomposes quarterly changes in FX reserves into net U.S. dollar purchases, other net purchases, and residual valuation effects, all of which are observed. The median USD share estimate captures well the marked increase in the USD share around 2014–2015 and is consistent with the contemporaneous revision of the RBI's internal benchmark range. [61] Prior to the end-2014 decision, the USD share was managed within a range of 43 to 57 percent, with an emergency leeway of ± 10 percentage points; following the revision, the upper bound was increased to 67 percent.[62] The estimated USD share continues to rise thereafter, reaching around 70 percent by end-2021, close to the revised upper bound, before starting to decline, consistent with diversification toward non-traditional currencies such as the Australian and Canadian dollars.

Although this estimation approach remains subject to further development and refinement, we consider the resulting estimates to provide a useful approximation of India's reserve currency composition over time. As with all such imputations, these estimates should nonetheless be interpreted cautiously. We emphasize that the estimated currency decomposition for India is used in this paper solely in the pie charts of the largest reserve holders for the U.S. dollar and the euro in Section 3.3.1, and for comparison with COFER-weighted shares in Appendix Figure 3—and plays no role elsewhere in the analysis.

[61] Although the end-2014 benchmark shares are imposed at that date, the estimated USD share was already trending upward beforehand and converging toward the reported benchmark. This is informative because, as a sequential Monte Carlo method, the particle filter estimates the latent state at date t using only contemporaneous and past observations, so the end-2014 benchmark does not mechanically affect the pre-2014 path.

[62] At the same time, the upper bound for the euro was reduced by 1 percentage point, to a range of 12–(17)–22, while the upper bound for pound sterling was increased by 1 percentage point, to a range of 8–(13)–19. The upper bounds for the Australian and Canadian dollars were each reduced from 10 to 5 percent.

Figure A.22. Estimates of the currency composition of India's FX reserve, 2002–2024
(top: median filtered currency shares; bottom: decomposition of Δ FX reserves; in %)



Note: The top panel reports median filtered estimates (and 10th/90th percentiles) of the currency shares in India's foreign exchange reserves, together with the reported aggregate SDR basket share. Diamond markers indicate currency shares reported at end-2014. Horizontal grey lines indicate the revision to the RBI's internal U.S. dollar benchmark range implemented at end-2014. The bottom panel decomposes quarterly changes in total foreign exchange reserves into USD net purchase rate, other currency purchases rate, and the valuation non-purchase rate. All series are expressed in percentage points.

Japan

For Japan, information on the currency composition of foreign exchange reserves is even more limited. The authorities have consistently declined to disclose this information, and no official or unofficial public statements provide quantitative guidance. The only available estimate in the literature is from Truman and Wong (2006), which has since served as a reference point. Truman and Wong estimate Japan's U.S. dollar reserve share at end-2005 by combining two sources of information. First, they rely on the COFER-reported U.S. dollar share for industrial economies as a group; at the time, Japan alone accounted for roughly 67 percent of total foreign exchange reserves within this group. Second, they use disclosed reserve currency compositions for those industrial economies that did report such information. Under mild additional assumptions, the

residual required to reconcile aggregate COFER data with disclosed country-level positions is attributed to Japan, yielding an estimated US dollar share between 83 and 89 percent at end-2005.

Building on this approach, we estimate Japan's US dollar reserve share for 2006 using our data. Table A.9 summarizes the underlying data sources, assumptions, and computational steps. We first compile the COFER aggregate USD share and holdings for industrial economies as of 2006, drawing on Tables I-1 and I-2 of the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (2007 vintage). We do not rely on later COFER vintages, as these backward-extend the series using the definition of advanced economies prevailing in 2015. In 2006, the industrial-economy group consisted of 33 economies; Singapore, Hong Kong, Korea, and Taiwan joined the group only in 2007. Using 2006 therefore avoids the need to impute U.S. dollar holdings for Singapore.[63] With the exception of Japan, information on USD shares is available for all other industrial economies, although not always exactly for the year 2006.[64] The difference between aggregate USD reserves implied by COFER and the sum of disclosed country-level holdings is then attributed to Japan. This residual-based calculation yields an estimate of Japan's US dollar reserve share for 2006 of about 81 percent. The corresponding shares for the euro and pound sterling are approximately 17 and 2 percent, respectively, while the renminbi share is zero and other non-SDR currencies account for only 0.03 percent, based on the reported aggregate share of reserves held in SDR currencies at that time.

[63] We have some information on USD shares for Hong Kong and Korea, but no comparable data for Singapore. Taiwan most likely did not report to COFER and thus should appear under unallocated reserves. Consistent with this interpretation, the increase in COFER unallocated total FX reserves for the advanced economies group between 2006 and 2007—from USD 4.4 billion to USD 294 billion, coinciding with Taiwan's entry into the industrial-economy group—is close in magnitude to Taiwan's foreign exchange reserves, which amounted to approximately USD 270 billion.

[64] The only other industrial country for which no information on USD share is available is Austria. We assume that Austria's reserve composition is similar to that of other euro-area economies and proxy its U.S. dollar share using the simple average of U.S. dollar shares across euro-area economies and the ECB.

Table A.9. Truman and Wong (2006)'s estimate of Japan's USD share

Reporter	**FX Reserves** (2006,$ bn)	**Year** (shares based on)	USD share	EUR share	GBP share	**USD holdings** ($ bn)
DEU	37719	2006	0.98	0.00	0.00	37029
FRA	40287	2018	0.82	0.00		33001
ECB	38979	2006	0.83	0.00	0.00	32353
AUS	52515	2012	0.35	0.36	0.00	18140
CAN	33198	2006	0.52	0.47	0.00	17263
ISR	28179	2012	0.61	0.25	0.04	17248
GBR	61176	2006	0.25	0.67	0.00	15493
CZE	31050	2006	0.49	0.51	0.00	15112
ITA	24413	2006	0.61	0.00	0.26	14993
NOR	41612	2006	0.32	0.40	0.12	13306
CHE	37364	2006	0.33	0.47	0.10	12260
ESP	9921	2006	1	0.00	0.00	9919
NLD	9206	2006	1	0.00	0.00	9178
BEL	7556	2006	0.99	0.00	0.00	7516
SWE	24046	2006	0.27	0.50	0.10	6407
CYP	5622	2022	0.99	0.00	0.01	5544
AUT	6568		0.8*	0.00		5279
DNK	24011	2006	0.16	0.71	0.07	3859
SVK	12645	2006	0.27	0.73	0.00	3464
EST	2781	2012	1	0.00	0.00	2777
FIN	6131	2006	0.45	0.00	0.40	2739
NZL	8828	2008	0.28	0.27	0.10	2452
LVA	4353	2006	0.44	0.46	0.00	1914
PRT	1820	2015	0.79	0.00	0.00	1433
SVN	6987	2006	0.15	0.73	0.04	1021
LTU	5364	2006	0.15	0.85	0.00	829
ISL	2273	2008	0.27	0.59	0.08	618
GRC	408	2022	0.8	0.00	0.05	325
MLT	2953	2006	0.07	0.78	0.16	199
LUX	156	2006	1	0.00	0.00	156
IRL	494	2016	0	0.00	0.00	0
USA	40845	2006	0	0.56	0.00	0
JPN	874596					
COFER aggregate USD holdings for the group of industrial economies:						999905
Sum of USD holdings from individual economies						291827
Residual JPN's imputed USD holdings						708078
Japan imputed USD share			0.81			

Beyond quarterly balance-of-payments data on aggregate net purchases of foreign currency reserves, the Bank of Japan publishes monthly data on its foreign exchange intervention operations to stabilize the yen, which since 2004 have been conducted exclusively in USD. Unlike in India, Bank of Japan net US dollar purchases associated with interventions occur less frequently over the sample period, but they remain important to account for when estimating the evolution of reserve currency shares.

Moreover, under the IMF's SDDS template, the BoJ/MoF discloses both the instrument composition of reserves and the aggregate share of FX reserves held in SDR currencies. As of end-2025, roughly 86 percent of FX reserves were invested in securities, heavily weighted toward sovereign bonds (about 77 percent), with most of the remainder placed as deposits with foreign central banks. Until 2022, Japan's FX reserves were held almost entirely in SDR currencies, with a share close to 99.96 percent. Since then, the BoJ/MoF has gradually increased the share of non-SDR currencies, which reached 1.65 percent in March 2025.

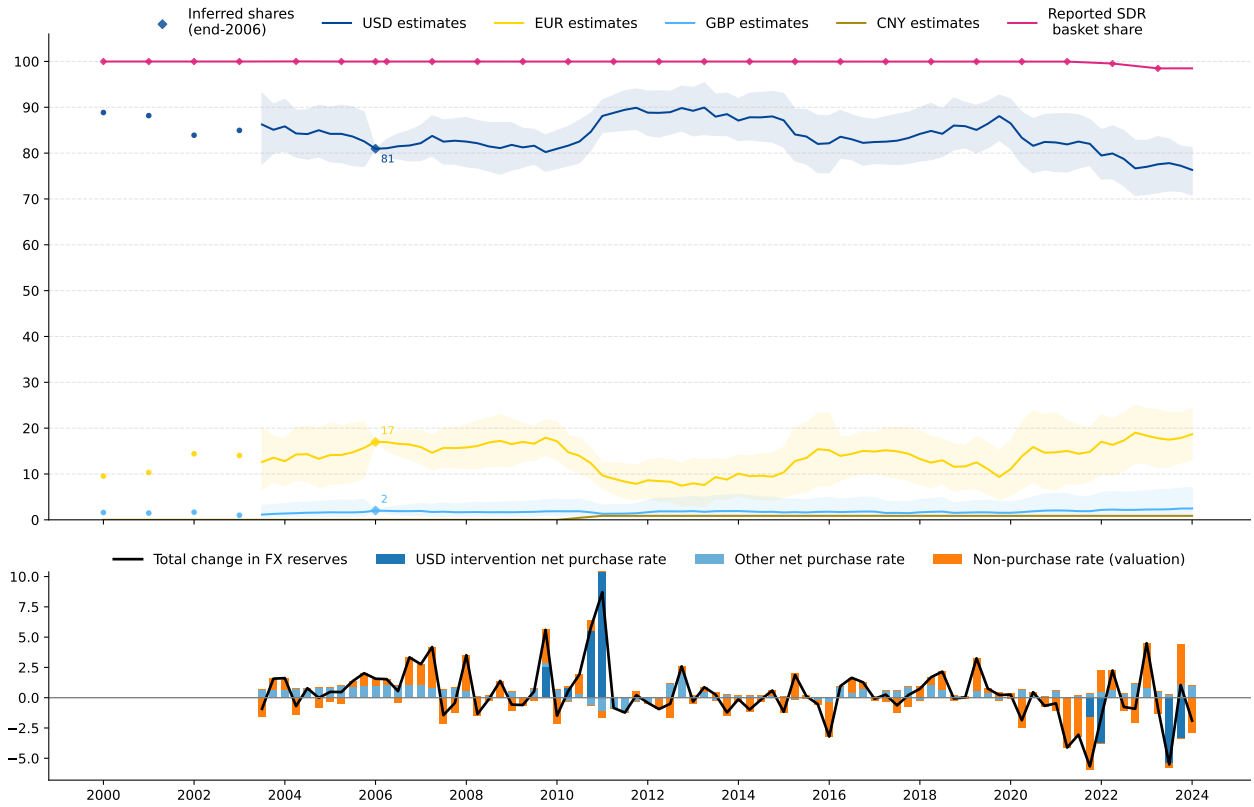
To estimate the time-varying currency composition of Japan's reserves, we apply, as in the case of India, the Hidden Markov Model of Ferranti (2023), incorporating the country-specific modifications described earlier. We restrict the currency universe to the US dollar, euro, and pound sterling. Consistent with the instrument composition of Japan's reserves, we proxy returns on securities using 3-year sovereign bonds and assume that the portion held as currency and deposits earns a 1-year rate. The latent state is anchored at end-2006 to the inferred benchmark composition, with shares of 81 percent for USD, 17 percent for EUR, and 2 percent for GBP.

The filter estimates are presented in Figure A.23. The top panel plots the estimated median reserve currency shares, together with their 10th and 90th percentiles of the posterior distribution. The bottom panel decomposes quarterly changes in FX reserves into US dollar intervention-related net purchases, other net purchases, and residual valuation effects, all of which are observed.

Two further adjustments are incorporated alongside the filter estimates. First, the estimates are extended backwards from 2004 to 2000 using the observed evolution of reserve currency shares for the group of industrial economies, a reasonable approximation given Japan's dominant share of reserves within the group. Second, CNY reserve holdings are incorporated from 2012 onward. We draw on publicly available information indicating that Japan began purchasing Chinese government bonds in 2012 as part of a broader initiative to strengthen financial cooperation with China (Reuters, 2012, reporting statements by former Japanese Finance Minister Jun Azumi). Based on the announced purchase amount of USD 10.3 billion relative to Japan's reserve holdings at the time, we assume a CNY reserve share of 0.86 percent from 2012 onward. The shares of other SDR currencies are adjusted proportionally to accommodate this allocation.

Based on these estimates, Japan's foreign exchange reserves at end-2024 are composed of 76.3% USD (10th–90th percentile interval: 70.9–81.2%), 18.6% EUR (13.1–24.3%), 2.5% GBP (1.0–7.0%), and 0.86% CNY. Non-SDR currencies account for the remaining 1.66% of reserves. As with all such imputations, Japan's estimates should be interpreted cautiously. They are used in the paper solely for the pie charts of the largest reserve holders in Section 3.3.1 and for comparison with COFER-weighted shares in Appendix Figure 3; they play no role elsewhere in the analysis.

Figure A.23. Estimates of the currency composition of Japan's FX reserve, 2004–2024
(top: median filtered currency shares; bottom: decomposition of Δ FX reserves; in %)



Note: The top panel reports median filtered estimates (and 10th/90th percentiles) of the currency shares in Japan's foreign exchange reserves, together with the reported aggregate SDR basket share. Diamond markers indicate currency shares inferred at end-2006. The bottom panel decomposes quarterly changes in total foreign exchange reserves into USD intervention net purchase rate, other currency purchases rate, and the valuation non-purchase rate. All series are expressed in percentage points.

Hong Kong, South Korea, and Taiwan

For Hong Kong, South Korea, and Taiwan, part of the missing currency composition is imputed using information from the IMF COFER aggregates for advanced economies, while ensuring that the reported SDR-share constraint is satisfied in every year.

For Hong Kong, while the USD share is available throughout the sample, EUR, GBP, and JPY shares are observed only for 2000–2002. Missing shares for 2003–2007 are imputed using the growth rates of the difference between the 2007 vintage of the industrial economies aggregate and the 2009 vintage of the advanced economies aggregate, reflecting the addition of Hong Kong, Korea, and Singapore. For 2008–2015, the last year for which the IMF reported a currency decomposition for advanced economies, shares are extrapolated using the growth rates of the advanced economies aggregate and thereafter held constant at their last available values.

For South Korea, only the USD share is reported, and only from 2007 onward. We therefore impute the USD share back to 2000 using the growth rates of the difference between the industrial economies aggregate, which excluded Hong Kong, Korea, and Singapore, and the 2009 vintage of the advanced economies aggregate, which includes these economies. Observed USD shares for Hong Kong are netted out from this residual before computing the adjustment, such that it captures only the combined contribution of Korea and Singapore.

For Taiwan, unofficial information provides estimates for USD, EUR, and GBP shares in 2015 and in 2025. Missing values between these dates are filled using linear interpolation. For 2007–2014, shares are extrapolated using the growth rates of the advanced economies aggregate. Prior to 2007, we apply the same adjustment as for South Korea. While Taiwan is not included in the relevant COFER aggregates, this approach assumes that its reserve composition evolved similarly to that of Korea and Singapore collectively prior to 2007 and, thereafter, to that of the advanced economies aggregate.

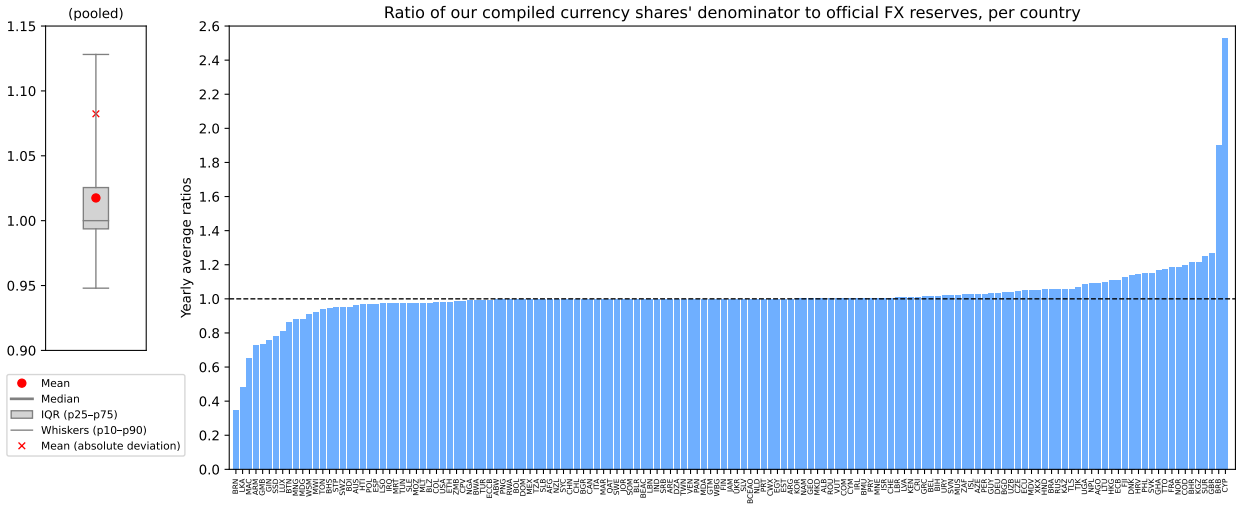
A.5 External validity checks

Next, we assess differences in coverage between our data and external sources. Specifically, Appendix Figure A.24 illustrates differences in coverage between the total foreign exchange reserves measure we use as the denominator for currency shares and official FX reserves reported by economies in the IMF's International Liquidity/IRFCL dataset. A boxplot of the ratio between the two measures, averaged across all years for the full sample of economies, is presented on the left-hand side. Meanwhile, the right-hand side displays the country-specific ratios, again averaged across all years. For the vast majority of economies, the differences between the two measures are negligible, indicating generally strong coverage of our compiled FX reserve data. There are, however, cases where our estimates under- or overstate official FX reserves reported to the IMF. For example, we underestimate official FX reserves for economies such as Brunei, Luxembourg and Sri Lanka, as our data includes only investment-securities instruments. Similarly, for Macao, our estimates are based solely on FX currency and deposit holdings, and we similarly underestimate the reported value to the IMF. Additional details and other cases can be found in Table A.6.

Appendix Figure A.25 expands the analysis to examine the combined shares of currencies within the Special Drawing Right (SDR) basket (i.e. US dollar, euro, Japanese yen, pound sterling, Swiss franc and Chinese renminbi). The discrepancies between the shares we calculate and those reported by economies in the IMF's International Liquidity/IRFCL dataset are generally minor, with a few notable exceptions.

Appendix Figure A.26 assesses the consistency of the USD shares of foreign exchange reserves derived from our dataset with those obtained from the combined datasets of Ito and McCauley (2020), Arslanalp et al. (2022), and Laser et al. (2025). On the left-hand side, a boxplot depicts the differences in percentage points between the two sets of shares, averaged across all years for the full sample of economies. On the right-hand side, the average difference per country, also averaged across all years, is presented. For most economies, the differences are minimal. However, some cases show large discrepancies. One such case is Brunei (BRN). As in previous datasets, information on the currency composition of reserve assets is available only for investment-securities instruments held by the country. The large negative deviation (over 70 percentage points) arises because our compilation additionally includes SGD holdings (which are pegged 1:1 to the BND), whereas these holdings are excluded from the other datasets.

Figure A.24. Differences in coverage between our compiled currency shares' denominator and official FX reserves



Note: The figure compares the total FX reserves compiled in our dataset, used as the denominator to compute currency shares, with the official FX reserves reported by economies to the IMF. Differences reflect variations in coverage. The left panel shows a boxplot of the ratio across all years for all economies, while the right panel presents country-specific averages. While currency shares are derived using our compiled FX reserve denominator, all reserve-weighted calculations and nominal reserve amounts reported in the paper use official IMF-reported FX reserves whenever available, and our compiled FX reserve denominator otherwise. Selected cases are discussed after the figure.

Selected cases on denominator coverage

BRN, LKA, LUX: For Brunei, Sri Lanka, and Luxembourg, our FX reserve denominator understates official FX reserves because currency shares are available only for investment-securities holdings.

MAC: For Macao, currency shares are based only on foreign-currency cash and deposit holdings.

ARM: For Armenia, currency shares are based on foreign-currency net assets (assets less liabilities), excluding IMF-related positions but including foreign-currency derivatives and other foreign assets. This tends to understate IMF-reported gross reserves because foreign-currency liabilities are netted out. For 2006–10, when both measures are available, gross and net foreign-currency assets yield broadly similar currency compositions.

GMB: Currency shares are based on foreign-currency cash and deposits (excluding SDR deposits) and securities holdings with identified currency denomination, primarily fixed-term deposits. Treasury-bill investments and equity investments for which no currency breakdown is available are excluded, resulting in a denominator below IMF-reported FX reserves. In 2023, our denominator amounted to USD 346 million, compared with USD 490 million reported to the IMF. Excluded treasury-bill investments totaled only USD 45 million and therefore appear insufficient to fully explain the gap. Other excluded items, including equity investments in Afreximbank and Africa Re, and domestic-government securities, are not considered reserve assets.

SSD: For South Sudan, identified foreign-currency assets excluding IMF-related positions are limited to cash and bank balances. In 2020, these amounted to only USD 45 million, compared with USD 183 million in FX reserves reported to the IMF. No additional balance-sheet items reported in the financial statements can fully reconcile the discrepancy.

GIN: For Guinea, currency shares are based on foreign-currency cash, current accounts, and term deposits with central banks and foreign financial institutions, excluding SDR holdings, gold, and non-marketable equity investments. The central bank does not appear to maintain a securities portfolio. Differences relative to IMF-reported reserves may reflect exchange-rate conversion effects, although we use the exchange rates reported in the financial statements.

MNG: For Mongolia, currency shares are based on foreign-currency assets excluding SDR holdings, gold, unquoted equity investments, and reverse-repo claims. In 2024, our denominator amounted to USD 3.19 billion, compared with USD 4.79 billion in FX reserves reported to the IMF. For reference, excluded reverse-repo claims totaled roughly USD 1.6 billion, broadly comparable to the discrepancy.

MDG: FOr Madagascar, currency shares are computed from official foreign-exchange reserve assets, excluding SDR holdings and monetary gold. Differences relative to IMF-reported reserves are concentrated in the early years of the sample (2013-2014). For example, our reserve denominator amounted to USD 491 million in 2015, compared with USD 750 million reported to the IMF. However, the same 2015 reserve position was subsequently reported as USD 751 million in the 2016 financial statements, suggesting that early-year discrepancies may partly reflect reporting or classification differences.

CYP: For Cyprus, reserve assets comprise claims on non-euro-area residents denominated in foreign currencies, excluding IMF-related positions and gold. While our compiled securities holdings are broadly consistent with the corresponding IRFCL figures, a large discrepancy exists for deposits. In 2025, the financial statements report EUR 292 million in balances with foreign credit institutions, compared with only EUR 3.4 million recorded under official reserve currency and deposits in IRFCL. Moreover, IRFCL records only around EUR 35 million in deposits under other foreign-currency assets outside official reserves, far below the amount needed to reconcile the discrepancy.

LBR: For Liberia, currency shares are computed from foreign-currency assets excluding SDR holdings, gold, and non-reserve assets (including staff loans, other assets, and loans and advances to the Government of Liberia). Both the Liberian dollar and the U.S. dollar circulate as legal tender. Since 2017, however, the currency-risk table no longer reports U.S.-dollar holdings separately. We therefore impute USD holdings as the difference between total FX reserves reported to the IMF and identified holdings in other currencies. Securities investments appear broadly consistent with the reserve-assets concept and include holdings with the Federal Reserve Bank of New York, BIS, Crown Agents, and Afreximbank.

BRB: For Barbados, currency shares are based on foreign-currency assets reported in the financial statements, specifically balances held abroad, foreign notes and coins, and foreign securities, excluding IMF-related assets. The Central Bank of Barbados reported gross international reserves of USD 3.186 billion, including USD 121.8 million in IMF-related assets, implying FX reserves of USD 3.064 billion, broadly consistent with our compiled denominator of USD 3.073 billion. By contrast, IMF International Liquidity Statistics report USD 1.593 billion in FX reserves and USD 1.653 billion in gross international reserves, including only USD 60.6 million in IMF-related assets. These differences suggest material discrepancies in reserve coverage and classification across sources.

BTN: For Bhutan, currency shares are based on foreign-currency assets excluding IMF-related assets, monetary gold, loans to staff, other non-reserve assets, and securities at amortized cost. The denominator therefore comprises cash and cash equivalents, deposits, and externally managed securities portfolios (previously managed under the RAMP program and currently by PIMCO and BlackRock). Securities at amortized cost are excluded because they largely consist of bonds issued by Bhutan's Green Digital Limited (GDL) and domestic government agencies.

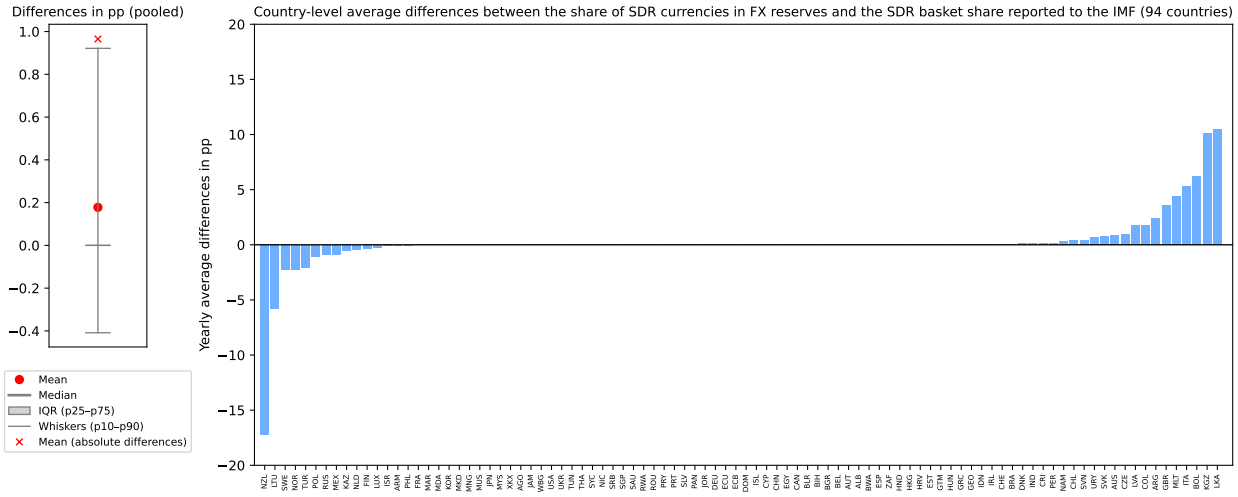
PHL: For the Philippines, currency shares are derived from aggregate foreign-currency financial assets rather than instrument-level reporting. The denominator excludes SDR holdings and appears to exclude gold, but includes deposits with foreign banks, cash balances, investment securities, overnight investment repo pools, other foreign-currency receivables, and foreign-currency derivatives in a net gain position. As a result, the compiled denominator exceeds IMF-reported FX reserves. In 2023, other foreign-currency receivables alone amounted to USD 6.2 billion (about 6.5% of total foreign-currency assets), broadly matching the overstatement relative to IRFCL reserves. The reported USD exposure in 2018 appears anomalous; we therefore retain the reported non-USD currency amounts and linearly interpolate the USD share between 2017 and 2019.

XKX: For Kosovo, currency shares are computed from foreign-currency assets excluding IMF-related positions, domestic-government securities, and monetary gold. The denominator comprises cash on hand, deposits with foreign banks, money-market placements, and foreign securities. To reconcile the balance-sheet data with the IMF reserve-assets concept, we deduct KPST and PAK/KTA-related liability balances from foreign-currency assets. Although backed by foreign-currency assets on the CBK balance sheet, these funds belong economically to the pension and privatization funds and are not available for reserve management purposes.

BRA: For Brazil, currency shares are computed from gross foreign-currency assets, excluding IMF-related assets, gold, and other non-reserve assets, but including derivatives and reverse-repo positions, consistent with the

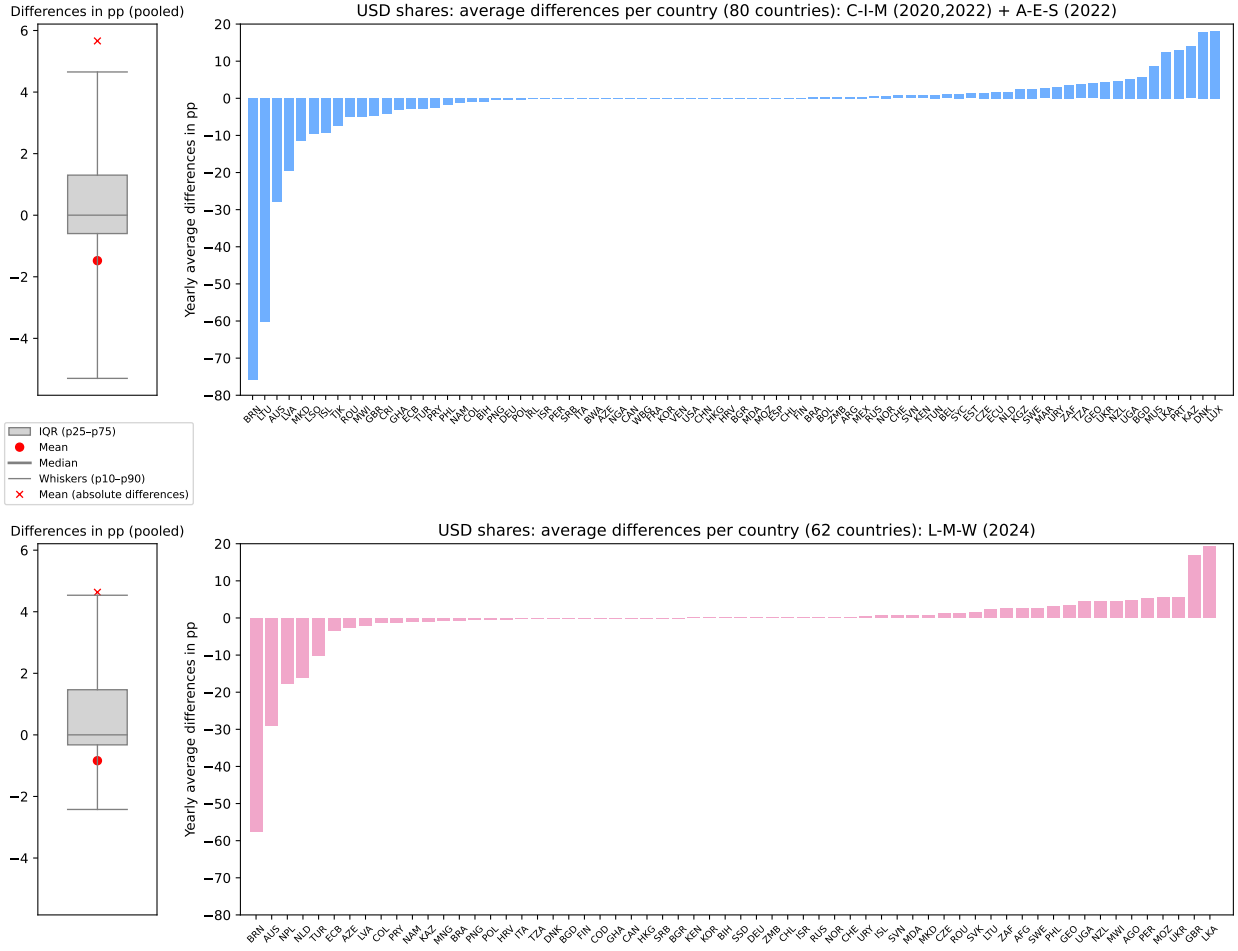
reserve-assets treatment reported in the IMF reserve template. For 2001–05, however, we additionally exclude USD-denominated deposits and U.S. Treasury securities pledged as collateral and held under BIS custody. These assets are only partially disclosed in the pre-2006 financial statements but are recorded in IRFCL as foreign-currency deposits and securities outside reserve assets. They served as collateral for Brazil's restructured external debt obligations, including Brady Bonds and emergency credit lines, and were therefore not fully available for reserve management purposes. Following the early repayment and buyback of these obligations, including Brady Bonds and IMF obligations, in 2006, the collateral requirements expired and the BIS-held assets were released and reabsorbed into Brazil's FX reserves.

Figure A.25. Comparison of our compiled shares of currencies in the SDR basket with the IMF-reported aggregate



Note: The figure compares the combined shares of SDR currencies in our dataset with the aggregate SDR basket shares reported by economies in the IMF's International Liquidity/IRFCL dataset. The left panel presents a boxplot of the ratios between the two measures, averaged across all years for the 94 economies in common. The right panel shows the corresponding country-specific ratios, also averaged over years.

Figure A.26. Comparison of USD shares in our dataset with other published datasets

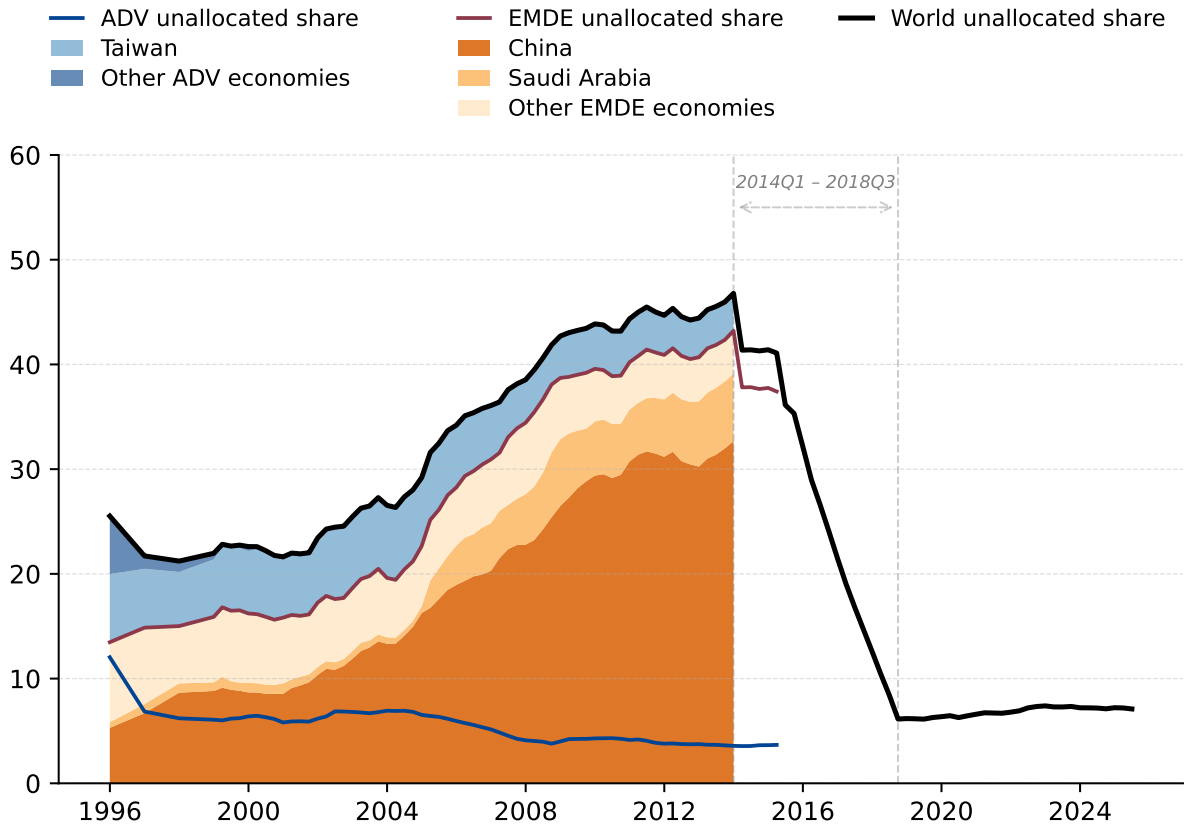


Note: The figure compares USD shares of foreign exchange reserves in our dataset with those reported by Ito and McCauley (2020) and Arslanalp et al. (2022) (top charts), and by Laser et al. (2025) (bottom charts). In each chart, the left panel shows a boxplot of differences (in percentage points) between the two sets of shares, averaged across all years for the sample of economies in common. The right panel shows the corresponding country-level average differences. Lower values show our USD shares tends to be smaller.

Appendix B. Supplementary evidence and robustness checks

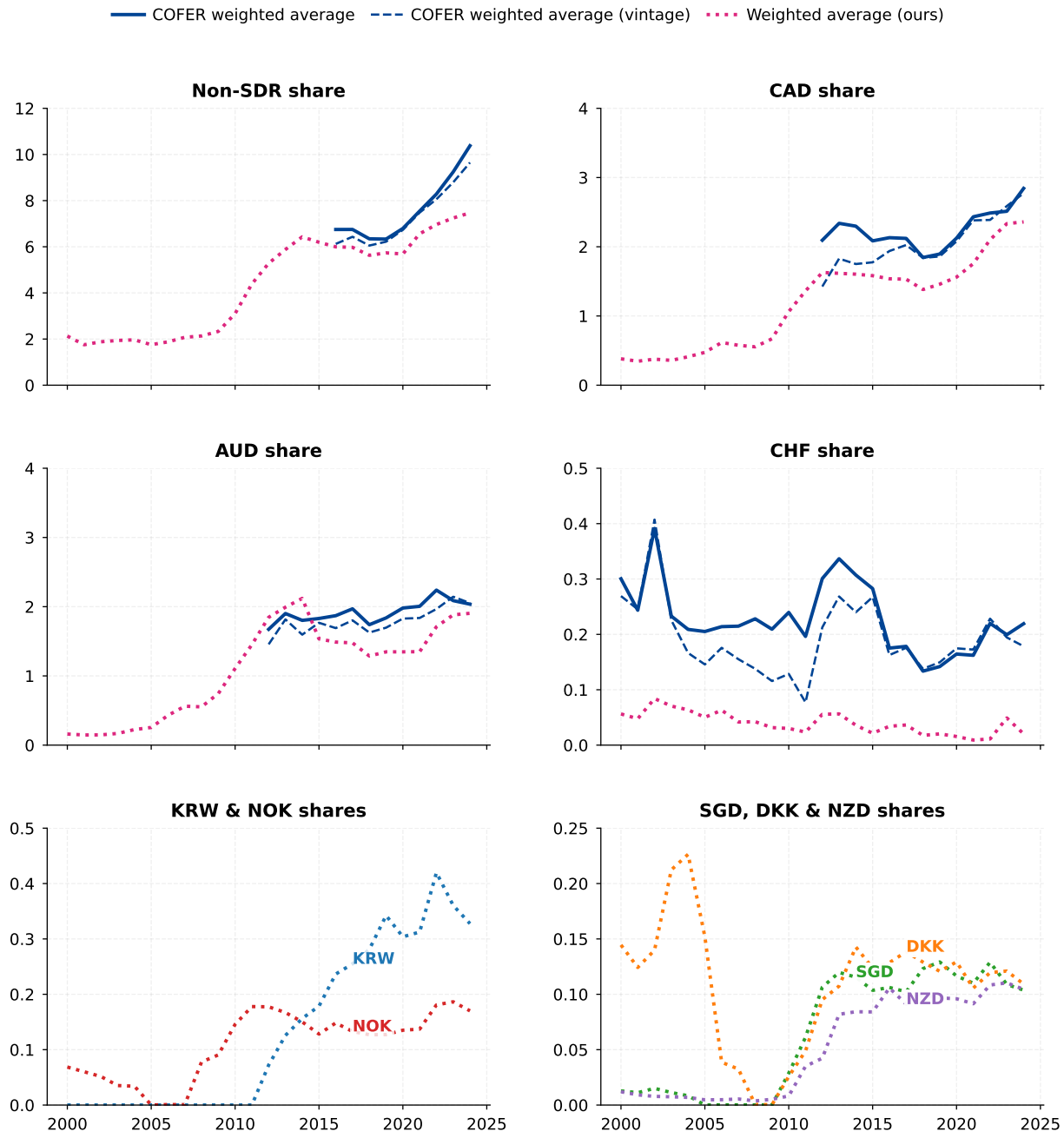
Figure B.27. COFER unallocated reserves

(shares of global foreign exchange reserves)



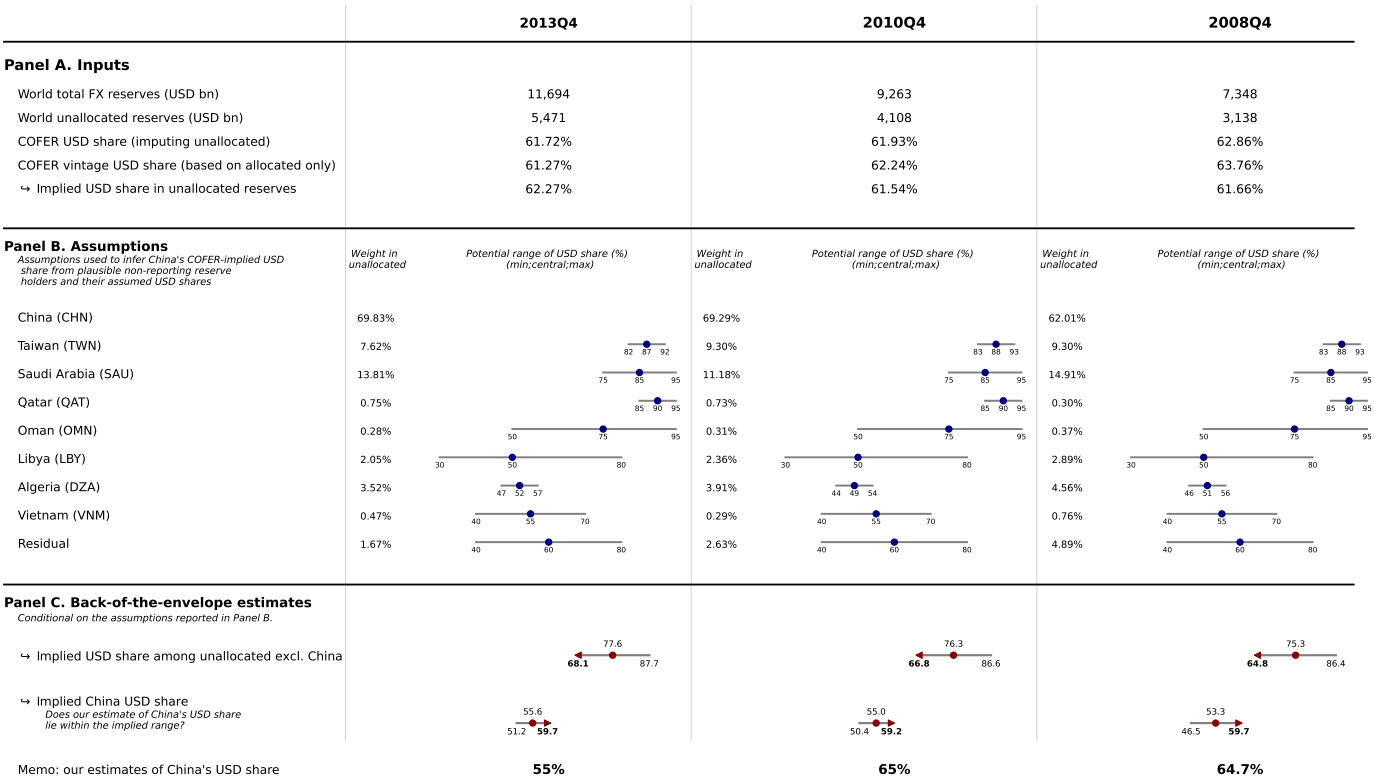
Note: Unallocated reserves are foreign exchange reserves whose currency composition is not disclosed in the IMF's COFER database. They may also include discrepancies between total reserves reported to COFER and to the IMF's IRFCL/International Liquidity databases. The figure reports unallocated reserves as a share of total world reserves and, through 2015Q1, decomposes this share into contributions from advanced economies (ADV) and emerging and developing economies (EMDE). Using publicly available information and forensic analysis, the ADV contribution can be further attributed to Taiwan and other advanced economies, while the EMDE contribution can be decomposed into China, Saudi Arabia, and other EMDEs. Taiwan accounts for nearly all of the ADV unallocated share over this period. In 2013Q4, China and Saudi Arabia together accounted for 90% of the EMDE unallocated share and 83.6% of the global unallocated share.

Figure B.28. Comparison with COFER weighted currency shares (selected non-SDR currencies)



Note: This figure supplements Figure 3 by reporting results for other non-SDR currencies. It compares the weighted average currency shares in central banks' FX reserves from our sample and the COFER currency shares (weighted average across all allocated reserves). It also shows the vintage COFER series—excluding imputations—prior to the December 2025 revision, after which IMF staff began imputing previously unallocated reserves to provide a complete currency composition covering 100 percent of global FX reserves. For this comparison, the weighted currency shares in our sample are drawn from an extended dataset that incorporates not only raw data but also interpolated shares and back-/extrapolated constant currency shares for missing observations, subject to constraints that preserve available aggregate SDR basket shares and aggregate shares for other residual currencies. Additionally, for China, India, and Japan, we apply specific imputation methods for their currency shares. For further details on the imputation methodology, see Appendix A.4.

Figure B.29. Back-of-the-envelope calculations used to infer China's COFER-imputed USD share under alternative assumptions for non-reporting reserve holders.

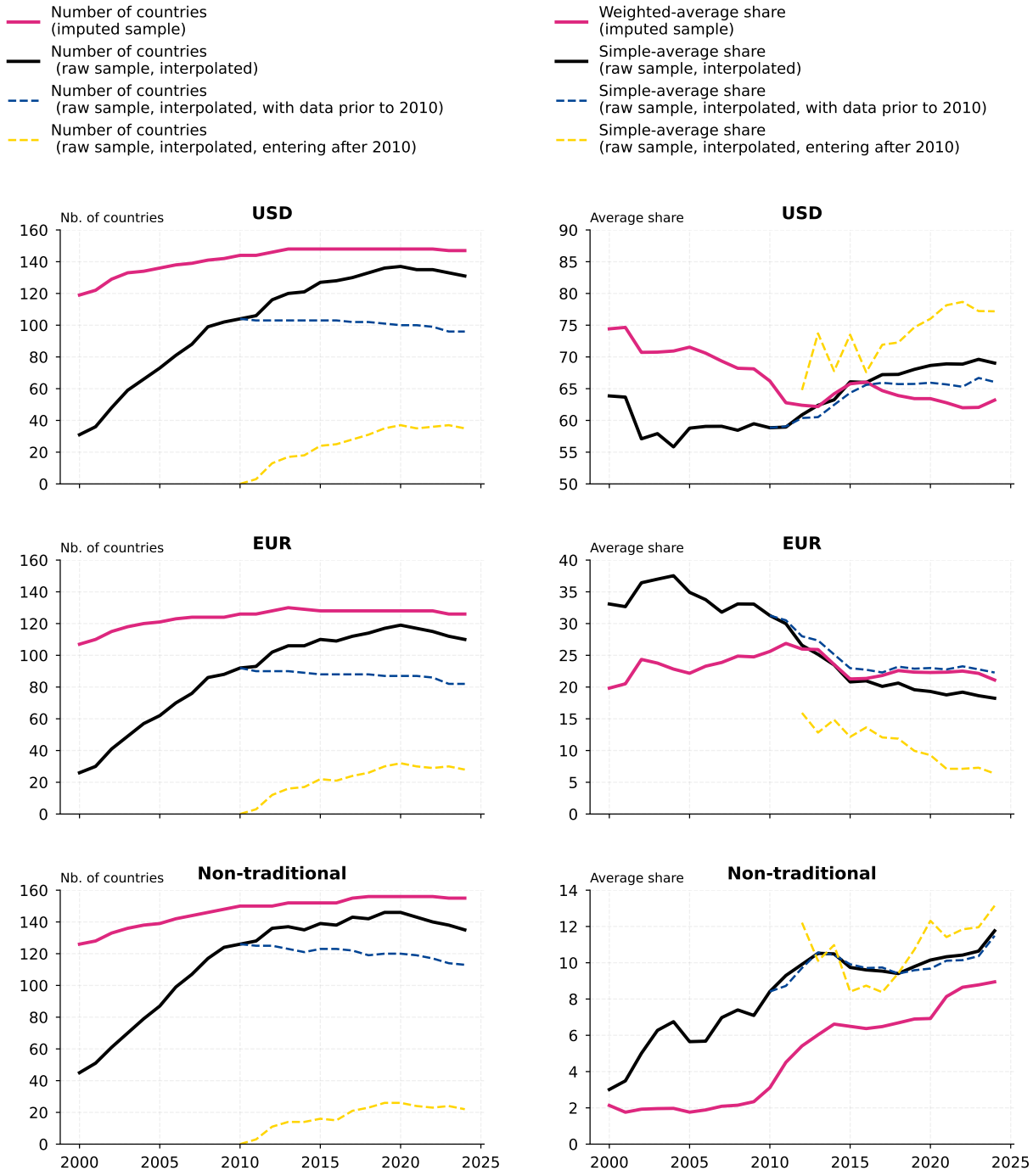


Note: Panel A reports global foreign-exchange reserves, unallocated reserves, and the corresponding COFER USD shares for three benchmark dates: 2013Q4, 2010Q4, and 2008Q4. It also reports the vintage COFER USD share, prior to the December 2025 revision, when the IMF began imputing the currency composition of previously unallocated reserves to provide a complete currency composition of global foreign-exchange reserves. The difference between the current and vintage COFER USD shares allows us to back out the USD share implicitly attributed to unallocated reserves in each period.

Among non-reporting economies, China, Taiwan, and Saudi Arabia accounted for the bulk of unallocated reserves during these periods. We additionally include a number of smaller economies, including Algeria, Qatar, Oman, Libya, and Vietnam, which we believe were also non-reporters at the time. Taiwan, Qatar, and Algeria are assigned relatively narrow ranges for their assumed USD shares based on unofficial evidence on the currency composition of their reserves. For Saudi Arabia, available evidence suggests that a large share of reserve deposits is held in USD (85%), while the currency composition of its securities portfolio remains less certain, although it is generally believed to be tilted toward USD-denominated assets as well. Panel B reports the weights of these economies within unallocated reserves together with assumed ranges for their USD shares.

These assumptions are used to back out the China USD share consistent with the COFER-imputed aggregate. The 2013Q4 calibration serves as a plausibility check for the assumptions reported in Panel B. Under our central, albeit necessarily judgment-based, assumptions for the USD shares of the main non-reporting reserve holders, the implied China USD share (55.6%) is close to our own estimate (55%), suggesting that the assumptions are broadly reasonable. The 2010Q4 and 2008Q4 calibrations serve a different purpose. They provide an upper bound on the China USD share consistent with COFER under a wide range of assumptions about the currency composition of non-reporting economies. Even when all other non-reporting economies are assigned implausibly low USD shares, thereby maximizing the USD share attributed to China in COFER, the implied China USD share remains below 60% in both 2010Q4 and 2008Q4, well below our corresponding estimates. This suggests that historical COFER imputations already incorporated much of China's diversification away from the USD prior to 2008.

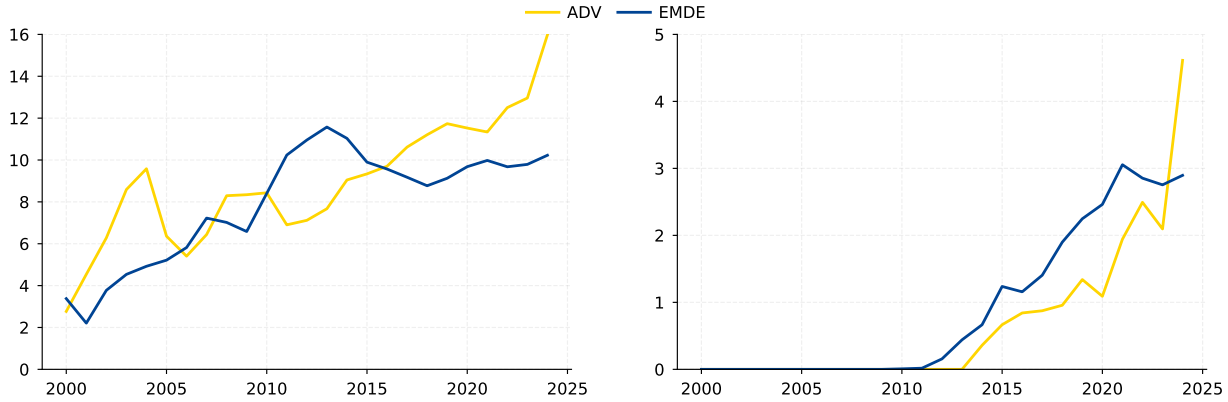
Figure B.30. Currency shares for different settings



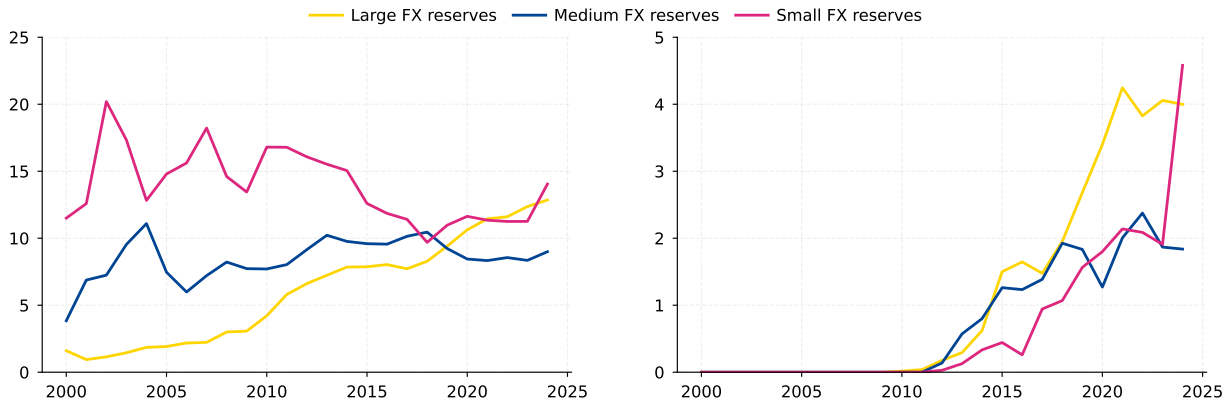
Note: The figure assesses the role of sample composition. Our sample is unbalanced, with country coverage increasing from 104 (92) in 2010 to a peak of 137 (119) for USD (EUR) in 2020. While changes in sample composition are generally more consequential for reserve-weighted than unweighted statistics such as arithmetic averages and medians, they are not innocuous in our setting. economies entering the sample after 2010 tend to exhibit higher USD shares and lower EUR shares than incumbent reporters, mechanically contributing to the post-2010 increase in average USD shares and decline in average EUR shares (see dashed yellow lines). However, both patterns are already evident among economies reporting prior to 2010 (see dashed blue lines). Sample expansion therefore amplifies, but does not drive, the documented trends for the average and median reserve holder.

Figure B.31. NRCs and CNY *average* shares in FX reserves since 2000—Alternative groups

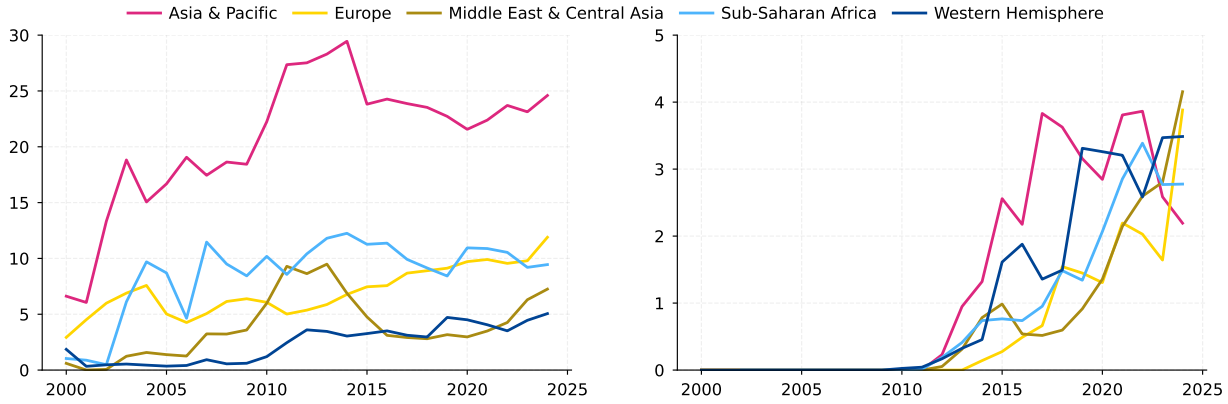
(a) By type of economy *(NRCs: left panel, CNY: right panel)*



(b) By size of reserve holder *(NRCs: left panel, CNY: right panel)*



(c) By region *(NRCs: left panel, CNY: right panel)*



Note: The figure shows the time series of NRCs (sum of non-traditional currencies, comprising CNY and other non-SDR currencies) and CNY simple average shares in central banks' foreign exchange reserves across alternative country groups, categorized by type of economy (top row), size of reserve holder (middle row), and region (bottom row). NRCs shares are displayed in the left panel charts, while CNY shares are shown in the right panel charts. For each currency, the corresponding issuing country(s) is excluded. The series are based on raw data, with missing values linearly interpolated.

Table B.10. Holdings of non-traditional reserves by country in end-2024

Note: The table shows the share of non-traditional currencies in FX reserves. When available, this share is further decomposed into CNY and non-SDR currencies aggregate. Depending on data availability, the non-SDR currencies are partly detailed in the last column. The figures are generally based on 2024, with the associated change since 2016 shown in parentheses, unless indicated otherwise in the second column. FX reserves exclude monetary gold, SDR holdings, and the reserve position in the IMF (and other reserve assets). Missing figures are indicated as "…". Macao's currency shares are based only on FX currency and deposit holdings, while those of Luxembourg and Brunei are based only on FX security investments.

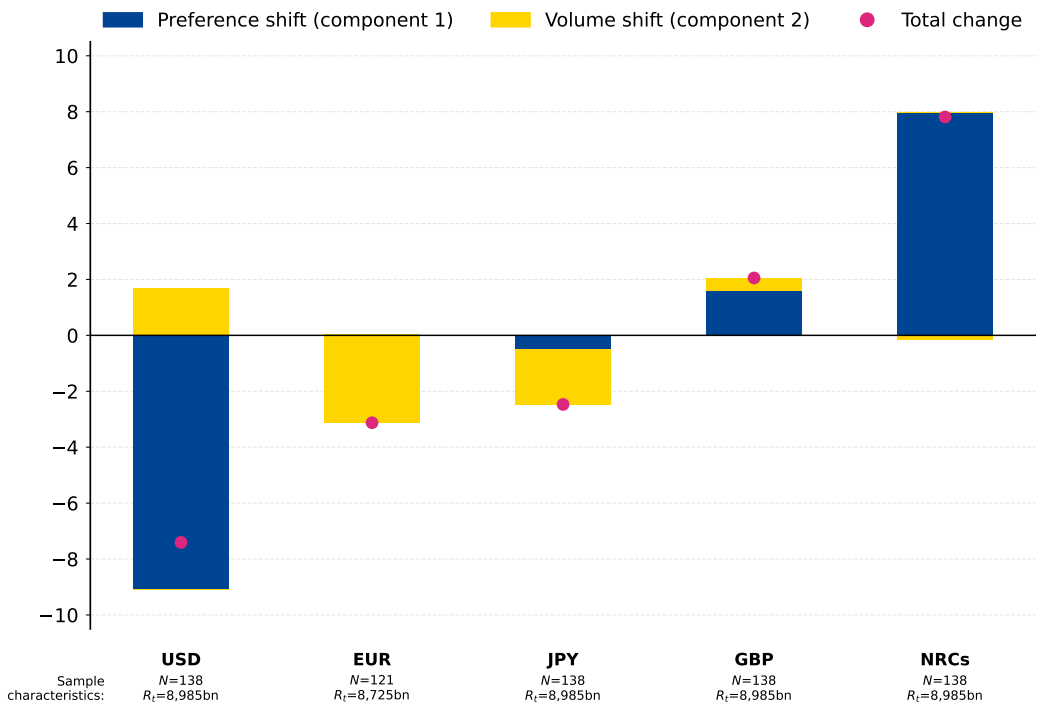
Reference area	**Based on** 2024 (Δ 2016)	**FX reserves** (in $ bn)	**Nontraditional share** (in %)	**CNY share** (in %)	**Non SDR share** (in %)	**Non SDR share: breakdown by currency** (where data available, in %)
Total (COFER allocated)	2024 (Δ 2016)	12329.9 (+1612.56)	12.4 (+4.61)	2.1 (+1.07)	10.3 (+3.54)	CAD: 2.8 (+0.70); AUD: 2.0 (+0.17); CHF: 0.2 (+0.02); Others: 5.2 (+2.66)
Luxembourg	2024 (Δ 2016)	0.04 (-0.1)	100 (+100)	100 (+100)	0 (=)	none
Macao	2024 (Δ 2018)	29.0 (+9.1)	84.3 (+23.3)	0 (=)	84.3 (+23.3)	HKD: 84.2 (+23.9); Others: 0.1 (-0.6)
Argentina	2024 (Δ 2016)	24.0 (-9.1)	73.6 (+36.6)	73.6 (+36.6)	0 (-0.1)	...
Lesotho	2024 (Δ 2016)	0.86 (=)	61.2 (+4.0)	0 (=)	61.2 (+4.0)	ZAR: 61.2 (+4.1)
Samoa	2024 (Δ 2016)	0.46 (+0.4)	55.5 (-19.5)	2.75 (+2.8)	52.8 (-22.2)	NZD: 28.0 (-17.8); AUD: 24.8 (-4.4)
Namibia	2024 (Δ 2016)	3.13 (+1.3)	53.4 (+4.4)	0.69 (-0.2)	52.7 (+4.6)	ZAR: 52.6 (+4.6); Others: 0.04 (=)
Brunei Darussalam	2024 (Δ 2016)	3.32 (+0.3)	52.2 (-46.5)	0.83 (+0.8)	51.4 (-47.4)	SGD: 42.2 (-56.6); AUD: 9.2 (+9.2)
Fiji	2023 (Δ 2016)	1.33 (+0.5)	51.6 (-0.5)	0 (=)	51.6 (-0.5)	AUD: 29.7 (-2.7); NZD: 21.8 (+2.2)
Vanuatu	2024 (Δ 2016)	0.59 (+0.3)	49.5 (+0.7)	0.72 (-0.5)	48.7 (+1.2)	AUD: 37.8 (+1.2); NZD: 10.9 (-0.1)
Tonga	2024 (Δ 2016)	0.37 (+0.2)	43.4 (-12.4)	0 (=)	43.4 (-12.4)	NZD: 22.3 (-17.8); AUD: 21.1 (+5.4)
Malta	2024 (Δ 2016)	1.01 (+0.5)	42.4 (+38.8)	0 (=)	42.4 (+38.8)	AUD: 19.3; CHF: 7.6; CAD: 7.5; NZD: 4.8; SEK: 2.4; NOK: 0.82; Others: 0.01 (-3.6)
Solomon Islands	2024 (Δ 2016)	0.68 (+0.2)	37.4 (+2.2)	1.21 (+1.2)	36.2 (+1.1)	AUD: 28.9 (+3.6); NZD: 5.7 (-0.3); SGD: 1.65 (-2.3)
Estonia	2024 (Δ 2016)	1.58 (+1.3)	36.4 (-7.6)	0 (=)	36.4 (-7.6)	...
Ireland	2024 (Δ 2016)	5.09 (+3.7)	35.6 (+8.9)	10.7 (+10.7)	24.9 (-1.7)	AUD: 11.1; SGD: 10.5; Others: 3.37 (-23.3)
Nepal	2023 (Δ 2017)	12.0 (+2.6)	33.8 (-6.5)	9.8 (-1.3)	24.0 (-5.2)	INR: 22.2 (-0.7); AUD: 1.23 (-2.6); CAD: 0.16 (-0.7); SAR: 0.13; Others: 0.31 (-1.3)
Kyrgyzstan	2024 (Δ 2016)	1.43 (+0.2)	32.9 (+5.2)	23.6 (+15.5)	9.3 (-10.3)	CAD: 6.4 (-0.2); AUD: 0.88 (-8.2); RUB: 0.86 (-0.1); Others: 1.14 (+0.1)
Turkiye	2024 (Δ 2016)	84.0 (-7.1)	27.9 (+26.4)	1.36 (+1.4)	26.5 (+25.1)	CHF: 0.04 (=); Others: 26.5 (+25.0)
New Zealand	2024 (Δ 2016)	11.0 (-4.2)	27.5 (-0.7)	3.11 (-1.8)	24.4 (+1.1)	AUD: 14.6 (+0.4); CAD: 9.8 (+0.7)
France	2024 (Δ 2016)	30.0 (-9.6)	$\geq$ 27.3 (+9.7)	...	27.3 (+9.7)	AUD: 13.0; CAD: 7.8; KRW: 6.5; Others: 0 (-17.5)
Poland	2024 (Δ 2016)	179.0 (+69.1)	22.8 (+5.8)	0 (=)	22.8 (+5.8)	...
Lithuania	2024 (Δ 2015)	6.02 (+4.7)	22.0 (-23.7)	0.09 (-4.0)	21.9 (-19.6)	AUD: 7.4 (+7.4); CHF: 7.4 (+7.3); CAD: 7.1 (+7.1); CZK: 0 (-41.5)
Eswatini	2024 (Δ 2016)	0.48 (=)	20.2 (-48.6)	3.98 (+4.0)	16.3 (-52.5)	ZAR: 16.2 (-51.8); CHF: 0.01 (=); BWP: 0.01 (=); AUD: 0 (-0.8)
Botswana	2024	3.06	20.1	4.68	15.5	AUD: 1.86; CAD: 1.32; ZAR: 1.19; Others: 11.1
Chile	2024 (Δ 2016)	40.0 (+0.9)	19.0 (+5.6)	5.9 (+3.5)	13.1 (+2.1)	...
Papua New Guinea	2024 (Δ 2016)	3.54 (+1.9)	18.7 (-2.8)	0 (=)	18.7 (-2.8)	AUD: 18.7 (+0.5); Others: 0 (-3.3)
Australia	2024 (Δ 2016)	40.0 (+0.4)	16.7 (+3.9)	4.0 (=)	12.7 (+3.9)	...
Costa Rica	2024 (Δ 2016)	13.0 (+6.1)	16.3 (+11.3)	0 (=)	16.3 (+11.3)	...
United Kingdom	2024 (Δ 2016)	119.0 (+7.2)	16.2 (+11.0)	0.36 (=)	15.8 (+10.9)	...
South Africa	2024 (Δ 2016)	48.0 (+9.2)	15.0 (+1.9)	8.4 (+4.8)	6.6 (-3.0)	...
Uzbekistan	2024 (Δ 2017)	8.6 (-5.1)	15.0 (+15.0)	15.0 (+15.0)	0 (=)	none
Mongolia	2024 (Δ 2017)	4.79 (+2.0)	14.7 (-7.1)	14.7 (-0.8)	0.04 (-6.4)	...
Egypt	2024 (Δ 2016)	11.0 (-0.2)	$\geq$ 13.1 (+12.8)	...	13.1 (+12.8)	...
Algeria	2022 (Δ 2016)	57.0 (-56.2)	12.9 (+12.9)	12.9 (+12.9)	0 (=)	none
Latvia	2024 (Δ 2016)	3.96 (+0.9)	12.6 (+6.9)	0 (=)	12.6 (+6.9)	CAD: 8.9 (+3.4); AUD: 1.32; Others: 2.36 (+2.2)
Romania	2024 (Δ 2016)	61.0 (+26.2)	$\geq$ 12.4 (+9.8)	...	12.4 (+9.8)	...
Czechia	2024 (Δ 2016)	151.0 (+68.2)	12.3 (-10.4)	0 (=)	12.3 (-10.4)	CAD: 7.4 (-2.9); AUD: 3.77 (-1.8); SEK: 1.05 (-0.1); Others: 0 (-5.5)
Colombia	2024 (Δ 2016)	58.0 (+12.6)	12.2 (-0.1)	1.58 (+1.4)	10.6 (-1.5)	CAD: 5.2 (+1.7); AUD: 4.83 (-0.1); Others: 0.55 (+0.4)

Table B.10 (continued)

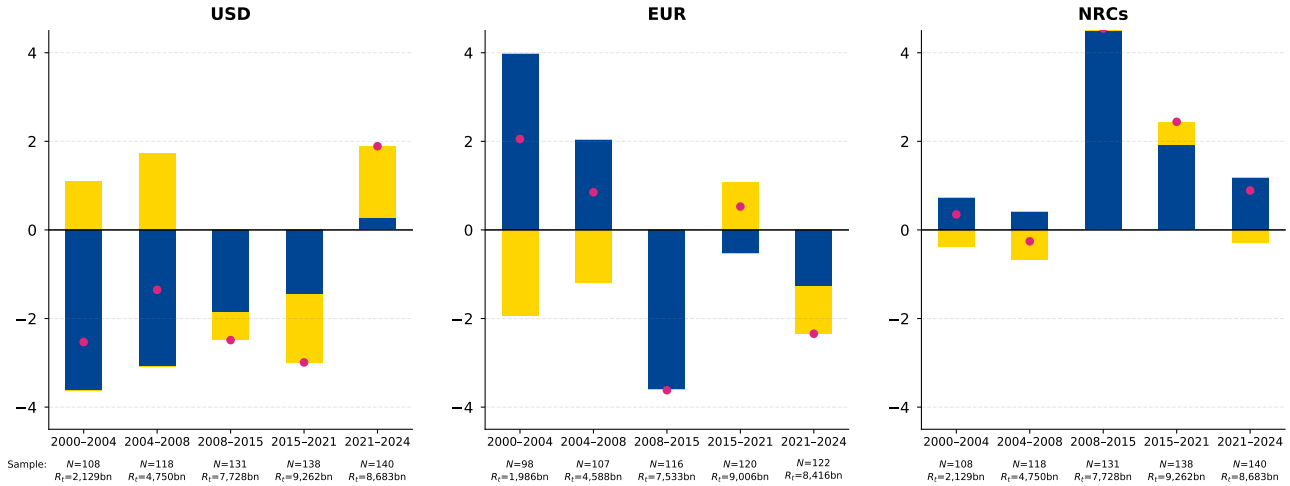
Reference area	Based on 2024 (Δ 2016)	FX reserves (in $ bn)	Nontraditional share (in %)	CNY share (in %)	Non SDR share (in %)	Non SDR share: breakdown by currency (where data available, in %)
Nigeria	2022 (Δ 2016)	30.0 (+5.4)	11.6 (+4.8)	11.2 (+4.3)	0.46 (+0.4)	...
Palestine, State of	2024 (Δ 2016)	1.33 (+1.0)	10.9 (+10.9)	0 (=)	10.9 (+10.9)	...
Kazakhstan	2024 (Δ 2016)	20.0 (+0.6)	10.8 (+6.8)	0.95 (+0.5)	9.8 (+6.3)	AUD: 2.85 (+1.7); CAD: 1.95 (+0.6); Others: 5.0 (+4.0)
Sweden	2024 (Δ 2016)	42.0 (-10.0)	10.4 (+2.6)	0 (=)	10.4 (+2.6)	...
Germany	2024 (Δ 2016)	35.0 (-1.6)	10.3 (+7.1)	0.88 (+0.9)	9.5 (+6.3)	CAD: 4.92 (+4.9); AUD: 3.3 (+0.1); Others: 1.23 (+1.2)
Suriname	2024	1.4	10.2	10.2	0	none
Greece	2024 (Δ 2016)	3.79 (+1.9)	10.1 (+9.8)	7.5	2.56 (+2.2)	NOK: 1.08; AUD: 0.77; CAD: 0.65; Others: 0.06 (-0.3)
Switzerland	2024 (Δ 2016)	808.0 (+173.1)	9.8 (+0.2)	0.81 (+0.2)	9.0 (=)	CAD: 2.76 (-0.3); AUD: 1.82 (+0.3); KRW: 1.54 (=); DKK: 0.73 (-0.3); SEK: 0.44 (=); SGD: 0.4 (=); Others: 1.34 (+0.3)
Mozambique	2024 (Δ 2017)	3.47 (+0.4)	9.6 (-18.0)	3.14 (+2.4)	6.4 (-20.4)	ZAR: 5.4 (-6.9); Others: 1.07 (-13.5)
Italy	2024 (Δ 2016)	50.0 (+15.8)	9.2 (+1.2)	0.85 (+0.3)	8.4 (+0.9)	AUD: 4.74 (+0.5); CAD: 3.24 (+0.3); Others: 0.4 (+0.2)
Netherlands	2024 (Δ 2016)	6.07 (+0.1)	9.0 (+9.0)	0 (=)	9.0 (+9.0)	...
Spain	2024 (Δ 2016)	64.0 (+16.6)	9.0 (-4.6)	1.0 (+1.0)	8.0 (-5.6)	CAD: 8.0 (+3.4); AUD: 0 (-9.0); Others: 0.01 (=)
Korea, Republic of	2024 (Δ 2016)	391.0 (+29.7)	$\geq$ 7.7 (+1.6)	...	7.7 (+1.6)	...
Brazil	2024 (Δ 2016)	283.0 (-71.1)	7.6 (+0.7)	5.5 (+5.5)	2.11 (-4.8)	...
Seychelles	2024 (Δ 2016)	0.75 (+0.2)	7.4 (+7.3)	5.4 (+5.4)	1.97 (+1.9)	...
Israel	2024 (Δ 2016)	210.0 (+112.7)	7.1 (+6.4)	0.1 (-0.5)	7.0 (+6.8)	...
Slovenia	2024 (Δ 2016)	1.31 (+1.1)	6.6 (+6.4)	6.5 (+6.5)	0.03 (-0.1)	CHF: 0 (-0.1); Others: 0.03 (=)
Angola	2024 (Δ 2016)	13.0 (-9.2)	6.2 (+3.8)	6.2 (+4.5)	0 (-0.7)	...
Sri Lanka	2024 (Δ 2016)	6.05 (+0.9)	5.5 (-12.6)	0 (=)	5.5 (-12.6)	AUD: 2.34 (-3.1); CAD: 2.19 (-0.3); NZD: 0.96 (-1.5); Others: 0 (-7.7)
Mauritius	2024 (Δ 2016)	7.13 (+2.9)	5.4 (-2.4)	3.84 (+1.8)	1.6 (-4.2)	...
Bangladesh	2024 (Δ 2016)	18.0 (-10.3)	4.9 (+0.3)	1.0 (=)	3.9 (+0.3)	AUD: 2.33 (+0.4); CAD: 1.36 (-0.2); Others: 0.21 (+0.1)
Peru	2024 (Δ 2016)	73.0 (+13.6)	4.38 (+3.8)	1.51 (+1.0)	2.88 (+2.9)	...
Trinidad and Tobago	2024	4.26	4.03	0	4.03	CAD: 0.39; Others: 3.63
Portugal	2024 (Δ 2016)	5.63 (-3.9)	4.0 (-3.0)	4.0 (-3.0)	0.01 (=)	undefined but trivial
Cabo Verde	2024 (Δ 2016)	0.78 (+0.2)	3.94 (+3.9)	3.94 (+3.9)	0 (=)	none
Madagascar	2024 (Δ 2016)	2.72 (+1.6)	3.91 (+0.4)	3.89 (+3.9)	0.02 (-3.5)	CHF: 0.02 (=); AUD: 0 (-3.5)
Albania	2024 (Δ 2016)	5.96 (+3.1)	3.84 (+1.8)	3.0 (+2.5)	0.84 (-0.7)	AUD: 0.84 (-0.7)
Mexico	2024 (Δ 2016)	201.0 (+31.4)	3.81 (+0.6)	2.88 (+2.8)	0.93 (-2.2)	...
Georgia	2024 (Δ 2016)	3.13 (+0.6)	3.37 (-7.8)	3.35 (+3.3)	0.03 (-11.1)	CAD: 0 (-3.3); AUD: 0 (-7.9); Others: 0.03 (=)
Philippines	2024 (Δ 2016)	84.0 (+14.0)	3.17 (-1.0)	1.07 (+0.4)	2.11 (-1.4)	AUD: 1.82 (-1.2); Others: 0.29 (-0.2)
Norway	2024 (Δ 2016)	67.0 (+12.4)	3.02 (-1.0)	1.46 (+1.5)	1.56 (-2.5)	...
Serbia	2024 (Δ 2016)	26.0 (+16.4)	2.34 (=)	0 (=)	2.34 (=)	CAD: 1.44 (-0.3); Others: 0.9 (+0.3)
Armenia	2023 (Δ 2016)	3.61 (+1.4)	2.21 (+2.2)	0 (=)	2.21 (+2.2)	RUB: 0.58 (+0.6); Others: 1.63 (+1.6)
Azerbaijan	2024 (Δ 2016)	12.0 (+6.3)	2.18 (+2.2)	2.18 (+2.2)	0 (=)	none
Hong Kong	2023 (Δ 2016)	411.0 (+37.4)	$\geq$ 1.0 (-2.4)	...	1.0 (-2.4)	...
Ukraine	2024 (Δ 2016)	40.0 (+28.5)	0.43 (-2.3)	0.35 (-1.7)	0.08 (-0.7)	...
Bolivia	2024 (Δ 2016)	0.05 (-8.2)	0.06 (-14.2)	0.06 (-7.4)	0 (-6.8)	CAD: 0 (-3.3); AUD: 0 (-3.4); Others: 0 (-0.1)
Paraguay	2024 (Δ 2016)	8.69 (+2.3)	0 (-6.1)	0 (=)	0 (-6.1)	CAD: 0 (-2.9); AUD: 0 (-3.2)
Bahrain	2024 (Δ 2016)	3.79 (+1.6)	0 (-9.7)	0 (=)	0 (-9.7)	...

Figure B.32. Robustness: decomposition using our extended dataset, without imputed/estimated data for JPN, IND, TWN, KOR, HKG

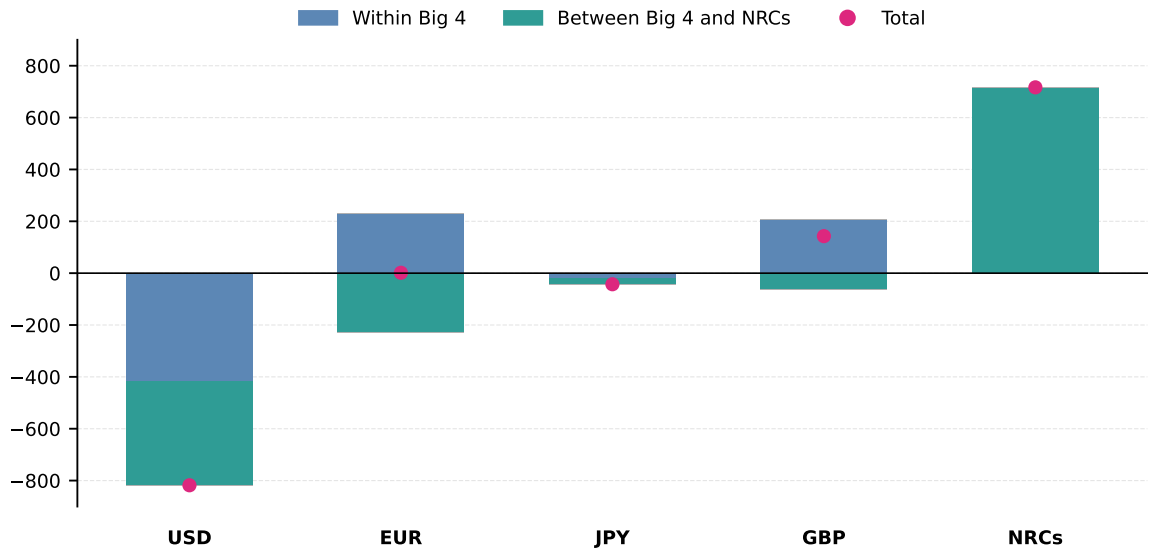
(a) Preference and volume shifts in reserve currency shares, 2000–2024 period (changes in percentage points)



(b) Preference and volume shifts in reserve currency shares across sub-periods (changes in percentage points)



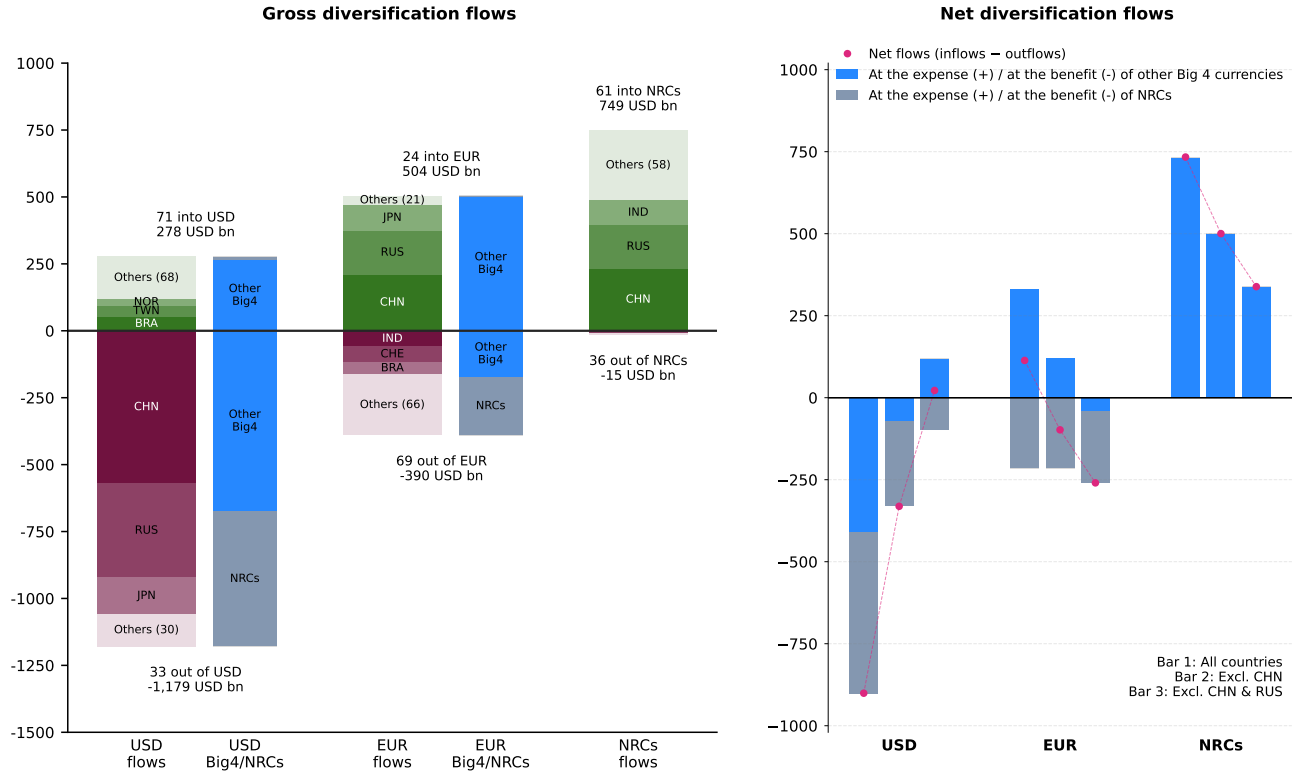
(c) Preference changes: shifts within and away from the Big Four currencies, 2000–2024
(left axis: net flows, USD billions; right axis: share changes, percentage points)



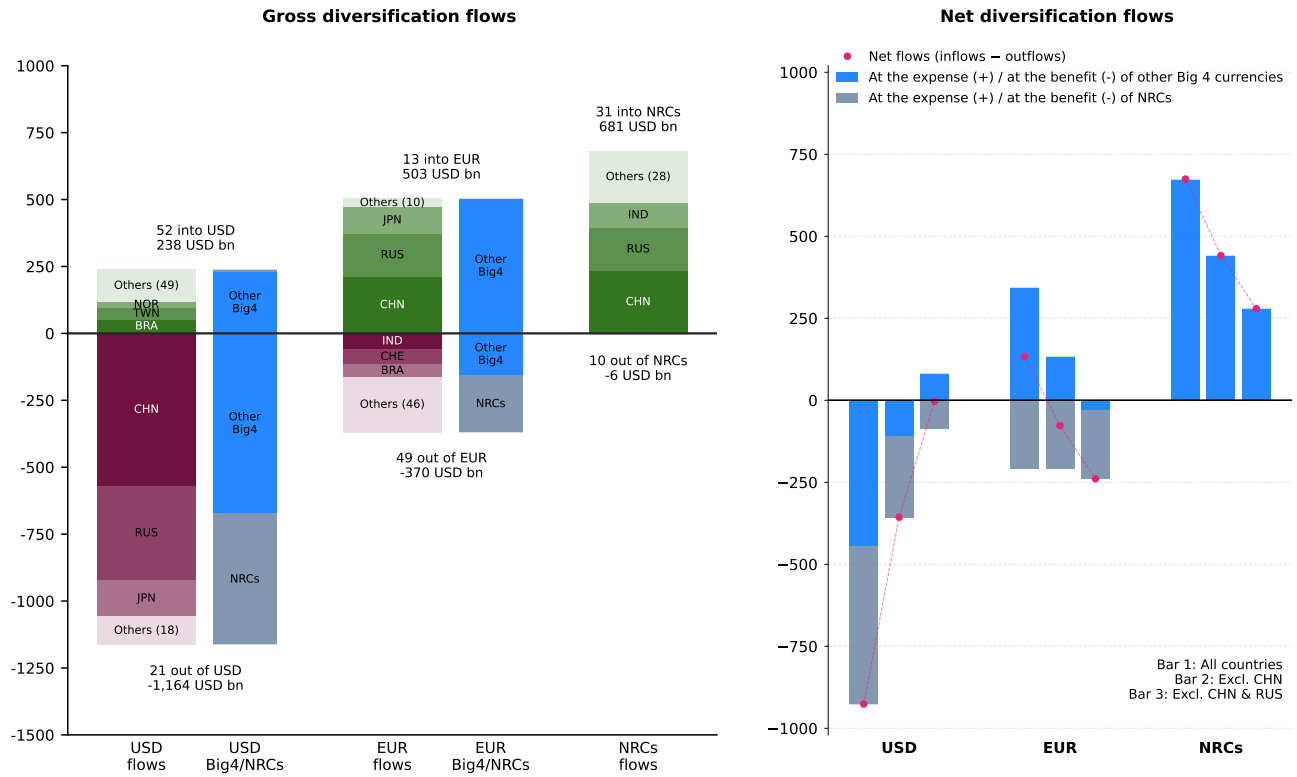
Note: The charts replicate the baseline figures reported in the main text. Panel (a) replicates Figure 12 and shows, for 2000–2024, the two-component decomposition in Eq. 1 of changes in aggregate reserve currency shares (USD, EUR, JPY, GBP, and NRCs). Panel (b) reports the same decomposition for selected subperiods and replicates Figure 13. Panel (c) replicates Figure 14 and shows, for 2000–2024, the decomposition in Eq. 2 of active (preference-driven) changes in aggregate currency shares. As in the baseline figures, all three panels rely on the extended dataset combining raw data with interpolated and back- and forward-extrapolated constant currency shares. However, unlike the baseline figures, estimated or imputed observations for Japan, India, Taiwan, Hong Kong, and Korea are excluded, while imputations for China are retained when needed. The excluded observations were originally incorporated to improve the identification of the volume component and facilitate comparisons with aggregate reserve-weighted currency shares. The results remain qualitatively robust, particularly with respect to the preference component. However, as discussed in the main text, Component 2 is less precisely identified because coverage effects play a larger role.

Figure B.33. Robustness checks: diversification flows under alternative settings (USD billion)

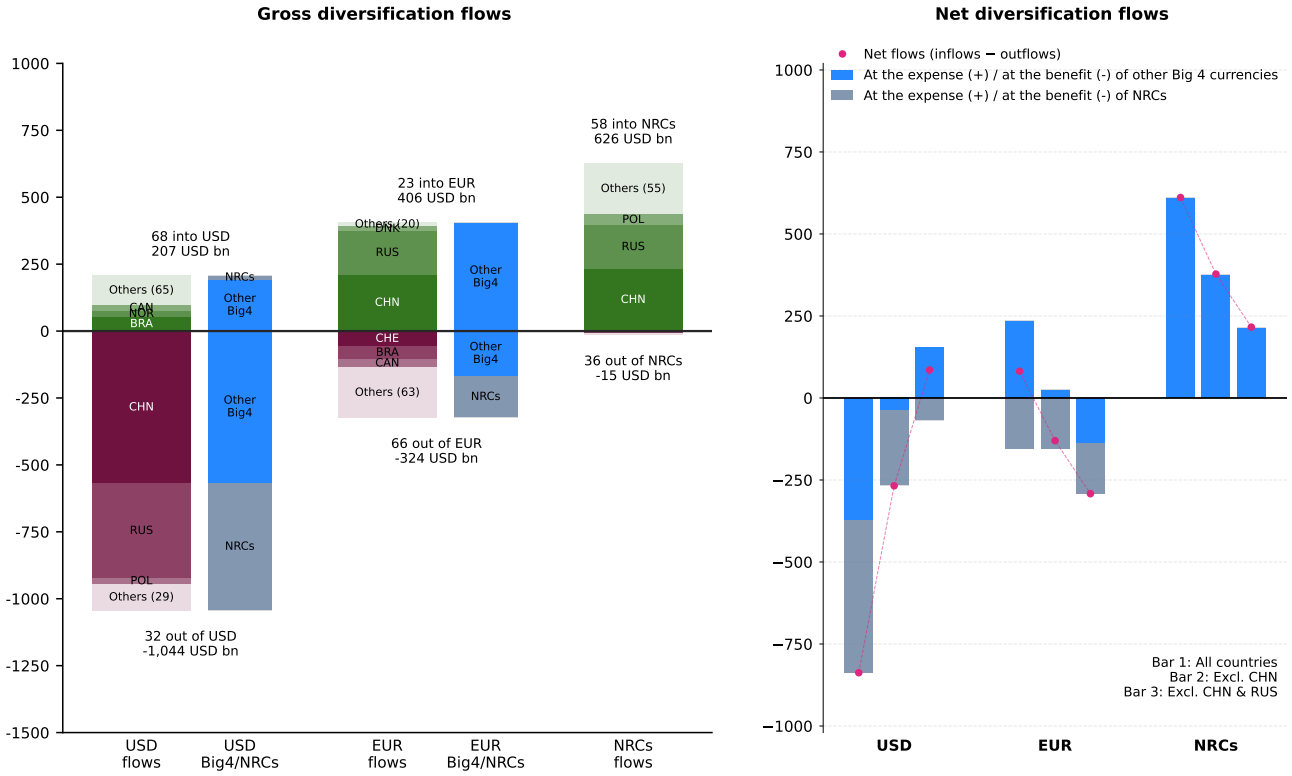
(a) Baseline setting, 2000–2024 period



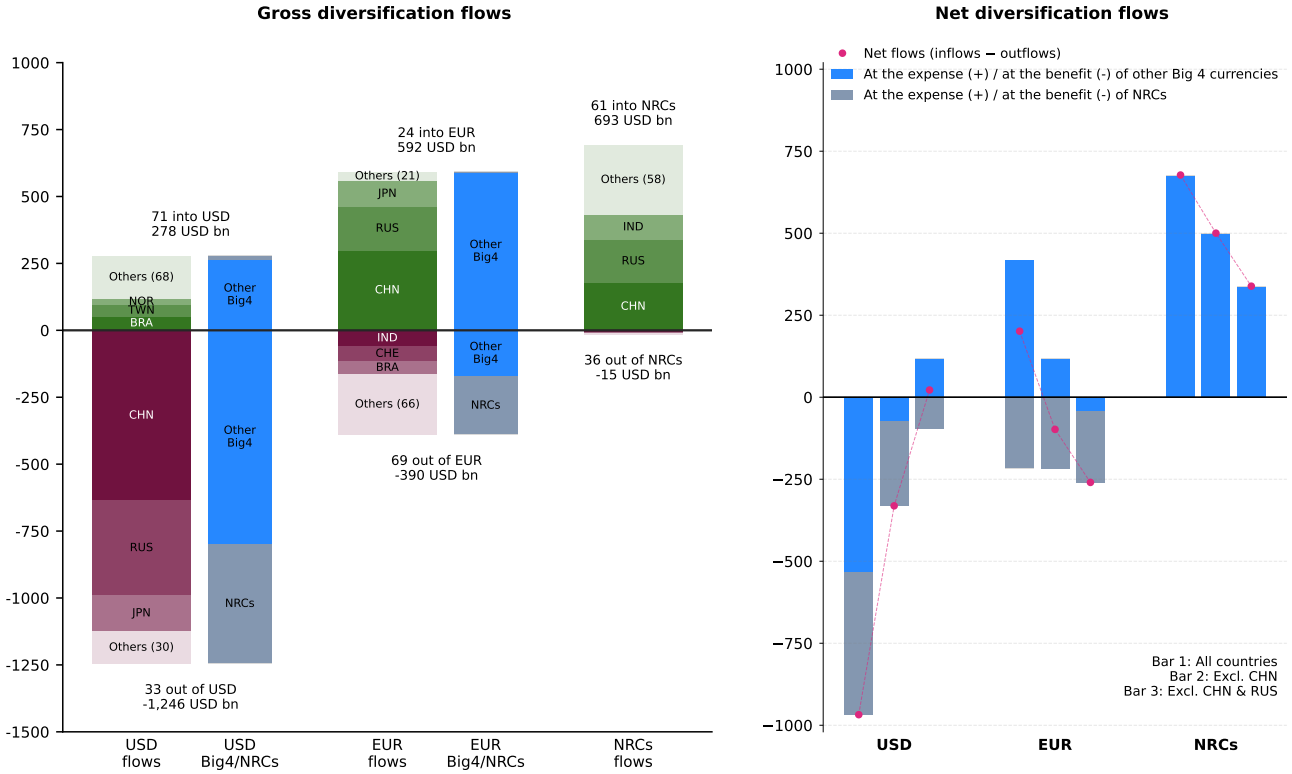
(b) Baseline setting, but restricting the sample to active diversifiers only



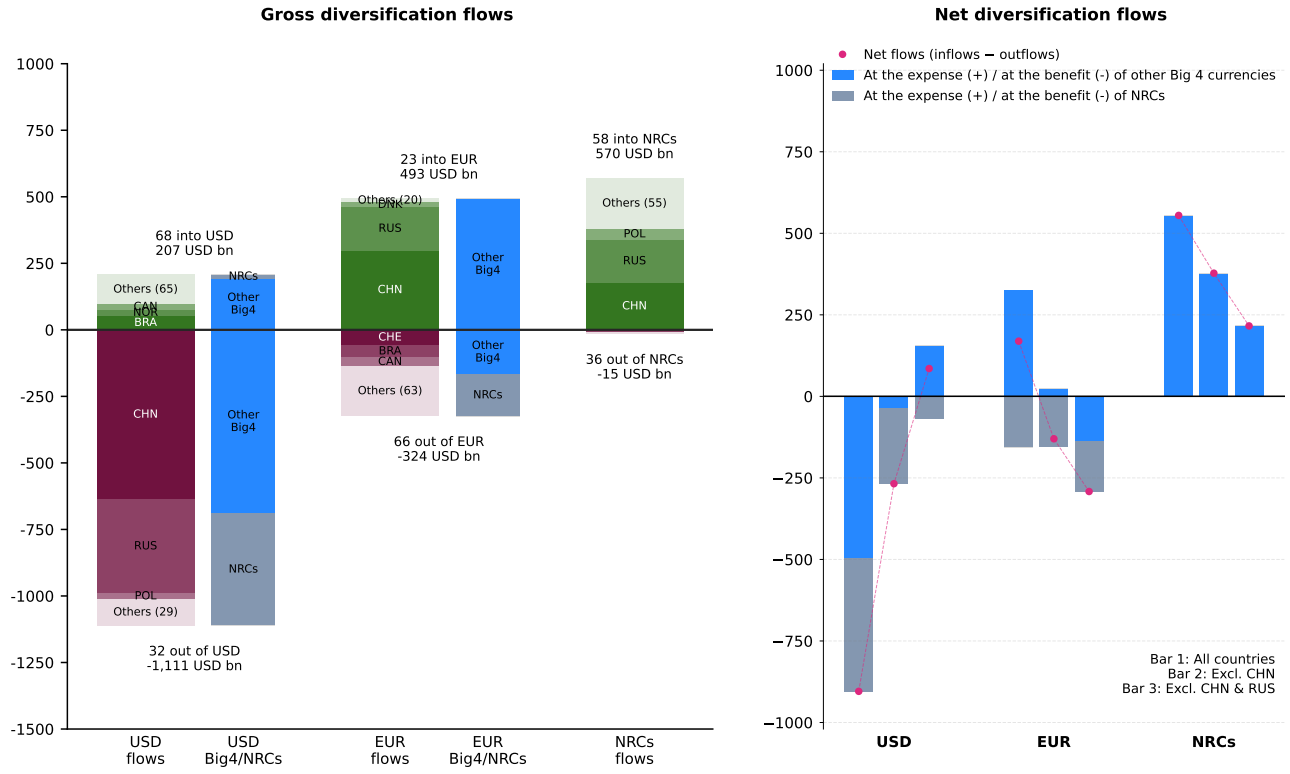
(c) Baseline setting, but excluding JPN, IND, TWN, HKG, KOR estimated/imputed observations



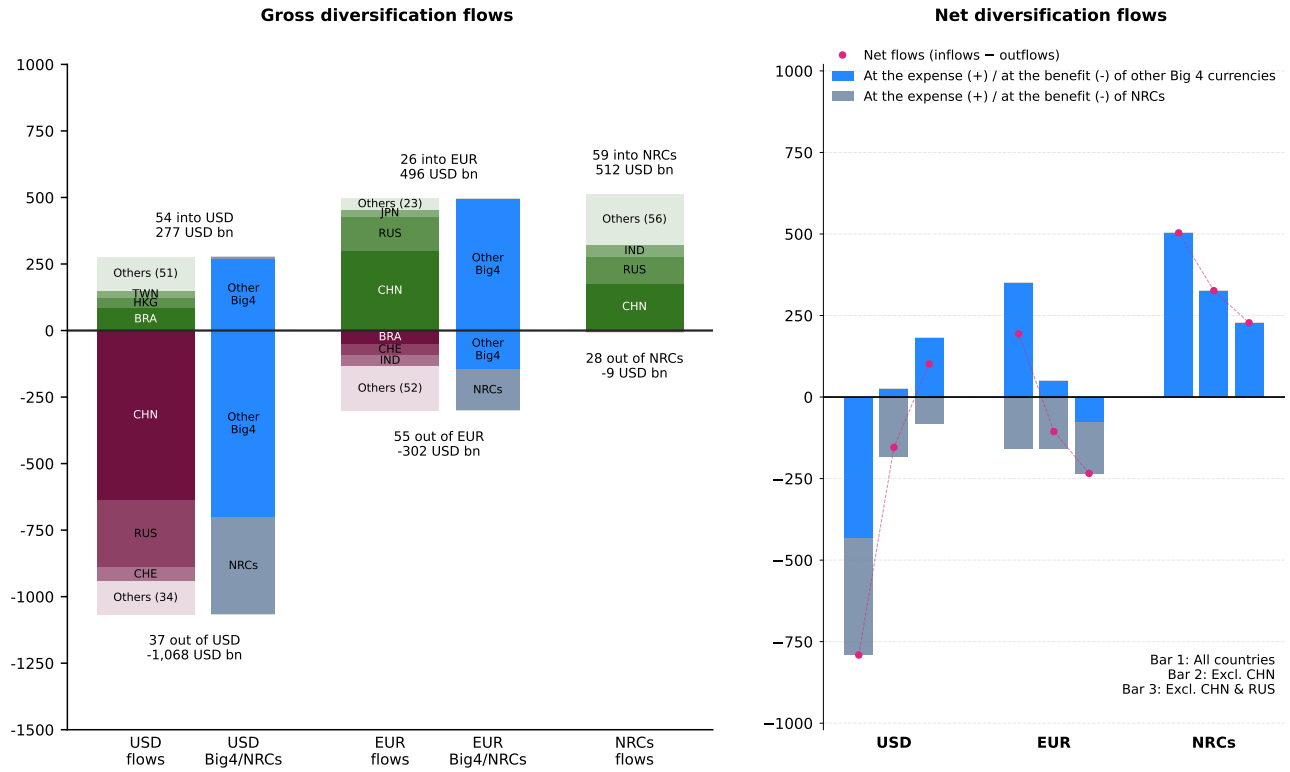
(d) Baseline setting, but excluding CHN imputed observations after 2019



(e) Baseline setting, but excluding CHN imputed observations after 2019, and JPN, IND, TWN, HKG, KOR estimated/imputed observations



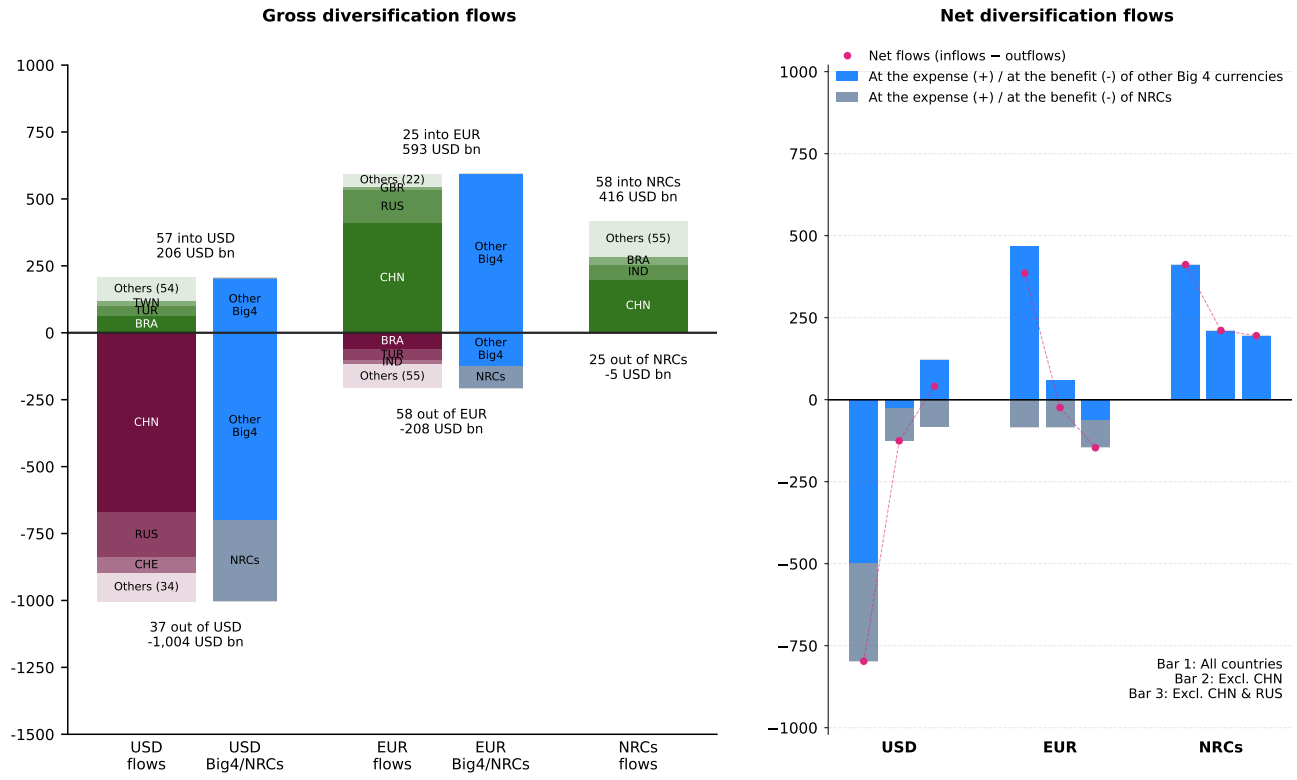
(f) Baseline setting, but 2000–2019 period



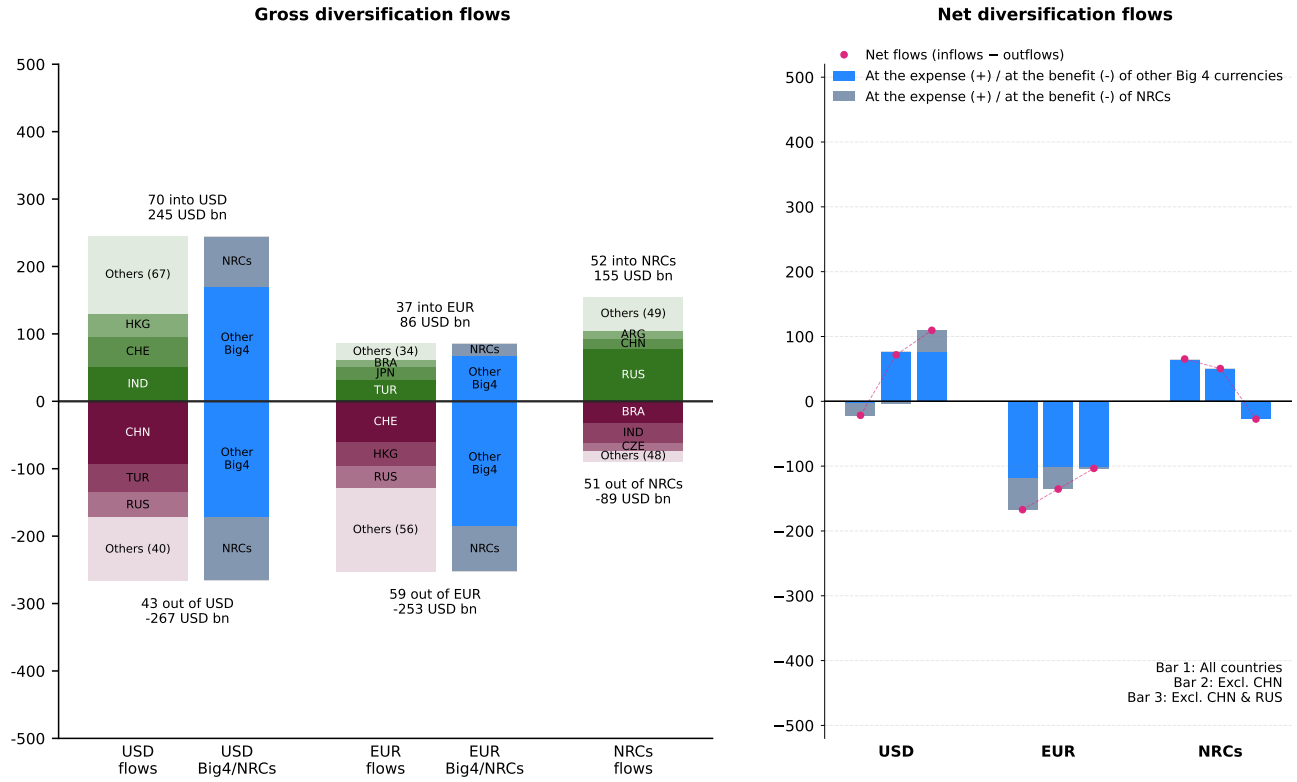
Note: The charts replicate baseline Figures 16 and 17, which report, respectively, gross and net reserve flows for the USD, EUR, and NRCs over 2000–2024 (or the earliest and latest available years), but using alternative settings.

Figure B.34. Robustness checks: diversification flows for alternative periods (USD billion)

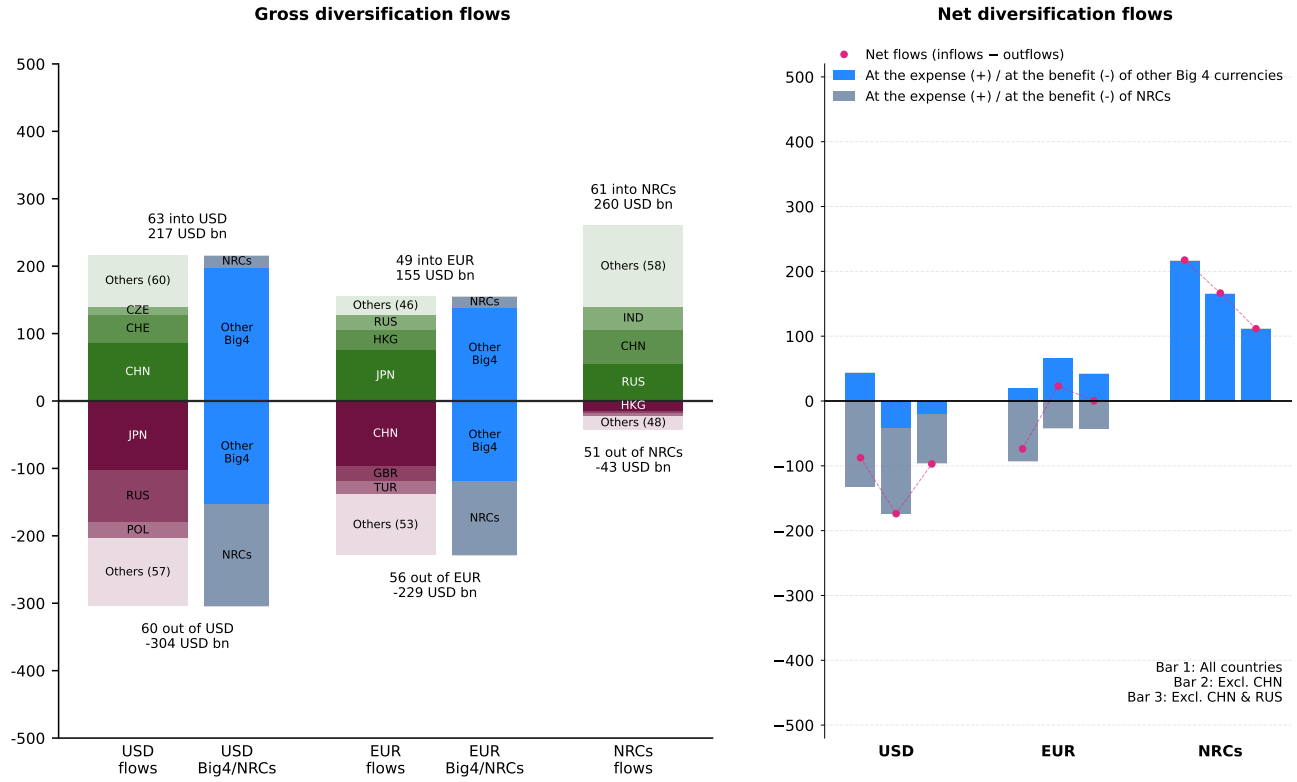
(a) Baseline setting, 2000–2014 period



(b) Baseline setting, 2014–2019 period



(c) Baseline setting, 2019–2024 period



Note: The charts replicate baseline Figures 16 and 17, which report, respectively, gross and net reserve flows into and out of the USD, EUR, and NRCs, but for alternative sample periods. Specifically, we consider 2000–2014, 2014–2019, and 2019–2024 instead of the baseline 2000–2024 period. These cutoffs are chosen so that the first two subperiods primarily rely on reported observations for China's USD, Big Four, and NRC shares, whereas the final subperiod relies predominantly on imputed observations for China's USD and other Big Four shares.

Placeholder: Evidence on gold diversification to be added

Appendix C. Additional empirical estimates and robustness checks

Table C.11. Tobit estimates - Determinants of USD shares of FX reserves

	(1)	(2)	(3)	(4)	(5)
USD peg	0.830	0.936	0.888	0.873	0.815
	(0.076)***	(0.085)***	(0.089)***	(0.091)***	(0.093)***
EUR peg	-1.744	-1.656	-4.66	-4.612	-4.599
	(0.211)***	(0.213)***	(118.693)	(118.740)	(118.324)
Trade with the US	0.202	0.155	0.193	0.195	0.161
	(0.029)***	(0.029)***	(0.032)***	(0.032)***	(0.034)***
Trade with the euro area	0.089	0.039	0.098	0.109	0.079
	(0.034)***	(0.035)	(0.040)**	(0.041)***	(0.043)*
Trade with the UK	-0.092	-0.102	-0.076	-0.082	-0.08
	(0.037)**	(0.038)***	(0.040)*	(0.040)**	(0.040)**
Trade with Japan	-0.166	-0.247	-0.238	-0.226	-0.241
	(0.041)***	(0.043)***	(0.046)***	(0.047)***	(0.047)***
USD debt	0.217	0.239	0.216	0.213	0.199
	(0.032)***	(0.033)***	(0.037)***	(0.037)***	(0.037)***
US troops		0.237	0.276	0.280	0.265
		(0.030)***	(0.033)***	(0.033)***	(0.033)***
Geopolitical distance from the US			0.151	0.169	0.205
			(0.036)***	(0.040)***	(0.042)***
US financial sanctions				-0.106	-0.045
				(0.096)	(0.099)
US trade sanctions				0.123	0.067
				(0.134)	(0.135)
Military alliance with the US					0.083
					(0.033)**
N	1,701	1,661	1,531	1,531	1,531
No. of economies	117	115	111	111	111
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports Tobit estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table C.12. Tobit estimates - Determinants of EUR shares of FX reserves

	(1)	(2)	(3)	(4)	(5)	(6)
USD peg	-0.787	-0.587	-0.539	-0.567	-0.589	-0.541
	(0.133)***	(0.119)***	(0.113)***	(0.113)***	(0.115)***	(0.110)***
EUR peg	1.495	1.425	1.605	1.615	1.635	1.44
	(0.165)***	(0.148)***	(0.200)***	(0.196)***	(0.200)***	(0.188)***
Trade with the US	-0.003	-0.023	-0.035	-0.038	-0.041	0.024
	(0.034)	(0.031)	(0.030)	(0.029)	(0.030)	(0.031)
Trade with the euro area	0.705	0.564	0.518	0.522	0.530	0.530
	(0.045)***	(0.040)***	(0.040)***	(0.040)***	(0.043)***	(0.040)***
Trade with the UK	0.046	0.081	0.037	0.028	0.028	0.007
	(0.034)	(0.031)***	(0.031)	(0.031)	(0.031)	(0.029)
Trade with Japan	0.197	0.080	0.058	0.068	0.075	0.039
	(0.045)***	(0.043)*	(0.042)	(0.043)	(0.044)*	(0.042)
EUR debt	0.124	0.208	0.190	0.189	0.194	0.146
	(0.039)***	(0.037)***	(0.038)***	(0.038)***	(0.038)***	(0.036)***
US troops		0.296	0.290	0.297	0.296	0.114
		(0.029)***	(0.028)***	(0.028)***	(0.028)***	(0.035)***
Geopolitical distance from euro area			-0.094	-0.074	-0.062	-0.145
			(0.030)***	(0.030)**	(0.034)*	(0.042)***
Financial sanctions from euro area				-0.225	-0.225	-0.075
				(0.094)**	(0.109)**	-0.104
Trade sanctions from euro area				-0.159	-0.206	-0.167
				(0.131)	(0.139)	(0.129)
US financial sanctions					-0.041	0.017
					(0.096)	(0.091)
US trade sanctions					0.150	0.026
					(0.143)	(0.135)
Military alliance with the US						-0.023
						(0.033)
N	1,412	1,394	1,292	1,292	1,292	1,269
No. of economies	106	104	100	100	100	99
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports Tobit estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table C.13. Tobit estimates - Determinants of CNY shares of FX reserves

	(1)	(2)	(3)	(4)	(5)	(6)
USD peg	0.352	0.323	0.308	0.272	-0.095	-0.13
	-0.219	-0.219	-0.213	-0.205	-0.216	-0.219
EUR peg	-1.214	-1.255	-0.925	-0.859	-0.631	-0.646
	(0.345)***	(0.348)***	(0.312)***	(0.309)***	(0.305)**	(0.308)**
Trade with the US	-0.375	-0.366	-0.393	-0.457	-0.544	-0.614
	(0.111)***	(0.111)***	(0.114)***	(0.110)***	(0.115)***	(0.125)***
Trade with the euro area	0.202	0.212	0.094	0.034	0.031	-0.028
	(0.088)**	(0.087)**	(0.087)	(0.085)	(0.083)	(0.089)
Trade with China	0.667	0.666	0.657	0.647	0.646	0.629
	(0.080)***	(0.079)***	(0.080)***	(0.078)***	(0.076)***	(0.075)***
USD debt	-0.024	-0.035	-0.121	-0.075	-0.205	-0.174
	(0.072)	(0.073)	(0.072)*	(0.070)	(0.073)***	(0.077)**
US troops		-0.090	-0.099	-0.058	-0.039	-0.023
		(0.067)	(0.077)	(0.079)	(0.076)	(0.081)
Geopolitical distance from China			0.012	-0.066	-0.168	-0.14
			(0.110)	(0.109)	(0.113)	(0.127)
Financial sanctions from China				-7.117	-8.66	-7.464
				(454.966)	(1580.400)	(149.769)
Trade sanctions from China				1.156	1.082	1.060
				(0.260)***	(0.247)***	(0.245)***
US financial sanctions					-0.345	-0.263
					(0.231)	(0.235)
US trade sanctions					1.692	1.544
					(0.334)***	(0.336)***
Military alliance with the US						0.084
						(0.073)
N	1,391	1,382	1,270	1,270	1,270	1,247
No. of economies	111	110	106	106	106	105
Sample	1999 - 2024	1999 - 2024	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports Tobit estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table C.14. Tobit estimates - Determinants of GBP, JPY, AUD and CAD shares of FX reserves

	GBP		**JPY**		**CAD**		**AUD**	
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
USD peg	-0.035	-0.052	-0.007	-0.043	-0.006	-0.009	-0.007	-0.011
	(0.010)***	(0.008)***	(0.008)	(0.013)***	(0.004)	(0.007)	(0.005)	(0.012)
EUR peg	-0.038	-0.071	-0.027	-0.072	-0.003	-0.024	-0.012	-0.043
	(0.011)***	(0.009)***	(0.018)	(0.014)***	(0.007)	(0.009)**	(0.007)	(0.016)***
Trade with US	-0.011	-0.017	-0.008	-0.008	0.001	0.008	-0.007	-0.021
	(0.004)**	(0.003)***	(0.008)	(0.004)*	(0.003)	(0.003)***	(0.003)**	(0.005)***
Trade with euro area	-0.006	-0.008	0.005	0.004	-0.005	-0.016	-0.013	-0.03
	(0.006)	(0.003)**	(0.009)	(0.006)	(0.004)	(0.004)***	(0.005)**	(0.007)***
Trade with UK	0.018	0.024						
	(0.007)**	(0.003)***						
Trade with Japan			0.041	0.059				
			(0.021)*	(0.006)***				
Trade with Canada					-0.027	0.002		
					(0.059)	(0.095)		
Trade with Australia							0.846	1.039
							(0.199)***	(0.061)***
USD debt	-0.003	-0.003	-0.01	-0.017	-0.003	-0.01	-0.004	-0.009
	(0.005)	(0.003)	(0.010)	(0.005)***	(0.002)	(0.003)***	(0.004)	(0.005)*
US troops	-0.007	-0.013	0.042	0.054	0	-0.003	-0.002	-0.004
	(0.006)	(0.003)***	(0.018)**	(0.004)***	(0.003)	(0.003)	(0.004)	(0.004)
Geopolitical distance	0.008	0.012	-0.003	-0.013	-0.005	-0.008	-0.006	-0.01
	(0.008)	(0.003)***	(0.011)	(0.005)***	(0.003)	(0.003)**	(0.004)	(0.006)*
N	1,436	1,436	1,337	1,307	1,150	1,150	1,162	1,162
Adj. R2	0.13	.	0.28	.	0.03	.	0.59	.
# of economies	108	108	108	108	104	104	104	104
Years covered	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022	1999 - 2022

Notes: The table reports OLS and Tobit estimates of Equation 3. Standard errors clustered at the country level are shown in parentheses. ***p<0.01, **p<0.05, *p<0.1.