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The Stealth Erosion of Dollar Dominance:

Active Diversifiers and the Rise of Nontraditional Reserve Currencies

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ABSTRACT: We document a decline in the dollar share of international reserves since the turn of the century. This decline reflects active portfolio diversification by central bank reserve managers; it is not a byproduct of changes in exchange rates and interest rates, of reserve accumulation by a small handful of central banks with large and distinctive balance sheets, or of changes in coverage of surveys of reserve composition. Strikingly, the decline in the dollar's share has not been accompanied by an increase in the shares of the pound sterling, yen and euro, other long-standing reserve currencies and units that, along with the dollar, have historically comprised the IMF's Special Drawing Rights. Rather, the shift out of dollars has been in two directions: a quarter into the Chinese renminbi, and three quarters into the currencies of smaller countries that have played a more limited role as reserve currencies. A characterization of the evolution of the international reserve system in the last 20 years is thus as gradual movement away from the dollar, a recent if still modest rise in the role of the renminbi, and changes in market liquidity, relative returns and reserve management enhancing the attractions of nontraditional reserve currencies. These observations provide hints of how the international system may evolve going forward.

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WORKING PAPERS

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I. Introduction

The literature on dollar dominance (e.g., Boz et al., 2020) emphasizes the outsized role of the U.S. currency in global markets. The dollar's share in global trade invoicing, international debt, and cross-border non-bank borrowing outstrips the share of the United States in trade, international bond issuance, and cross-border borrowing and lending. The currency's dominance has been resilient in the face of a declining U.S. share of global GDP. Dollar dominance survived the collapse of Bretton Woods (Gourinchas, 2021), while its shares of international debt and non-bank borrowing rose still further following the global financial crisis (Eren and Malamud, 2021).

Influential contributions (e.g., Prasad, 2014) argue that the dollar has been the dominant international currency by default. The absence of alternatives has allowed it to dominate international funding markets, trade invoicing and settlement, and foreign exchange reserves. Other currencies suffer from an inadequate supply of investment-grade government securities for investors to hold as safe assets and central banks to accumulate as reserves (Eichengreen and Gros, 2020). Or their liquidity and availability is limited by regulation, including capital controls (Prasad and Ye, 2013; and Sullivan, 2020). They do not benefit from the large installed base of transactions denominated in dollars. They therefore lack the complementarities and synergies of different cross-border uses benefiting the dollar (Gopinath and Stein, 2021).

But with the rise of the euro and the renminbi, this narrative continues, the situation may be poised to change. Starting in 2012, with Mario Draghi's "do whatever it takes" pledge, the European Central Bank asserted its readiness to act as liquidity provider of last resort to markets in euro-denominated assets in countries using the euro (European Commission, 2018). In 2020, with the creation of the €850 billion European Recovery Fund, there arose the prospect of a growing stock of safe and liquid AAA-rated government securities to be held as reserves by central banks (Hudecz, Cheng, Moshammer and Raabe, 2021).

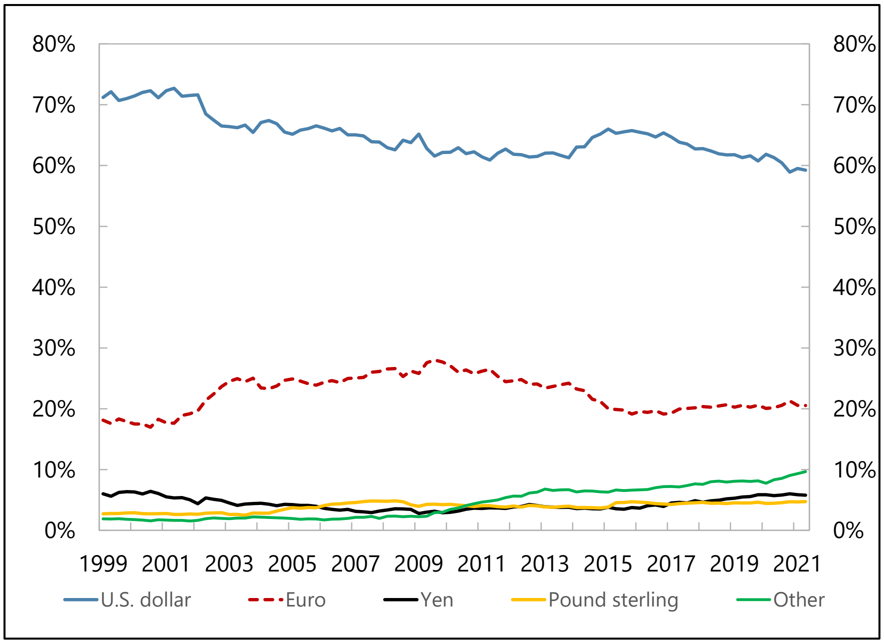
China, meanwhile, embarked on a process of currency internationalization, aided by growing imports and exports, Belt and Road investments, a global network of renminbi currency swaps and official clearing banks, and addition of the renminbi to the Special Drawing Rights (SDR) basket (Subacchi, 2016; Greene, 2021). The capstone on this evolution, it is said (Jia, 2021), is now issuance by China of a central bank digital currency, the e-CNY.

In this paper, we focus on the currency composition of international reserves. On this dimension, the dollar has not become more dominant. It has not even maintained the dominance of prior years. Figure 1 shows the currency composition of foreign exchange reserves according to the IMF's Currency Composition of Official Foreign Exchange Reserves (COFER) survey. According to this source, the share of reserves held in U.S. dollars by central banks dropped by 12 percentage points since the turn of the century, from 71 percent in 1999 to 59 percent in 2021.[1]

[1] Reporting to COFER and the IMF Reserve Data Template (see Sections 5 and 6) are based on actual holdings of currencies, not exposure to a currency including the impact on positions of currency derivatives. This is because reserve assets, to qualify, must be readily available and be recorded on the central bank's balance sheet. Accordingly, currencies to be received on the maturation of forward contracts are not counted as reserves; only the market value of the contract is counted. This is also because when reserve managers settle the forward contracts, they may not actually receive the currencies but may pay/receive just the market value of the contract without an exchange of notional values. We discuss some additional limitations of these data below.

This decline is not an inadvertent byproduct of changes in exchange rates, interest rate levels, or interest rate differentials. To the contrary, reserve managers have tended to rebalance their portfolios, restoring prior currency shares, to offset such changes. The decline is not the result of reserve accumulation by a small number of large reserve holders with a preference for non-dollar currencies. Nor is it a figment of changes in country or currency coverage of surveys of reserve composition. Rather, it reflects active portfolio diversification by central bank reserve managers.

Figure 1. Currency Composition of Global Foreign Exchange Reserves 1999–2021 (in percent)



Sources: IMF Currency Composition of Official Foreign Exchange Reserves (COFER).
Note: The "other" category contains the Australian dollar, the Canadian dollar, the Chinese renminbi, the Swiss franc and other currencies not separately identified in the COFER survey. China became a COFER reporter between 2015 and 2018.

Figure 1 shows that this decline in the dollar's share is not a shift toward the euro, the British pound sterling and Japanese yen—the other currencies that, historically, have played a significant international role and, along with the dollar, that have comprised the basket making up the IMF's Special Drawing Rights.[2] Though there was a rise in the share of reserves in euros after the turn of the century, this increase was not sustained. This is contrary to widespread expectations that the euro would come to play a more consequential international role and challenge the dollar's dominant reserve currency status (see e.g., Chinn and Frankel, 2007, 2008).[3]

As a result, the decline in the dollar's share has been matched by a rise in the share of what we refer to as nontraditional reserve currencies, defined as currencies other than the US dollar, euro, Japanese yen and British pound sterling. As shown in Figure 1, the share of nontraditional reserve currencies rose from negligible levels at the turn of the century to roughly $1.2 trillion and 10 percent of total identified reserves in 2021. Using

[2] The renminbi was added to the basket in 2016; we analyze the implications of this below.
[3] Chinn and Frankel's forecast was predicated on the assumption that the UK would join the Euro Area.

data from the IMF's Special Data Dissemination Standard (SDDS) and national sources, we show that the shift away from the dollar has been a quarter a shift into the Chinese renminbi and three quarters a shift into other nontraditional reserve currencies. The renminbi has long been thought to pose a challenge to the dollar (see Subramanian 2011 for an early statement). However, not only is it starting out well behind the greenback, but the shift out of dollars, in fact, is not overwhelmingly a shift into the renminbi, as we show below. Rather, the shift out of dollars is more substantially a shift into the currencies of smaller economies that, historically, had less of the scale and liquidity needed to constitute an attractive form of international reserves.

This shift into nontraditional reserve currencies is substantial, and it is also broad based. We identify 46 "active diversifiers," defined as countries with a share of official reserves in nontraditional currencies of at least 5 percent at the end of 2020.

Three factors contribute to the growing footprint of nontraditional reserve currencies. First is the growing liquidity of markets in those currencies. Historically, only a handful of countries have possessed deep and liquid markets in domestic-currency assets open to the rest of the world. Foreign exchange dealers, able to find counterparties only in that same handful of currencies, quoted and transacted in a limited number of bilateral exchange rates. Canales-Kriljenko (2004, p.7) describes how the principal currencies traded in the foreign exchange markets of developing countries at the turn of the century were the dollar, euro, pound sterling, and Japanese yen (currencies sometimes labelled the "Big Four"). He illustrates this by explaining that the cheapest way of purchasing Canadian dollars with Mexican pesos was by first purchasing U.S. dollars with Mexican pesos and then using the U.S. dollars to purchase Canadian dollars, reflecting the high liquidity and low transactions costs of markets for U.S. dollars.[4]

But as transactions costs have fallen with the advent of electronic trading platforms and now automated market-making (AMM) and automated liquidity management (ALM) technologies for foreign exchange transactions, the savings associated with transacting in U.S. dollars are less. Meanwhile, a growing number of countries have developed markets for trading currencies other than the Big Four.[5] In addition, the expanding global network of central bank currency swap lines (Aizenman, Ito, and Pasricha, 2021) has enhanced the ability of central banks to access currencies other than the ones they hold as reserves, weakening these links across markets and functions.[6]

Second, central bank reserve managers have become more active in chasing returns. Central banks have accumulated substantial portfolios of financial assets. The larger the portfolio, the more scope there is for financial gains (and also, to be sure, losses) from active reserve management. When reserves exceed the level associated with reserve adequacy, reserve managers come to distinguish different reserve tranches: the minimum required for reserve adequacy (the "liquidity tranche"), which should be held in liquid, low-risk assets; and the rest (the "investment tranche"), which can be more actively managed, with returns in mind, and

[4] Hence, it would be more expensive, in terms of transactions costs, for the Bank of Mexico, entering the market, to purchase and hold a nontraditional reserve currency such as the Canadian dollar, as opposed to the U.S. dollar. Intervening to support the peso would require the Bank of Mexico to first sell Canadian dollars for US dollars, the intervention currency.

[5] To continue with the example, Canada reports transactions of its dollars against the Big Four but also the Mexican peso, Australian dollar, Swiss franc, Swedish krona and Hong Kong dollar (as well as a miscellaneous category of "other currencies") in response to the most recent BIS Triennial Survey. See Bank of Canada (2019). Bank of Mexico reports onshore transactions in Canadian dollars and Swiss francs (Bank of Mexico 2019). Numbers for Mexico are relatively small, but the practice is more widespread elsewhere: Australia for example reports over-the-counter foreign exchange transactions in 22 currencies against the Australian dollar. Cheung, McCauley and Shu (2019) document how a growing number of emerging-market currencies have come to be traded in financial centers in addition to just New York, London and Tokyo in recent years.

[6] This is apt to be true for some but not all swap lines, since in some cases the swap is not of one country's currency for the other country's currency but for U.S. dollars (Truman, 2021).

invested in less liquid assets (Hentov et al. 2019).[7] The liquidity tranche is used to finance ongoing deficits, service and redeem debt, and intervene in the foreign exchange market, and as such tends to be held in the same relatively liquid assets denominated in the same currencies against which intervention is conducted. The investment tranche can be placed in nontraditional instruments and currencies. As the investment tranche grows relative to the liquidity tranche, one should expect to see more diversification in this direction.[8]

Third, and relatedly, as yields on bonds issued by the governments of the Big Four countries have fallen toward zero, central bank reserve managers may have intensified their search for higher yielding alternatives.[9] As we show below, Sharpe Ratios (returns adjusted for volatility) have been more attractive for nontraditional currencies than the Big Four at a variety of points in the last decade.[10]

In sum, several factors have combined to prompt the shift from dollars to nontraditional reserve currencies in recent decades. The literature on reserve diversification (potential as well as actual) has tended to emphasize policy initiatives on the part of the official sector that fly under the banner of, inter alia, "renminbi internationalization" and fostering internationalization of the euro to boost Europe's "strategic autonomy" (Reuters, 2020; Economist, 2021). Our analysis suggests that market forces and incentives matter at least as much as these policy measures.

Our paper builds on several related literatures. Most obvious is the literature on dollar dominance. Gopinath and Stein (2021), already mentioned, emphasize mutually reinforcing synergies between use of the dollar in trade and bank-intermediated capital flows, while Farhi and Maggiori (2017) emphasize complementarities between dollar invoicing and the demand for dollar-denominated assets. Closely related is the literature on network effects and liquidity in foreign exchange markets. The literature on network effects (e.g., Matsuyama, Kiyotaki, and Matsui,1993; Rey, 2001) suggests that it pays to use and therefore for central banks to hold the same national currency used and held by others engaged in international transactions, since only that currency, or small handful of currencies, is widely priced and accepted, and since foreign exchange transactions are costly. Ogawa and Muto (2018) focus on liquidity and suggest that only large economies possess deep and liquid markets open to the rest of the world, thereby rendering their currencies attractive as international reserves.

Skeptics of this view (e.g., Eichengreen, Mehl, and Chitu, 2018; Eichengreen, 2019) question the importance of these complementarities between different international uses of a currency. They argue that as financial markets and relations develop, the case for a central bank to hold its reserves in the same currency that exporters invoice or banks borrow becomes weaker; they envisage movement toward a more multipolar

[7] Of the central bank reserve managers surveyed in Castelli and Salman (2021), 68 percent report tranching or segmenting their reserves. There exist a number of definitions and associated measures of reserve adequacy, starting with the Greenspan-Guidotti rule of reserves equal to the current account deficit plus short-term debt maturing within the next year. Reserve managers may of course vary the size of the liquidity tranche with market conditions (see Central Banking 2021).

[8] Consistent with this, Aizenman, Cheung, and Qian (2020), discussed below, provide direct evidence that reserve managers diversify away from the Big Four currencies as their reserve portfolios grow large. In addition, to the extent that central banks are engaging in less foreign exchange intervention, they may be more comfortable about holding a portion of the liquidity tranche in nontraditional instruments and currencies. Indeed, Adler et al. (2021) find that foreign exchange interventions by emerging market economies have declined following the global financial crisis.

[9] Consistent with this hypothesis, Castelli and Salman (2021) report survey responses from 30 central banks indicating that reserve managers see low and negative yields in fixed income markets as a concern, and that they have responded by moving in the direction of more diversification of reserves.

[10] Low returns on government bonds of the Big Four countries may also explain the increase in gold reserves of central banks in the course of the last decade (Kitagawa 2021), although analysis of central bank demand for gold is properly the subject of another paper.

(multiple-currency) international monetary and reserve system. They point to the declining importance of network effects in an increasingly high-tech financial world and emphasize changes in market technology that reduce the cost and increase the ease of transacting in nontraditional international currencies.

Our paper is directly related to the empirical literature on the composition of foreign reserves. Eichengreen and Frankel (1996), Eichengreen (1998), and Chinn and Frankel (2007) have used published COFER aggregates to model the determinants of reserve currency shares and forecast their future evolution. Dooley, Lizondo, and Mathieson (1989) and Eichengreen and Mathieson (2000) used confidential country-level data underlying the COFER data base to explore the determinants of country-level reserve currency shares.[11] Eichengreen and Mathieson found a striking degree of stability in the currency composition of reserves between the 1980s and 1990s and highlighted the importance of trade flows and debt denomination as determinants of currency shares.

As an alternative to the COFER data, Iancu et al. (2020) analyze data published by central banks. They assemble data on the reserves of 42 countries for the period 1999–2018. They conclude that financial links play an increasingly important role in the currency composition of reserves and that inertia in reserve proportions remains important. They find little evidence that trade shares significantly affect reserve composition, regardless of whether the former is measured as the share of trade with the reserve-currency country or the share invoiced in its currency. Similarly, Ito and McCauley (2020) use data published by 58 central banks. They find that dollar invoicing of exports is an important determinant of dollar reserve shares, and that countries hold larger dollar shares when their domestic currency co-moves with the dollar.

In the paper most closely related to our own, Aizenman, Cheung, and Qian (2020) assemble data for 58 countries from reports to the IMF on reserves in the form of nontraditional currencies (other than the dollar, euro, yen, and sterling).[12] They find that countries that trade more with the US, Euro Area, Japan, and UK and that peg to their currencies hold a larger share of Big Four reserves; in addition, central banks diversify away from the dollar and other traditional reserve currencies as their reserve portfolios grow large. However, these authors do not distinguish changes in the shares of the renminbi and other nontraditional reserve currencies, as we do here.

Finally, there is a literature on rebalancing by central bank reserve managers. Dominguez, Hashimoto, and Ito (2012) analyze aggregate reserve accumulation; they distinguish between active reserve accumulation, resulting from purchases and sales of reserve assets, and passive accumulation, resulting from returns on reserve assets. In contrast to that paper, we use this decomposition to study changes in the currency composition of reserves rather than changes in total reserves. We also use total return indices to estimate valuation changes in reserve assets, whereas they use balance of payments estimates. Chinn, Ito, and McCauley (2021) use their country-level sample to test for rebalancing: they reject both no rebalancing and full rebalancing, where the extent of rebalancing increases with country and reserve-portfolio size. Also related is Truman and Wong (2006), who analyze published data on reserve composition for 23 central banks for the period 2000–04. They compare changes in reserve shares with and without exchange-rate valuation effects but do not consider rebalancing per se. Utilizing this same sample, Wong (2007) finds evidence of partial

[11] Access to such data for research purposes is now more restricted, explaining why we do not utilize it here.

[12] This data base provides a breakdown for the share of reserves *not* held in the “Big Four” reserve currencies, and, in some cases, breakdown within the Big Four. The IMF publishes these data under the heading “Data Template on International Reserves and Foreign Currency Liquidity” https://data.imf.org/?sk=2DFB3380-3603-4D2C-90BE-A04D8BBCE237. In addition, in Section IV, we draw on more detailed data disclosed by 80 economies on the currency composition of reserves utilizing the dataset compiled by Ito and McCauley (2020) as updated by Chinn, Ito, and McCauley (2021), the IMF’s Data Template and central bank annual reports.

rebalancing for some countries, notably Japan, but not others. In contrast to these earlier studies, our analysis of rebalancing builds on a larger sample of central banks and encompasses a more recent period.

Section II describes at more length trends and possible determinants of recent changes in the share of the dollar in international reserves. Sections III and IV then provide econometric analysis of these changes and their determinants. Section V turns to nontraditional reserve currencies, showing that recent reserve diversification has been roughly one quarter toward the renminbi and three quarters toward the currencies of small economies. Section VI considers and dismisses alternative explanations for observed trends: large reserve holder effects, changes in COFER reporting, exchange rate effects and interest rate effects. Section VII, in concluding, draws out the implications for the possible future evolution of the international monetary and reserve system.

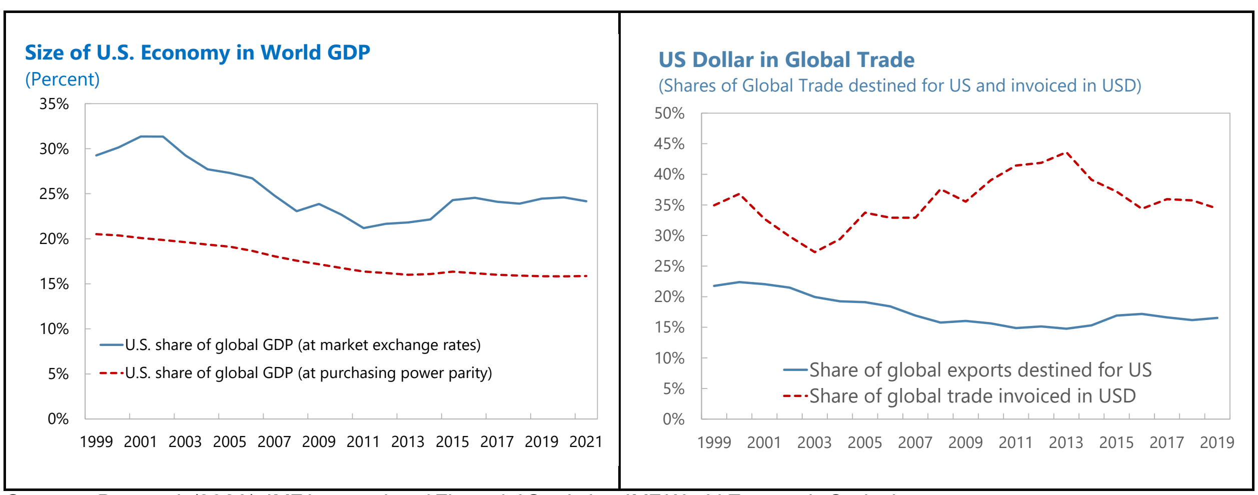
II. Changes in the Dollar's Share

We first discuss potential determinants of changes in the dollar's reserve share that have featured in the literature as a way of informing our regression analysis.

Figure 2 shows two of these determinants. The left panel shows the US share of global GDP, at market exchange rates (in blue) and purchasing power parity (in red). Both indicators declined over the period, coincident with movements in the dollar's share in global reserves.

The right panel shows the US share of global trade, alongside the share of global trade invoiced in dollars. The share of global exports destined for the United States moved down over the period, in line with movements in the dollar's share in global reserves. Note also that the uptick in exports to the US around the middle of the last decade coincided with an uptick in the share of reserves held in dollars.

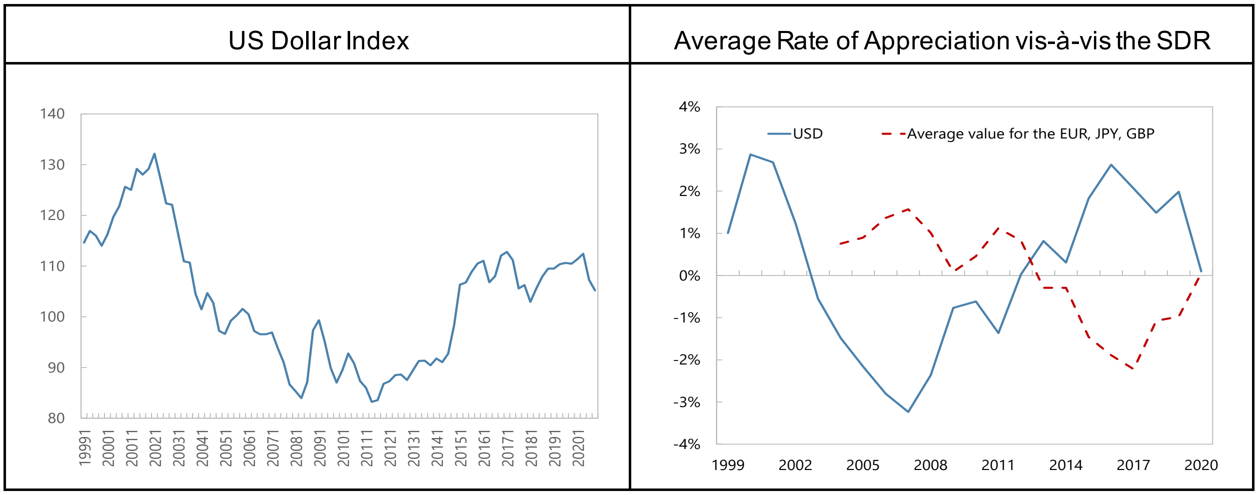
Figure 2. Standard Determinants of US Dollar Share of Reserves



Sources: Boz et al. (2020), IMF International Financial Statistics, IMF World Economic Outlook.
Note: The share of the US dollar in global trade is based on calculations using the Boz et al. (2020) dataset and the IMF's International Financial Statistics.

The left panel of Figure 3 shows that the dollar in fact strengthened noticeably in this period. We will therefore need to explore whether exchange rate changes are a common cause of both movements. Moreover, the observed tendency to diversify away from the dollar may have been affected by changing perceptions of its tendency to hold its value. This credibility effect is measured in the literature as the average rate of appreciation vis-à-vis the SDR basket over the previous five years. The right panel of Figure 3 shows the difference between credibility so measured for the dollar and its average for the euro, sterling, and the yen. It shows the dollar was generally stronger against these other traditional reserve currencies over the last decade, suggesting that credibility effects cannot help to explain the dollar's declining share in global reserves during the period.

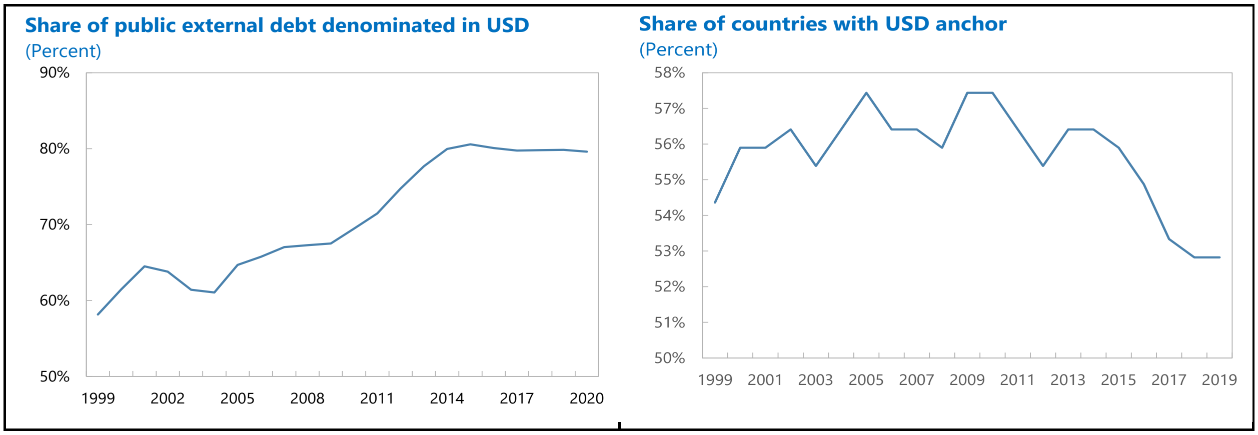
Figure 3. US Dollar Index and Average Rate of Appreciation of Reserve Currencies vis-à-vis the SDR Basket, 1999–2020



Sources: Federal Reserve Board (FRB) and IMF International Financial Statistics.
Note: Nominal FRB Broad Trade-Weighted Dollar Index (Jan-06=100). In the second panel the average appreciation is measured over the previous five years.

The left panel of Figure 4 shows the share of public external debt denominated in dollars. This rose strongly (as noted in our introduction), especially in the second half of the period. In contrast, there is some, relatively slight, decline in the share of countries pegging their currencies to the dollar, concentrated mainly late in the period, as shown in the right panel of the figure.

Figure 4. Additional Determinants of US Dollar Share of Reserves, 1999–2020



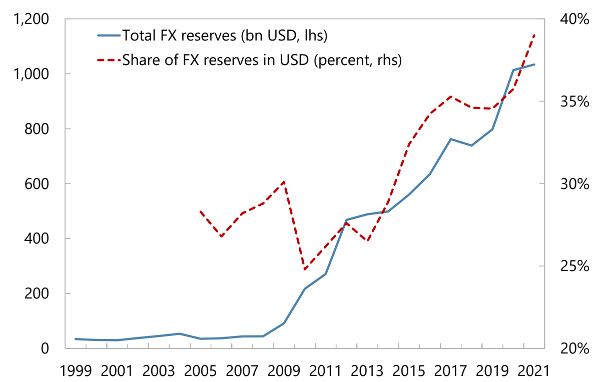
Sources: Ilzetski, Reinhart and Rogoff (2019) and World Bank International Debt Statistics.
Note: The share of global external debt denominated in US dollars is calculated from the World Bank International Debt Statistics. The share of countries with a US dollar anchor come from Ilzetski, Reinhart and Rogoff (2019).

All the while, the euro's share of reserves fluctuated around 20 percent (again see Figure 1 above). This stability is contrary to earlier expectations. At its inception, the euro was widely viewed as a potential rival to the dollar. Thus, Chinn and Frankel (2007) emphasized the importance of scale and network effects favoring utilization of the euro. In their analysis of the pre-euro period, they showed that the share of reserves held in a currency rose *more than* proportionally with the scale of the issuing economy as the latter grew large (plausibly reflecting those same scale and network effects). Subsequent work (e.g., Eichengreen, Mehl, and Chitu, 2018) suggested that with the further articulation of financial markets and digitization of currency trading, such scale and network effects may have grown less important. The rise of nontraditional currencies, as opposed to the euro, is consistent with this view.

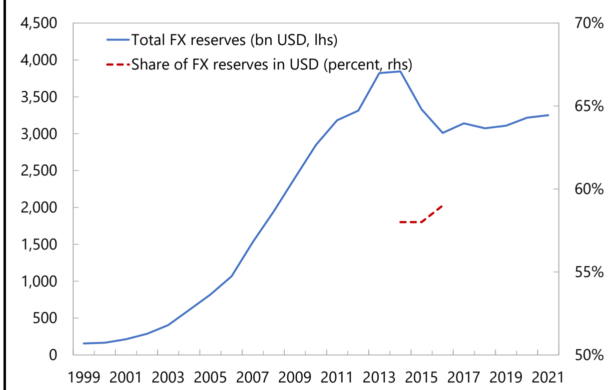
There is the possibility that changes in the dollar's share may be driven by the preferences and behavior of a small number of central banks, such as the Swiss National Bank (SNB) and People's Bank of China (PBOC), accumulating substantial reserves in recent years. Figure 5 shows total reserves (left hand scale) and the dollar's share (right hand scale) for the SNB (left hand panel of the figure) and PBOC (right hand panel of the figure—these data are only available for a shorter period). Total reserves of the SNB rose to a trillion dollars over the last two decades. Given that the dollar share of those reserves is below the global average (according to COFER), it is possible that this may have depressed the dollar's share. Similarly, Chinese reserves rose to more than three trillion dollars, and the dollar share of those reserves was below the global average in 2014–16 (years for which a currency breakdown is available). We will therefore need to explore (as we do in Section VI) whether reserve accumulation and composition of Switzerland or China are largely responsible for the dollar's declining share.

Figure 5. Switzerland and China: USD Share of Foreign Exchange Reserves

Switzerland



China

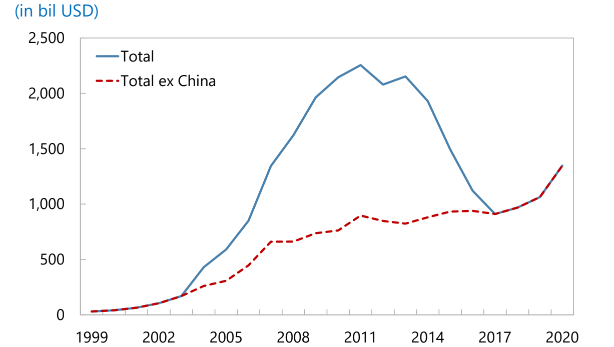


Sources: IMF, International Financial Statistics, Swiss National Bank (SNB), State Administration of Foreign Exchange (SAFE).

Finally, there is the possibility that the shift out of dollars has been driven by active diversification by central banks with excess reserves seeking to place the investment tranche in higher yielding nontraditional currencies. The left-hand panel of Figure 6 shows one measure of the magnitude of the investment tranche. It subtracts the IMF's standard measure of minimally adequate reserves from total reserves.[13] The investment tranche so measured has grown steadily over time when China is excluded. When China is included, excess reserves rise through 2011 before falling. The right-hand panel shows the percent of reserves that are "in excess" for the average and median country with excess reserves. It also shows that the number of countries with excess reserves rose to around 30 by 2008 and has remained at roughly that level since then.

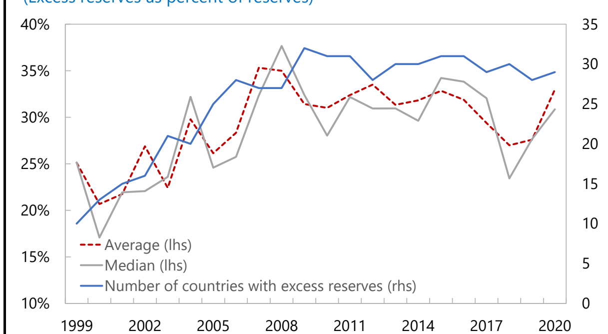
Figure 6. Emerging Market Economies: Excess International Reserves

Emerging Market Economies: Excess International Reserves
(in bil USD)



Source: IMF, Assessment of Reserve Adequacy (ARA).
Note: The sample includes 56 emerging markets covered by the IMF's ARA exercise.

Emerging Market Economies with Excess International Reserves
(Excess reserves as percent of reserves)



Source: IMF, Assessment of Reserve Adequacy (ARA).
Note: The sample includes 56 emerging markets covered by the IMF's ARA exercise.

[13] The IMF's measure of reserve adequacy is based on a vector of country characteristics (economic flexibility, financial integration, debt maturity). These are operationalized by using indicators such as import coverage, short-term debt coverage and portfolio liabilities to assess the prudent level of reserves that would reduce the likelihood of balance-of-payments crises, protect economic and financial stability against pressures on exchange rates and disorderly market conditions, and enhance policy autonomy. See https://www.imf.org/external/np/spr/ara/ for further details.

III. Analysis of Global Aggregates

As noted above, two approaches have been taken to analyzing the dollar's share of international reserves: modeling the determinants of global aggregates and modeling the determinants of country-specific demands using a panel of national observations. We provide further explorations in both approaches.

The first approach takes annual COFER data for the dollar, yen, pound sterling, renminbi, and euro shares for 1999–2020 and the Eichengreen, Mehl, and Chitu (2018) dataset for 1970–98 (which includes the French franc and German mark shares instead of the euro), and regressing them on:

- ***Issuer GDP.*** Relative country size as captured by nominal GDP in dollars at market exchange rates as a share of global GDP.
- ***Credibility.*** This is measured as the average rate of appreciation of the reserve currency vis-à-vis the SDR basket over the previous five years.
- ***Foreign exchange rate volatility.*** The standard deviation of changes of the reserve currency vis-à-vis the SDR basket over the previous five years.
- ***Foreign exchange market turnover.*** Data for years starting from 1989 are from BIS Triennial Surveys. Data for 1973–88 are from Chinn and Frankel (2008) based on G30, NY Fed, and central bank surveys. Observations between survey years are log-linearly interpolated.
- ***Consumer price inflation differential.*** The differential between the five-year moving average of consumer price inflation in the issuing country and the advanced country average.
- ***Inclusion in the SDR basket.*** We construct seven separate dummy variables, one for each currency in the sample: The dummy variable for the dollar is equal to one for the full sample; the dummy variables for the French franc and German mark are one from 1974 to 1998; the dummy variable for the euro is one from 1999; the dummy variables for the yen and pound sterling are one from 1974; and the dummy variable for renminbi is one from 2016.
- ***Change in public debt.*** Measured as the change in the general government-debt-to-GDP ratio.
- ***Inertia.*** This is captured by the lagged dependent variable.[14]

Here we are adopting the specification of Chinn and Frankel (2007, 2008). Following their example, we define the dependent variable as the logit of the currency share (log[share/(1-share)]). This transforms the currency share from a limited dependent variable (bounded between zero and one) to an unbounded variable, allowing us to use OLS and panel regression estimators directly. It also allows the explanatory variables to be related in nonlinear fashion to reserve currency shares. It admits the possibility that variables such as issuer country size have a larger impact on currency shares when that relative size is large (consistent with liquidity effects and network increasing returns). Compared to their earlier work, our estimates make use of two additional decades of data. In addition, we introduce the change in the public debt ratio as an explanatory variable, recent

[14] Inertia in reserve shares may reflect lock-in due to network effects and synergies, but it may also reflect behavioral biases and lagged adjustment by central banks themselves. For example, Chitu, Gomes and Pauli (2019) report that the Governors of the ECB review the currency composition of its reserves once every three years. It is not implausible that other central banks follow similar practices.

commentary (Tenengauzer, Velis and Yu, 2020) having pointed to rising public debts as a potential threat to confidence in the dollar. And we test whether network increasing returns, as captured by the nonlinear effect of relative economic size, may have been growing weaker.

Results are in Table 1. We report pooled ordinary-least squares regressions for comparability with earlier studies but also fixed- and random-effects models. The Hausman test strongly rejects random effects. The coefficient on the inertia term is smaller when the model is estimated with fixed effects, compared to other columns in Table 1 and previous studies. This makes sense: some currencies have larger or smaller reserve shares than predicted because of the influence of unobserved, slowly moving national characteristics. In the absence of fixed effects, these unobservables are captured by the inertia term. This adjustment suggests that earlier studies may have overestimated the influence of inertia, as argued by Eichengreen, Mehl, and Chitu (2018).

To address the possible influence of slow moving unobservables, in Column 7 we estimate the fixed effects model using a method from Griliches (1961). The Griliches method uses the second lag of the dependent variable and the first lags of the other exogenous regressors as instruments for the lagged dependent variable. In principle, this allows us to distinguish inertia per se from slowly moving omitted variables, which would otherwise be contaminating our estimate of the coefficient on the lagged dependent variable. The results reinforce the evidence that inertia is important, and also that the coefficient on the inertia term is overestimated by the models that do not include fixed effects.

The coefficient on the economic size of the issuing country is also smaller than otherwise when we include fixed effects. Indeed, it is insignificantly different from zero in Column 6 of Table 1 while significant elsewhere. We interpret this as indicating that the currencies of countries that are larger on average over the sample period tend to have larger reserve shares, but that marginal changes in country size, relative to that average, do not have much additional impact.

We also investigate the possibility that the coefficient on issuer size has decreased in recent years. Such a structural break would be consistent with the declining importance of network related increasing returns and rising role of nontraditional currencies in reserves. We interact a “post-break” dummy with issuer size for a given break year, where the latter takes the value 1 for years after the break and 0 otherwise. We test each year from 1999 (when the euro was introduced and earlier studies generally end) onwards to see if the coefficient on the interaction term is significant. This test suggests that there was a significant decline in the effect of issuer size, starting roughly around the time of the 2007–8 global financial crisis, when the coefficient on the interaction term becomes significantly negative (see Figure 7). It becomes even more negative thereafter.

Table 1. Global Aggregate Regressions, 1970–2020

Variable	OLS				Panel		
					RE	FE	FE (Griliches)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inertia	0.91***	0.89***	0.91***	0.91***	0.91***	0.70***	0.76***
Issuer size	1.23*	1.64**	1.23*	1.26*	1.26**	0.83	-0.01
Credibility	1.58*		1.57*	1.52*	1.52*	1.25*	1.34***
FX volatility	-1.04	-1.51**	-1.03**	-0.77	-0.77*	0.28	0.09
FX turnover	0.05	0.15	0.05	0.00	0.00	0.77***	0.56***
CPI differential		-3.75**					
SDR basket			-0.02	-0.09	-0.09	-0.14	
ΔPublic debt				-0.47*	-0.47**	-0.74*	-0.72**
Constant	-0.09	-0.21	-0.07	0.04	0.04	-0.69	-0.61**
N	218	218	218	212	212	212	205
R^2	0.99	0.99	0.99	0.99			
R^2 (within)					0.85	0.87	0.86
R^2 (between)					1.00	0.99	1.00
R^2 (overall)					0.99	0.98	0.99
Hausman test (p-value)					0.00		

* p<0.10; ** p<0.05; *** p<0.01

Note: Column 1 shows the baseline specification, while Column 2 substitutes the CPI differential for the credibility variable. Columns 3 and 4 add SDR basket inclusion and then the change in public debt respectively to the baseline; the panel models are then based on Column 4. In the final column, the SDR basket variable is omitted due to collinearity. The dependent variable and the 'Inertia' term are both logit transformations of the raw currency shares - log(share/(1-share)). The currency share dataset is an unbalanced panel covering the years 1970 to 2020, including the US dollar, the euro, the Japanese yen, the British pound, the Chinese renminbi, the German mark, and the French franc. Standard errors are robust to heteroskedasticity and clustered by currency. All specifications also include time dummies constructed from non-overlapping five-year intervals (rather than individual years to reduce the number of parameters) for which the coefficients are omitted from the table; the dummies are jointly significant in columns 2,6 and 7.

In addition, the credibility, CPI differential, foreign exchange rate volatility and exchange rate turnover measures all enter with their expected signs.[15]

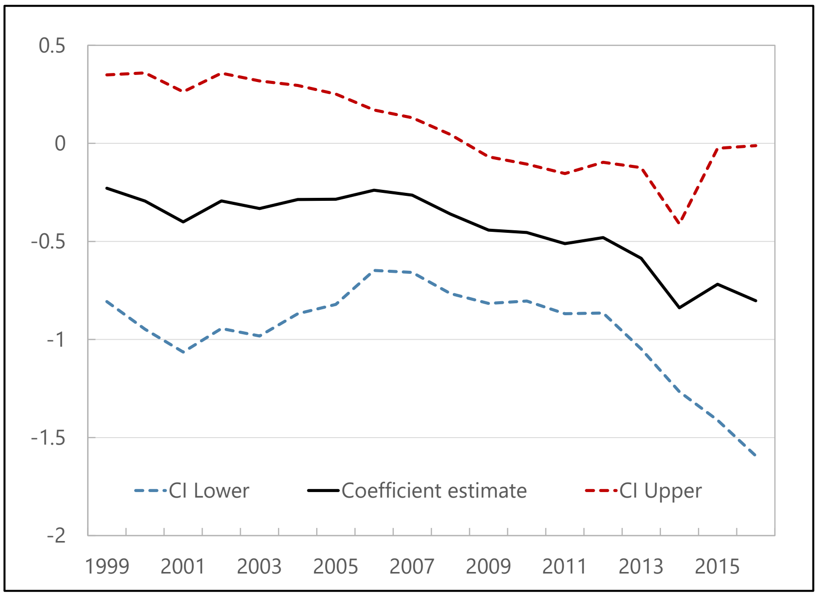
Two new variables in our specification are the change in the public debt of the reserve issuing country and whether its currency is included in the SDR basket. (One reason that China called for addition of the renminbi to the basket was presumably the expectation that this would encourage other countries to hold it as reserves and otherwise use it in international transactions.[16]) The SDR variable does not enter significantly in any of the specifications. Note, as mentioned above, that we have only a relatively small number of observations where the currency in question is not in the basket (the franc, deutschemark, yen, and pound in the first half of the 1970s and the renminbi in the mid-2010s.

[15] Many are significant so long as we do not include the CPI differential and credibility variables at the same time, the two being collinear.

[16] See the discussion in Wei (2020).

Increases in the reserve issuer's public debt are negatively and significantly associated with reserve shares. We looked also at the level of indebtedness, but the models indicated that the change in indebtedness as opposed to the level was more important. The public debt variable may be capturing the fact that U.S. public debt has been trending upward for two decades, even while the dollar's share has been trending down, although readers may worry that it is dominated by the effect of the declining share of reserves in yen post 1988, coincident with the very strong ongoing rise in Japanese public debt. Be that as it may, the public debt variable is still significant when we exclude the Japanese yen from the sample.

Figure 7. Test for Structural Break in Issuer Size Coefficient
(Point estimate and 95 percent confidence interval)



Note: The figure shows the point estimates and 95 percent confidence interval for the coefficient on the interaction term between issuer size and a post-break dummy, where the regression is estimated separately to test for a break in each year from 1999 to 2016. The confidence intervals are calculated using robust standard errors.

Overall, the results of aggregate regressions confirm the importance of traditional economic variables in determining reserve currency shares. However, in line with the rise of nontraditional currencies, we find that the size of the reserve issuer's economy has become less important in recent years, and that inertia in currency shares may have been overestimated in previous work. We also find evidence that changes in the public debt of reserve issuers can affect a currency's share in global reserves.

IV. Analysis of Country-Level Data

We now analyze the determinants of the dollar's share using country-level data for central banks reporting this in published documents. We draw on the currency composition dataset compiled by Ito and McCauley (2020) and updated by Chinn, Ito, and McCauley (2021), the IMF's Special Data Dissemination Standard (SDDS)

Reserve Data Template and individual central bank annual reports. Our unbalanced panel includes 80 central banks, covering as many as 21 years.[17]

Explanatory variables are as follows:

- ***Currency regime.*** The reserve currency to which a country pegs its exchange rate. This includes three separate dummy variables: dollar peg, euro peg, or other peg. Each dummy variable is equal to one if the currency pegs to the respective currency and zero otherwise. For countries that do not peg, all three dummy variables are zero. The euro peg variable includes only non-Euro area countries pegging their currencies to the euro.
- ***Currency composition of external debt.*** The share of each country's external debt service payments denominated in each big-four reserve currency.
- ***Direction of trade.*** The share of each country's external trade (exports plus imports) conducted with each Big-Four reserve currency issuer.
- ***Invoicing currency.*** The share of each country's imports invoiced in US dollars, euros, and other currencies, as compiled by Boz et al. (2020).
- ***Inertia.*** We again measure this by the lagged currency share.

We estimate three models including these determinants, one where the dependent variable is the dollar share, a second where we estimate four equations for the shares of the dollar, euro, yen, and sterling by seemingly unrelated regression, and a third more parsimonious specification where we add a lagged dependent variable to capture inertia.

Three variants of the dollar-share model are in Table 2. The results confirm that a currency peg to the US dollar is associated with an increase in the share of the dollar in a country's international reserves. In all specifications, a dollar peg increases the dollar share by about 10 percentage points. Pegs to the euro and other currencies correspondingly reduce the dollar's share of reserves. Similarly, trade with the US is associated with a higher dollar share, trade with the Euro Area, Japan, and the UK with a lower dollar share. When we include the share of trade invoiced in dollars instead of the share of trade with the US, the trade variable is again positively and significantly associated with the dollar's share of reserves.[18]

[17] Note that here we use the simple currency share rather than its logit transformation, since we are using a Tobit and not including issuing country size as an explanatory variable, given that this would not vary across reserve-holding countries in a given year. Any such effects will be picked up in any case by period fixed effects, which we again include in our preferred specification.

[18] This variable is taken from the dataset which accompanies Boz et al. (2020). Note that the sample size is reduced since the time coverage of the invoicing share data is not as complete as that of the trade share data. As a result, a number of point estimates are smaller and significance levels are slightly reduced.

Table 2. Country-Specific Tobit Regressions, 1999–2020

Variable	(1)	(2)	(3)
USD Share			
Dollar peg	0.10***	0.10***	0.09***
Euro peg	-0.51***	-0.42***	-0.35***
Other peg	-0.15***	-0.14***	-0.03
Trade with US	1.08***	1.03***	
Trade with Euro Area	-0.09	-0.16*	
Trade with Japan	-0.98**	-1.04**	
Trade with UK	-1.07*	-1.28**	
Dollar debt share	-0.18**	-0.19**	-0.23**
Euro debt share	-0.04	-0.18**	-0.18
Yen debt share	-0.04	-0.02	0.48*
Pound debt share	-3.52	-2.92	2.65
Euro Area dummy		0.26***	0.31***
Trade Invoice USD			0.20**
Constant	0.66***	0.74***	0.53***
Statistics			
N	696	696	363
Pseudo R^2	1.08	1.19	0.81

* p<0.10; ** p<0.05; *** p<0.01

Note: The table reports Tobit model estimates of our baseline specifications for country level reserve currency shares. The country level dataset is an unbalanced panel covering the years 1999 to 2020 and including 80 countries. A lower limit at 0 and an upper limit at 1 for the dependent variable is imposed on all specifications. All specifications also include year dummies, for which the coefficients are omitted; these dummies are not jointly significant in Column 2. Standard errors are robust to heteroskedasticity.

In contrast, the coefficients on debt denominated in different currencies are not consistently different from zero. Over the last two decades, advanced country governments and a growing number of emerging markets have moved away from issuing debt in dollars, so their central banks are less compelled to hold dollar reserves. This is in contrast to trade, where dollar invoicing continues to prevail.

As expected, a euro peg decreases the share of dollar reserves, all else equal. Recall that Euro Area countries are not recorded as having a euro peg, since they are issuers of their own currency. As they cannot hold euro assets as international reserves, they tend to have higher dollar shares. We address this by adding a Euro Area dummy variable, which takes a value of 1 if the country is a member of the Euro Area for a given year. This results in a coefficient on the Euro Area dummy with the expected sign. The adoption of a euro peg reduces the dollar share of reserves, while being part of the Euro Area increases the dollar share by around 30 percentage points.[19]

[19] We have also estimated the specifications in Table 2 using the currency zone weights defined in Ito and McCauley (2018) instead of the peg variables to capture currency anchors. These weights decompose each currency based on its dependence on each of the key currencies (USD, EUR/DEM, JPY, GBP), as measured by co-movement with these currencies. The results are mixed. We find that in the analogue of Column 2 in Table 2, dollar dependence is associated positively with the dollar share, while euro dependence is associated negatively (other currencies are omitted to avoid collinearity, since the weights sum to one). Both coefficients are significant. In the other specifications, dollar dependence enters negatively.

Table 3. Country-Specific Seemingly Unrelated Regression, 1999–2020

Variable	USD	EUR	JPY	GBP
Currency Share				
Dollar peg	0.07***	-0.02	0.00	-0.03***
Euro peg	-0.42***	0.50***	-0.01	-0.03***
Other peg	-0.17***	-0.02	0.01	-0.07***
Trade with US	1.05***	-0.65***	-0.27***	-0.09**
Trade with Euro Area	-0.22**	0.47***	-0.06*	-0.01
Trade with Japan	-1.08**	0.39	1.21***	-0.07
Trade with UK	-0.89	-0.39	0.96***	0.66***
Dollar debt share	-0.19**	0.20***	0.17***	-0.17***
Euro debt share	-0.16	0.16**	0.15***	-0.20***
Yen debt share	-3.83	5.42***	-2.06***	1.94
Pound debt share	0.02	-0.20***	0.00	-0.09
Euro Area dummy	0.16***	-0.32***	0.07***	0.00
Constant	0.76***	0.06	-0.10	0.19***
Statistics				
N	616	616	616	616
R^2	0.41	0.70	0.27	0.24

* p<0.10; ** p<0.05; *** p<0.01

Note: The table reports estimates for determinants of country level reserve currency shares using a seemingly unrelated regression (SUR) framework. The country level dataset is an unbalanced panel covering the years 1999 to 2020 and including 80 countries. All equations also include year dummies, for which the coefficients are omitted; these dummies are jointly significant. Standard errors are robust to heteroskedasticity

Table 3 shows the results of estimating dollar, euro, yen and pound sterling shares by seemingly unrelated regression (SUR), to account for dependence between the error terms of each currency's equation.[20] The results for the dollar share, in the first column, are broadly aligned with those in Table 1. The coefficients on shares of external debt denominated in dollars, euros, sterling and yen are inconsistent, both in sign and significance, presumably because these values are collinear with one another.[21] [22]

How large are the contributions of these country level determinants? We can decompose the R^2 of our regression model for the US dollar share following the approach of Hüttner and Sunder (2011). For simplicity, we exclude the dollar invoicing share from this analysis, while including the trade share measures; the following

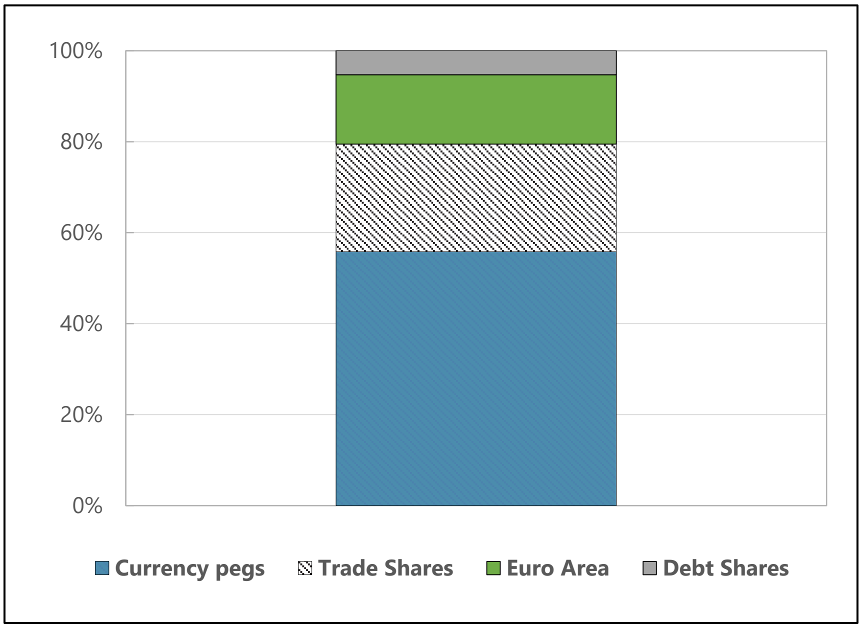
[20] The Breusch Pagan test rejects the independence of the residuals with a p-value of 0.00, supporting the choice of SUR.

[21] When we drop the cross-currency effects (debt denominated in currencies other than that in question), we obtain more significant and intuitive results (see Table 4 below). It can be argued that debt managers and reserve managers are both solving the same problem (responding to the same imperatives and conditions), such that they are both affected by the same (omitted) factor. We include the debt variables because they feature in a number of influential earlier studies. If we drop them, the other estimates and significance levels remain basically unchanged, with the exception of the peg variables, which are now consistently significant and enter with their expected signs (dollar pegs affect the demand for dollar reserves positively, the demand for other reserves consistently negatively; euro pegs affect the demand for euros positively, the demand for other reserves consistently negatively).

[22] We can use coefficients from Table 3, and the fact that the effects across all currencies should sum to zero, to back out estimates for the determinants of nontraditional currency shares. These results suggest that the share of nontraditional currencies is increased by "other" pegs, trade with the US and Japan. We can compare this result with those in Aizenman, Cheung and Qian (2020), which indicate that trade with the issuers of the Big Four currencies should decrease the reserve share of nontraditional currencies, and that a currency anchor with the US dollar should also decrease the nontraditional share.

results thus are derived from the second specification in Table 2. Figure 8 shows that currency pegs are the most important determinant of reserve currency shares, accounting for 56 percent of the explained variation in dollar shares. Ilzetzki, Reinhart, and Rogoff (2019), from whom our data on pegs are drawn, show that there has only a small decline in the prevalence of dollar pegs over this period (see also Figure 4 above). Thus, while the choice of peg has a large effect, changes in choice of peg and hence in reserve shares over the period are relatively small. We also see that the share of trade conducted with the economies of different reserve issuers are an important determinant of the dollar share. Insofar as the US accounted for a declining share of global trade over the period (see Figure 2 above), this is a significant factor in the dollar's falling reserve share.

Figure 8. Determinants of US Dollar Shares



Note: R-squared decomposition following the approach described in Hüttner and Sunder (2011).

In our third model, we add a lagged dependent variable to capture the influence of inertia. Combined with the specification in Tables 2 and 3, this results in a high degree of multicollinearity. If we simplify that model by eliminating cross-currency effects, as in Iancu et al. (2020), we obtain the results in Table 4. Note that the resulting model closely resembles that of these previous authors, although we include more countries and additional explanatory variables.

The Hausman test strongly prefers fixed over random effects, though an argument can also be made for the Tobit model, since there are a number of cases of zero currency shares. In contrast, the Arellano-Bond estimator is unreliable owing to the relatively small cross section structure of our panel. Hence, we focus on columns 1 and 2 of the table.

Table 4. Determinants of Currency Shares with Inertia but No Cross-Currency Effects, 2000–2020

Variable	Tobit (1)	Random Effects (2)	Fixed Effects (3)
Currency Share			
Inertia	0.95***	0.93***	0.68***
Peg to Currency	0.02*	0.03*	0.00
Trade Share	0.06***	0.05***	0.04*
Debt Share	0.01	0.02**	0.03*
Euro Area	-0.43***	-0.04***	0.00
Euro Area*Currency			
*USD	0.46***	0.06***	0.00
*JPY	0.47***	0.04***	-0.06***
*GBP	0.42***	0.04***	0.04***
Constant	-0.03	-0.01	0.08**
Statistics			
N	3094	3094	3094
R^2(between)		1.00	0.99
R^2(within)		0.49	0.49
R^2(overall)		0.96	0.96
Pseudo R^2	2.38		
Hausman Test (p-value)		0.00	

* p<0.10; ** p<0.05; *** p<0.01

Note: This table displays estimates for the determinants of country level currency shares, where the country level panel dataset is stacked across reserve currencies. The Tobit specification is estimated on the raw currency shares; lower and upper limits of 0 and 1 are imposed on the dependent variable. All models also include year dummies and currency effects, for which the coefficients are not shown in the table; the year dummies are not jointly significant in these models. Standard errors are robust to heteroskedasticity and clustered by currency.

Our results confirm the existence of powerful inertia, on the same order of magnitude as in earlier studies of cross section data. In addition, we continue to find effects of currency pegs, trade shares, debt shares and euro area membership.

V. Rise of Nontraditional Reserve Currencies

Global holdings of nontraditional reserve currencies have risen from negligible levels (about US$30 billion in 1999) to US$1.2 trillion in the last two decades. COFER data shed light on the timing. Figure 9 compares the share of official reserves denominated in one of the "Big Four" leading reserve currencies (the US dollar, the euro, the British pound, and the Japanese yen) with the share denominated in nontraditional currencies, over the period from 1999 to 2021. The share of the traditional reserve currencies in global reserves has declined over the period, mirrored by a rising share of nontraditional currencies, which now stand at roughly 10 percent of global reserves. In particular, there was a shift in reserve composition after 2008, during which reserve managers diversified away from the Big Four currencies relatively quickly, followed by a steadier downward trend in these subsequently. The timing of this shift may partly be explained by the lowering of interest rates by major central banks in response to the Global Financial crisis. COFER data also indicate that the Chinese renminbi accounts for about one-quarter of this increase, while non-SDR currencies make up the remaining three quarters.

In this section, we provide additional evidence at the country level that many central banks are diversifying their foreign exchange reserves away from leading international currencies and specifically from the dollar. We utilize data from the IMF Special Data Dissemination Standard (SDDS) Reserve Template to document the recent shift towards the Chinese renminbi and currencies not included in the IMF's Special Drawing Rights (SDR) basket.

What are the nontraditional reserve currencies (defined as any currency other than the Big Four) exactly? COFER provides data on reserves held in the Australian Dollar, Canadian Dollar, Chinese Renminbi, and Swiss Franc, which together constitute 71 percent of the nontraditional currency total as of end-2020. To estimate the currency composition of the remaining 29 percent, we use data from the IMF's Coordinated Portfolio Investment Survey (CPIS) and the methodology of Arslanalp and Tsuda (2014).[23] Our estimates indicate that the remaining 29 percent is comprised of three European currencies (Swedish Krona, Norwegian Krone, and Danish Krone) and four Asian currencies (Korean Won, Singapore Dollar, New Zealand Dollar, and Hong Kong Dollar). The two groups are of roughly equal size. Estimated weights are shown in Table 5.

Table 5. Nontraditional Currencies in Global Foreign Exchange Reserves, end-2020

	in bil US$	as % of Total
Total	1070	100%
Australian dollar	217	20%
Canadian dollar	247	23%
Chinese renminbi	272	25%
Swiss franc	21	2%
Other	315	29%
Korean won	81	8%
Swedish krona	63	6%
Singapore dollar	51	5%
Norwegian krone	49	5%
Danish krone	47	4%
New Zealand dollar	12	1%
Hong Kong dollar	11	1%

Sources: IMF, COFER and CPIS.
Note: The size of "other" currencies is estimated based on Arslanalp and Tsuda (2014).

Another observation from Table 5 is that the share of the Swiss franc is small, despite the fact that the franc has long since played at least some role in reserve portfolios. Switzerland currently has the lowest policy rates

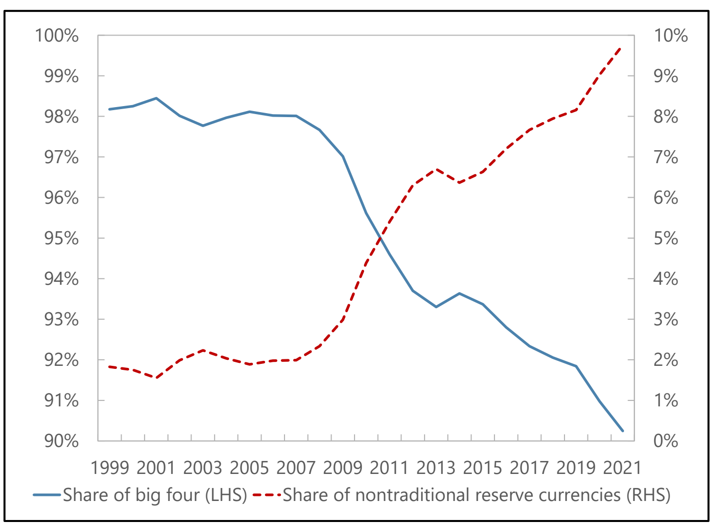
[23] The methodology is based on a merger of two IMF databases: (i) Table 9 of the CPIS database—Securities Held as Foreign Exchange Reserves (SEFER), which reports the residency of the issuer of debt securities held as reserve assets by global central banks; (ii) COFER data for "other currencies" held by global central banks as reserve assets. The SEFER data is then used to distribute the COFER data to specific currencies based on a proportionality assumption (as the coverage of COFER data is larger than the CPIS). We know from qualitative sources that some central banks hold still other currencies in addition to those listed in the table (Lesotho and Namibia hold South African rand, for example). But CPIS data show these holdings to be very small relative to global aggregates, so we set them to zero for the purposes of this table.

in the world (at -0.75 percent), which may have encouraged reserve managers to diversify away from the Franc rather than toward it (just as they have diversified away from the Big Four currencies).

Which countries have been driving the trend towards nontraditional reserve currencies? To answer this, we use the data from the IMF Reserve Data Template, covering more than 80 countries representing over 90 percent of global foreign exchange reserves as of end-2020. These data provide a breakdown of the composition of each economy's official reserves into currencies included in the IMF's Special Drawing Rights (SDR) basket (currently the Big Four and the Chinese renminbi), and currencies not included in the basket. Table 6 displays the currency composition of reserves for 46 countries that we classify as "active diversifiers," defined as countries with more than 5 percent of their FX reserves denominated in the renminbi and non-SDR currencies as of the latest available period (generally end-2020).

The trend toward diversification is quite evenly split between emerging and advanced economies. At the same time, a number of countries stand out as being especially active diversifiers. China emerges as the largest holder of nontraditional currencies. It is followed by Switzerland with $97.5 billion and Russian with $94.7 billion. Chinn, Ito and McCauley (2021) describe how the Swiss National Bank added nontraditional currencies to its strategic asset allocation. Changes for other countries may be explained by their trade and financial links with nontraditional reserve currency issuers. For example, Namibia holds a large share of its reserves in South African rand due to its peg to that currency and trade relations with South Africa. Kazakhstan and Kyrgyz Republic hold Russian rubles due to their close trade relationships with Russia. The motivations of some other central banks are less obvious. For example, Estonia holds Australian dollars (AUD) and Canadian dollars (CAD) according to the Central Bank of Estonia.[24] Malta holds about 40 percent of its reserves in CAD, AUD, SEK, NOK, and CHF, according to its central bank.[25]

Figure 9. Official Reserve Shares of "Big Four" Currencies vs. Nontraditional Currencies



Source: IMF Currency Composition of Official Foreign Exchange Reserves (COFER).
Note: The "big four" currencies are the US dollar, the euro, the Japanese yen, and the British pound.

[24] It may be that it holds these "commodity currencies" as a hedge against high energy and commodity prices.
[25] The annual reports of the Central Bank of Malta provide regular information on claims on non-euro area residents denominated in foreign currencies.

Table 6. Foreign Exchange Reserves in Nontraditional Currencies, end-2020

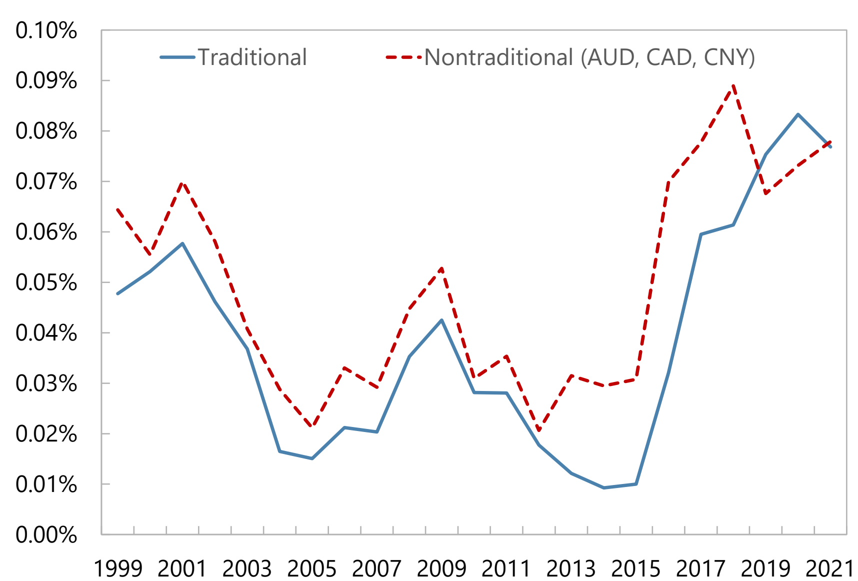
Foreign Exchange Reserves in Nontraditional Currencies, end-2020					
		Reserves in nontraditional currencies (bil US$)			
	Foreign exchange reserves (bil US$)	Total	Chinese renminbi	non-SDR currencies	Share of reserves in nontraditional currencies
Total	**8270.0**	**769.6**	**117.2**	**650.8**	**9%**
Lesotho	0.9	0.6	0.0	0.6	69%
Namibia	2.2	1.2	…	1.2	53%
Malta	0.7	0.3	0.0	0.3	41%
Estonia	1.9	0.6	0.0	0.6	34%
Ireland	5.0	1.7	0.3	1.4	34%
Turkey	48.5	15.9	…	15.9	33%
Chile	37.8	10.6	3.1	7.6	28%
Kyrgyz Republic	1.6	0.4	0.1	0.3	25%
Russia	444.5	94.7	75.3	19.5	21%
Malaysia	102.6	20.7	…	20.7	20%
Botswana	4.8	1.0	…	1.0	20%
Lithuania	4.2	0.8	0.0	0.8	20%
New Zealand	12.0	2.1	…	2.1	17%
Tanzania	5.1	0.9	0.8	0.1	17%
Australia	32.6	5.2	1.7	3.5	16%
Kenya	9.9	1.6	…	…	16%
Indonesia	128.4	19.3	…	19.3	15%
Poland	138.5	20.8	0.0	20.8	15%
Spain	57.3	8.5	0.6	7.9	15%
Czech Republic	164.1	24.1	0.5	23.6	15%
South Africa	43.1	6.1	3.8	2.4	14%
Colombia	56.6	7.8	…	7.8	14%
Sweden	45.9	6.1	0.3	5.7	13%
Singapore	359.3	45.2	…	45.2	13%
France	57.1	7.0	0.0	7.0	12%
Latvia	4.7	0.5	0.0	0.5	11%
United Kingdom	182.6	19.8	0.5	19.3	11%
Romania	44.4	4.8	1.1	3.7	11%
Italy	47.5	5.1	0.4	4.7	11%
Germany	36.9	3.6	0.3	3.3	10%
Switzerland	1013.2	97.5	10.2	87.4	10%
India	465.8	44.8	…	44.8	10%
Georgia	3.7	0.3	0.0	0.3	9%
Thailand	246.0	20.8	…	20.8	8%
Norway	71.6	5.4	0.3	5.1	7%
Korea	431.3	28.3	…	28.3	7%
Kazakhstan	11.3	0.7	0.4	0.3	6%
China	3216.0	198.4	0.0	198.4	6%
Zambia	1.0	0.1	…	…	6%
Hungary	39.0	2.2	…	2.2	6%
Mexico	184.2	9.2	3.3	5.9	5%
Brazil	336.9	16.8	10.8	5.9	5%
Philippines	84.4	4.2	1.7	2.4	5%
Costa Rica	7.0	0.3	0.0	0.3	5%
Mauritius	6.4	0.3	0.1	0.2	5%
Peru	71.4	3.3	1.6	1.7	5%

Sources: IMF Reserve Data Template, Bangko Sentral ng Pilipinas, Bank of Botswana, Bank of England, Bank of Italy, Bank of Russia, Bank of Spain, Bank of Tanzania, Bank of Zambia, Central Bank of Kenya, Central Bank of Lesotho, Czech National Bank, National Bank of Romania, National Bank of Kazakhstan, and Reserve Bank of South Africa.

Note: Foreign exchange reserves do not include monetary gold, SDR holdings, and reserve position in the IMF. The data are as of end-Jun 2020 for India, end-Mar 2021 for South Africa, and end-Jun 2021 for Brazil, Kenya and Tanzania. Missing figures are indicated as "…".

Part of the explanation for this broad shift toward nontraditional reserve currencies is that financial technology and market conditions have enhanced the attractions of smaller currencies. In other words, nontraditional currencies have become more liquid and therefore more attractive as reserves. Figure 10 shows average bid-ask spreads against the dollar for three traditional and three nontraditional reserve currencies. Both series display the same cyclical component.[26] In most periods, the spread between the two series is small. In the most recent period, spreads on nontraditional currencies have actually been lower than those on their traditional counterparts.

Figure 10. Bid-ask spreads of reserve currencies against USD (in percent)



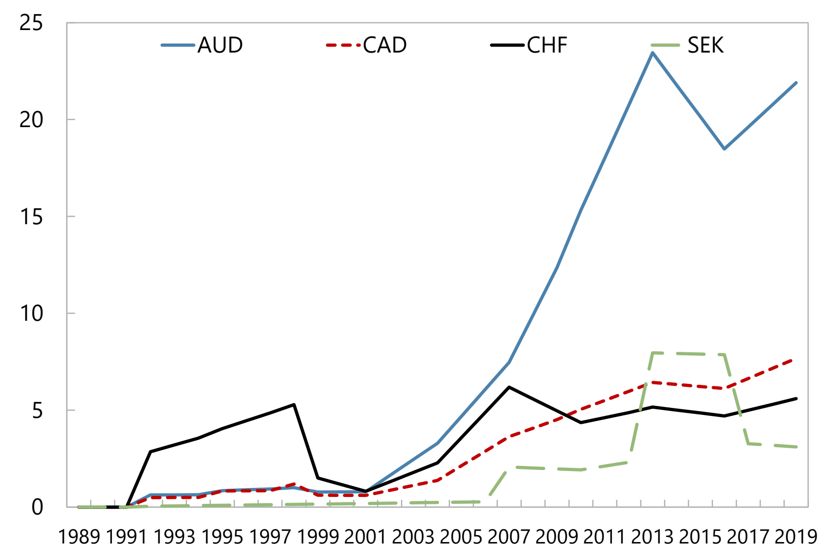
Source: Bloomberg.

Note: Traditional currencies include EUR, JPY, GBP. Nontraditional currencies include AUD, CAD, CNY.

One can see the same thing when looking at the volume of (turnover in) foreign exchange transactions that do not involve a Big Four currency as one leg of the transaction. We have data on this (courtesy of the BIS) for four nontraditional reserve currencies: the Australian Dollar, Canadian Dollar, Swiss Franc and Swedish Krona. The upward trend in turnover (in Figure 11) is clearly evident, most obviously for the Australian dollar but also more generally.

[26] The sharp increase in bid-ask spreads which we observe in recent years may be explained partly by a reduction in overall liquidity due to the implementation of banking regulation after the global financial crisis. Du, Tepper and Verdelhan (2017) document persistent arbitrage opportunities in foreign exchange forward and swap markets and provide evidence that constraints on bank balance sheets due to financial regulations explain part of this development.

Figure 11. Total Foreign Exchange Turnover between Nontraditional Currencies
(Local currency ex Big Four against AUD, CAD, CHF, SEK; in USD billions)



Source: BIS Triennial Central Bank Survey
Note: The data are interpolated for intervening years between each triennial survey.

Another part of the explanation has to do with changes in reserve management practice. Central banks have attached more weight to mean-variance optimization and less to liquidity in an environment of low yields (Ito and McCauley, 2020).[27] In that environment, nontraditional currencies that have higher Sharpe Ratios (i.e., higher expected excess return per unit of volatility) could improve the risk-return tradeoff in a portfolio with only traditional reserve currencies.[28] Figure 12 shows excess returns and volatility vis-à-vis the SDR basket and is calculated over a 5-year horizon—the preferred habitat of most reserve managers within the yield curve. It confirms that the Australian dollar, Canadian dollar, and the Chinese renminbi have had higher Sharpe ratios than the euro, the yen and the pound.[29] This reflects the decline in interest rates in the principal advanced economies over the last decade (the phenomenon known as “secular stagnation”), higher yields in other economies not as immediately affected by these same tendencies, and in the case of the renminbi the limited volatility of a heavily managed currency.[30]

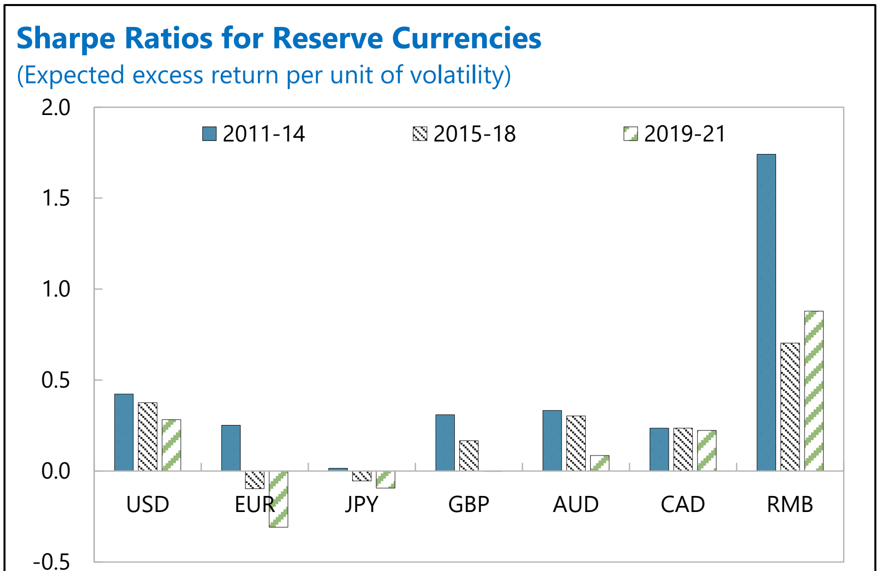
[27] This also raises the question of whether excess returns on nontraditional currencies would decrease when interest rates rise on traditional reserve currencies. The behavior of interest rates over the last two decades suggests that these excess returns may be quite robust. For five-year government bonds, Canada’s annual average spread versus the US was negative in eleven years between 1999 and 2021, but for Australia and China spreads have been positive for most of the period.

[28] Ito and McCauley suggest that, in addition to the Sharpe Ratio, reserve managers may prefer currencies that co-move with the domestic currency on foreign exchange markets, since these will be relatively stable in terms of local purchasing power.

[29] The Sharpe ratio for each currency is constructed based on the five-year expected return of a government bond (in excess of the SDR interest rate) divided by the volatility of the currency against the SDR basket over the past five years. It is possible for all currencies to have positive excess returns because the SDR interest rate is calculated using the short-term rates on the currencies in SDR basket, which will usually be lower than the five-year expected returns of respective government bonds due to term premia.

[30] Note that the Sharpe Ratio for the dollar is biased upward since volatility here is computed vis-à-vis the SDR basket, and the dollar has a relatively heavy weight in and therefore relatively low volatility against that basket.

Figure 12. Sharpe Ratios for Reserve Currencies



Sources: National authorities and IMF International Financial Statistics.
Note: Excess return and volatility vis-a-vis the SDR basket and based on a 5-year horizon.

VI. Robustness Checks

The previous sections document that the share of the US dollar in official reserve assets worldwide has fallen over the past two decades, and that this fall has been associated with the increased share of nontraditional reserve currencies, such as the Australian dollar, Canadian dollar, Chinese renminbi, Korean won, Singapore dollar and Swedish krona. While it is tempting to conclude that central banks have actively moved away from the dollar towards nontraditional reserve currencies, there may be alternative explanations.

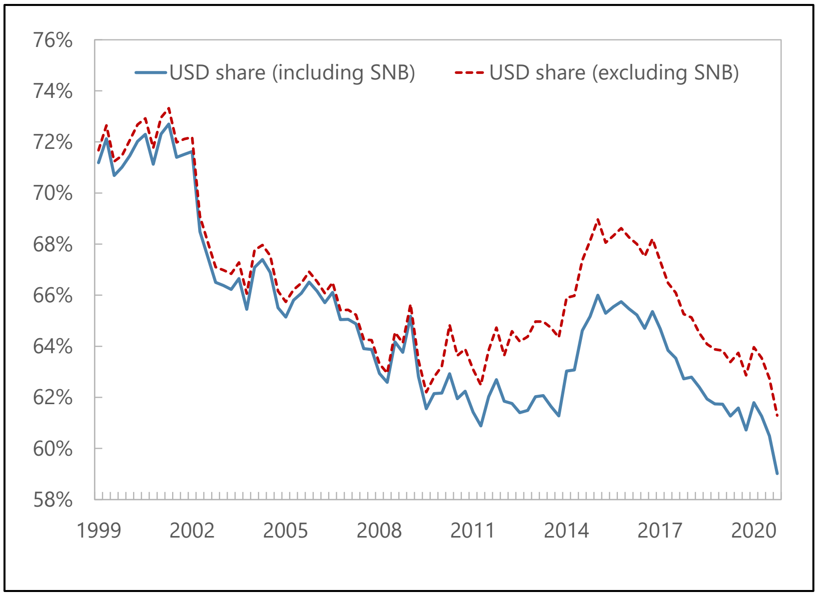
A. Large Reserve Holder Effects

A non-trivial component of the increase in reserves allocated to currencies other than the dollar could conceivably be due to the actions of Swiss National Bank (SNB), which holds an unusually low share of dollars. Since the first quarter of 2000 the total FX reserves held by the SNB have grown from $28bn to $1.03tn at end-2021. At the same time, the SNB's dollar assets fell from 42 percent of its portfolio in Q1 2000 to 39 percent at end-2021. Together, these observations may explain a nonnegligible share of the decline in the dollar share.[31]

We therefore remove the SNB from the sample and report the share of the dollar in the FX reserves of the remaining countries. As Figure 13 shows, this does affect the level of the dollar share. Removing the SNB's reserves increases the dollar share by two percentage points, from 59 percent to 61 percent at end-2020. However, this does not change the overall trend: the USD share excluding the SNB still falls from 72 percent to 61 percent between 1999 and 2020.

[31] For a more detailed exposition of this argument, see the 2011 blog post "How Fast Is the US Dollar's Share of International Reserves Declining?" by Allie E. Bagnall for the Peterson Institute for International Economics.

Figure 13. US Dollar Share of Aggregate Official FX Reserves, Including and Excluding the Reserves of the Swiss National Bank, 1999–2020



Sources: COFER, SNB.

B. COFER Reporting Effects

Similarly, changes in the composition of the COFER dataset could have contributed to the fall in the dollar share. The share of allocated reserve holdings (for which the currency breakdown is available) has increased significantly due to the inclusion of new reporting countries. There is in fact a large increase in the share of allocated reserve holdings between 2015 and 2018, from 58.9 percent in Q1 2015 to 93.8 percent in Q4 2018, complicating historical comparisons. The confidentiality of country data in the COFER survey prevents us from measuring the contribution of the new countries individually, although we know that the 145 countries reporting as of end-2012 has since increased to 149. The most notable change is the gradual inclusion of China between 2015 and 2018, which started to report a representative portfolio of foreign exchange reserve assets to COFER on a partial basis in September 2015 and announced that it would gradually increase the reported portfolio to full coverage within a period of around two to three years (IMF, 2015).

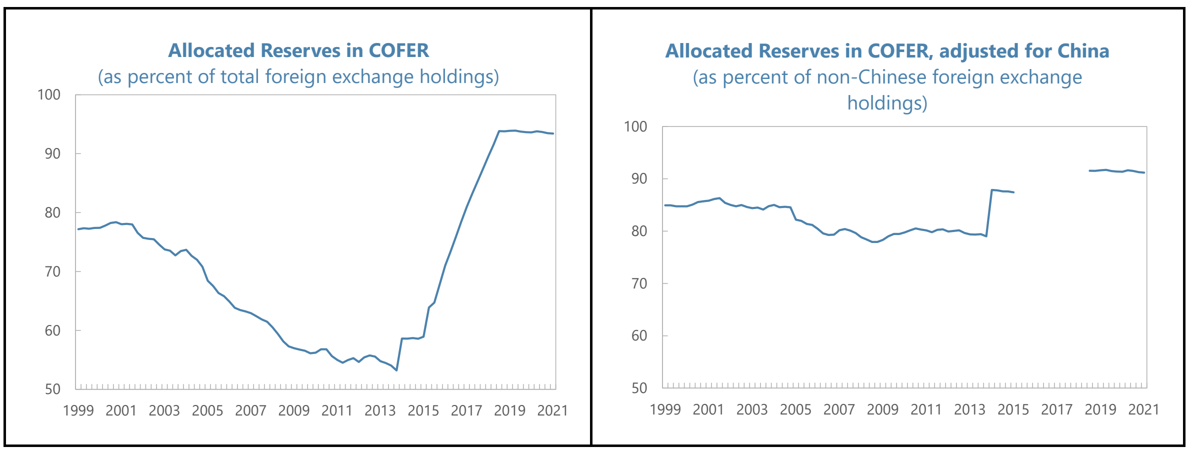
From 2019 onwards, allocated reserves remained relatively stable at over 90 percent of global reserves, making the reserves data for subsequent years more directly comparable. But, despite the stability of allocated reserves over this recent period, the dollar's share continues to fall. Between Q1 2019 and Q3 2021, the dollar share decreases in 10 out of 11 quarters even after we adjust for fluctuations due to exchange rate and interest rate effects. This suggests that the inclusion of new reporters may explain some of the decline, but it cannot be the only factor driving the fall in the dollar share.

Even if we exclude China, the coverage of COFER data has remained high for our entire period of interest, with allocated reserves close to or above 80 percent of total non-Chinese foreign exchange holdings (Figure 14). Thus, while the inclusion of China may have had an impact on the composition of the COFER survey, other additions have not had the same effect. Moreover, the addition of China's reserves could not have lowered the dollar share by much, since annual reports by the State Administration of Foreign Exchange, an agency charged with managing China's foreign exchange reserves, state that in 2014 and 2015 the share of the dollar in Chinese reserves was 58 percent and in 2016 it was 59 percent, not far below the global average recorded by the COFER survey.

To explore this point further, we conducted a back-of-the-envelope calculation on the assumption that China has kept its USD share of reserves at 59 percent since 2016. We then calculated the USD share of global reserves had China not been a reporter in 2020Q4. The share would have been the same, at 58.9 percent, with or without China. This suggests that even if China had an initial impact at the time of its inclusion in the COFER survey, this impact had dissipated by 2020.

In summary, the decline in the USD share of global reserves over last two decades cannot be attributed to China, since that long-term trend is not specific to the 2015-18 period when China was included in COFER. Moreover, as noted in the previous section, diversification away from the Big Four currencies is a broad trend shared by many countries—at a minimum the 46 economies we identify in Table 6.

Figure 14. Allocated Reserves as a Share of Global Foreign Exchange Holdings



Source: COFER

Note: In the second chart, China is excluded from total foreign exchange reserves for the full period, and from allocated reserves starting in Q3 2018. China has reported a representative portfolio to COFER on a partial basis since September 2015 and announced that it would gradually increase the reported portfolio to full coverage of foreign exchange reserve assets within a period of around two to three years. Given that we do not have further information, we do not attempt to make this calculation for this transition period during 2015–18.

C. Exchange Rate Effects

An alternative hypothesis is that, apart from allocation decisions by reserve managers, the dollar share may also be driven by exchange rate changes. To address this, we first remove the contribution of exchange rate fluctuations and construct an adjusted dollar share time series that more closely captures the impact of reserve asset purchases and sales. The decomposition is based on a methodology outlined in Arslanalp and Tsuda (2015). The methodology is a more general version of earlier approaches (e.g., Truman and Wong 2006) that use the SDR (rather than the US dollar) as numeraire when adjusting for exchange rate fluctuations. The main task is to calculate the change in the dollar share which would occur if all reserve managers were buy-and-hold investors and hence all changes in currency shares were driven by exchange rate movements. The exchange-rate-adjusted series then subtracts this effect from the reported quarterly change in the dollar share.

Let w_t denote the share of the dollar in period t. Then decomposition is:

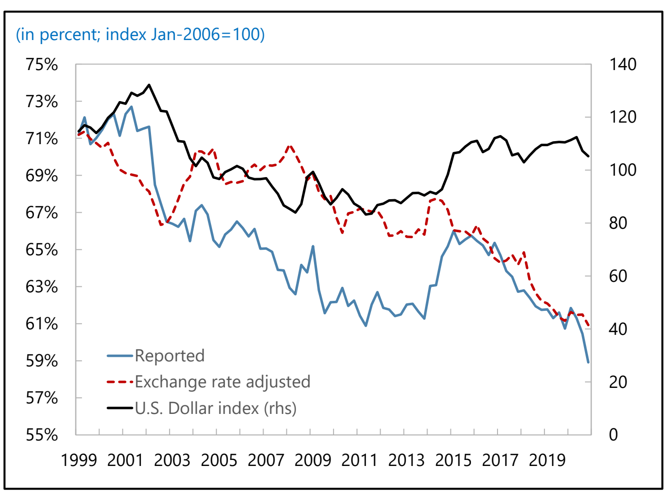
$$w_{t+1} - w_t = \left(w_{t+1} - w_t * \frac{R_t^e}{R_{bt}^e}\right) + \left(w_t * \frac{R_t^e}{R_{bt}^e} - w_t\right)$$

where R_t^e is the gross return on the dollar between period t and period $t+1$, R_{bt}^e is the gross return on the aggregate portfolio of reserve currencies between period t and $t+1$, where the weight of each currency in the portfolio is given by its share in aggregate official FX Reserves in the period t. The currencies included in the portfolio are the US dollar, the Euro, the Japanese yen, the pound sterling, the Swiss franc, the Australian dollar, the Canadian dollar, and the Chinese renminbi.

The first component captures the impact of active sale/purchase decisions of reserve managers, while the second is the valuation effect. Specifically, the first part is the change in the dollar share resulting from transactions in reserve assets (the exchange-rate adjusted share), while the second is the exchange rate effect stemming from movement of the dollar vis-à-vis other reserve currencies.

The exchange-rate-adjusted series indicates that although fluctuations in the value of the US dollar may explain short-term movements in the dollar share, they do not account for the long-term decline in the dollar share over the period (Figure 15). The Federal Reserve's Advanced Foreign Economy dollar index shows that the value of the US dollar against other major currencies has remained broadly unchanged over the past two decades, although there have been fluctuations in the interim. The latter explain about 85 percent of the quarterly variance in the US dollar's share of global reserves since 1999. The remaining 15 percent of the short-term variance is presumably explained by active rebalancing decisions of central banks to attain a target currency share of reserves. Taking a longer view, the fact that the value of the US dollar has been broadly unchanged, while the US dollar's share of global reserves has declined, confirms that central banks have indeed been shifting gradually away from the dollar.

Figure 15. Exchange-Rate-Adjusted Dollar Share of Global Reserves, 1999-2020



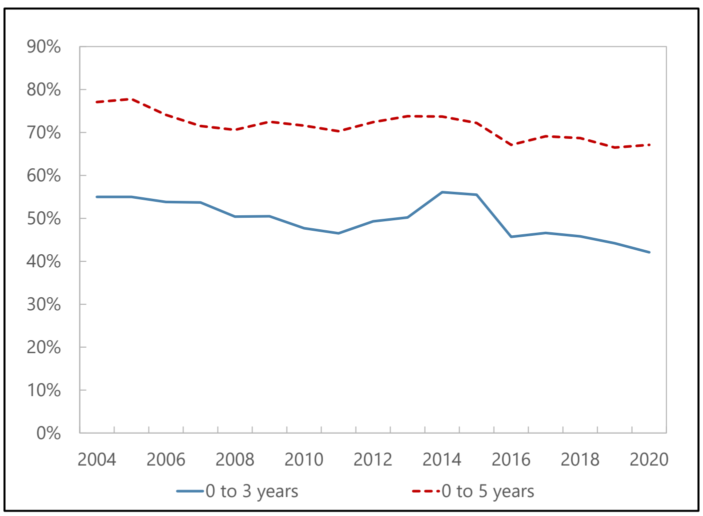
Sources: IMF Currency Composition of Official Foreign Exchange Reserves (COFER), U.S. Federal Reserve Board, and authors' calculations.
Note: The U.S. dollar index is the Federal Reserve's Advanced Foreign Economy dollar index.

D. Interest Rate Effects

Another mechanism that could generate movements in the dollar share without active sales or purchases by reserve managers is a sustained interest rate differential between dollar and other reserve assets. Since a large share of FX reserves is likely to be held in interest-bearing assets, such as deposits and government bonds, any differences in rates of return on different currencies would cause the shares to fluctuate (especially if interest income earned in a given currency is reinvested in assets of the same currency).[32] Thus, we might observe a fall in the dollar share if dollar interest rates are lower than rates on other currencies. Relatedly, significant movements in reserve currency bond yields could lead to capital gains or losses and a change in currency shares.

To measure the contribution of interest rates in each jurisdiction, we use total return indices on government bonds with a maturity of zero to five years. Total return bond indices capture both the interest payments and the capital gains accrued on a portfolio due to movements in interest rates. The zero-to-five-year range captures the bulk of the holdings of U.S. Treasury bonds by official investors according to Treasury International Capital (TIC) data. Figure 16 confirms that this maturity range accounted for more than 65 percent of official holdings of Treasury bonds at the end of 2020.[33] When discussing the investment of recently purchased dollars, Chinn, Ito, and McCauley (2021) note that Treasury securities at intermediate maturities ("the belly of the curve") are the modal investment for central bank reserve managers.

Figure 16. Maturity Composition of Foreign Official Sector Holdings of U.S. Treasury bonds (by remining maturity), 2004–2020



Source: Treasury International Capital (TIC) data

Our expanded decomposition of the change in the dollar share is then:

$$w_{t+1} - w_t = \left(w_{t+1} - w_t * \frac{R_t^i}{R_{bt}^i} * \frac{R_t^e}{R_{bt}^e}\right) + \left(w_t * \frac{R_t^i}{R_{bt}^i} * \frac{R_t^e}{R_{bt}^e} - w_t\right)$$

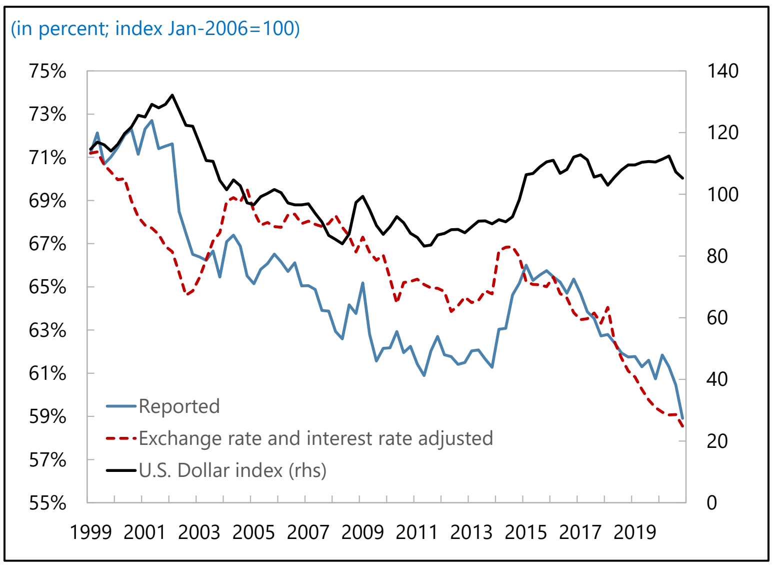
[32] See also Dominguez, Hashimoto and Ito (2012) for a more detailed discussion on interest income on reserves.

[33] We also tried the 0-to-3-year maturity indices and found that the results were similar.

where R_t^i is the total return on the index of Treasury bonds, and R_{bt}^i is the total return on a portfolio of reserve currency government bonds, each weighted by the currency's share in total official FX reserves in period *t*. Interpretation of this equation is analogous to the previous one, except that here the gross return on each reserve currency includes both exchange rate changes and interest income.

Adjusting for interest rates in addition to exchange rates has a relatively small additional effect, since interest rates in major advanced economy currencies generally move together. The path of the exchange-rate-and-interest-rate-adjusted dollar share is similar to the exchange-rate-adjusted share, indicating that exchange rate effects are larger (Figure 17). These results again support the argument that the fall in the dollar share results primarily from active decisions by reserve managers.

Figure 17. Exchange-Rate-and-Interest-Rate-Adjusted Dollar Share of Official FX Reserves and the U.S. Dollar Index, 1999-2020



Sources: COFER and author's calculations.
Note: The US dollar index is the Federal Reserve's Advanced Foreign Economy dollar index.

E. Evidence of Rebalancing?

The preceding subsections suggest that observed changes in reserve composition reflect active diversification by central bank reserve managers rather than revaluation effects. We can also consider this question directly by asking whether central bank reserve managers rebalance their portfolios in response to such valuation effects.

We follow Chinn, Ito, and McCauley (2021) by including the valuation effect (as defined previously) as an explanatory variable in the dollar share regressions. We extend their framework to consider dynamic effects and introducing a distributed lag of the valuation effect. In contrast to their analysis, we estimate the equations in levels rather than differences.[34] As well as the valuation effects, we retain the explanatory variables from the previous set of regressions. We therefore investigate whether central banks rebalance their reserve portfolios, controlling for structural changes in reserve composition driven by other explanatory variables.

Zero coefficients on the valuation effects would be consistent with rebalancing, whereas nonzero coefficients would indicate that central banks allow currency shares to fluctuate with valuation effects over the specified time period.[35] We can also consider weaker forms of rebalancing where currency shares may fluctuate with the contemporaneous valuation effect but remain stable over longer horizons. This would be equivalent to a restriction on the sum of the coefficients on the valuation terms.

Table 7 displays the results of the rebalancing estimation. In Columns 1 to 4, we show the results for including successively longer lags of the valuation effect, from the model with just the contemporaneous valuation effects up to a model with three lags. In Column 5, we show the results for a Koyck lag model, which includes one lag of the dollar share and the contemporaneous valuation effect. This specification allows the current valuation effect to have an exponentially declining effect on all future dollar shares, but the conclusion regarding rebalancing is still determined by the coefficient on the valuation effect.[36] The results indicate that central banks do rebalance their dollar shares; that is, the estimated coefficient on the valuation effects are not significantly different from zero in any specification. In addition, F-tests of the coefficients on the valuation terms do not reject the null hypothesis that all of these coefficients are equal to zero.

[34] We also estimated the equations in differences. This does not change our conclusions on rebalancing but, given the presence of slow-moving economic variables in our models, the version in levels performs better overall.

[35] Note that estimating the equations in levels rather than differences slightly changes the interpretation of the coefficients on the valuation effects compared to Chinn, Ito and McCauley (2021). A coefficient of zero still indicates full rebalancing as in their paper. However, while in their paper a coefficient of one means that reserve managers allow the USD reserve share to move one-for-one with valuation effects, in our equations it does not have the same special significance.

[36] The high level of persistence in the USD share suggested by the Koyck specification raises the question of whether the model should be estimated in changes rather than levels. However, the coefficient on the lagged USD share is quite precisely estimated, and we would reject the hypothesis that the coefficient is equal to one at the five percent significance level.

Table 7. Rebalancing of USD Shares Using the US Dollar Share of Foreign Exchange Reserves, 1999–2020

Variable	(1)	(2)	(3)	(4)	(5)
USD Share					
Valuation effect	-0.54	-0.77	-0.83	-0.01	-0.27
Dollar peg	0.05*	0.04	0.02	-0.01	0.00
Euro peg	-0.42***	-0.42***	-0.41***	-0.40***	-0.04**
Other peg	-0.16***	-0.16**	-0.23*	-0.40*	-0.02
Trade with US	1.49***	1.73***	2.10***	2.82***	0.28***
Trade with Euro Area	-0.21**	-0.20*	-0.20	-0.25*	-0.09*
Trade with Japan	-1.62***	-1.90***	-2.17***	-2.74***	-0.42*
Trade with UK	-0.92	-0.79	-0.68	-0.28	0.06
Dollar debt share	-0.30***	-0.37***	-0.42***	-0.51***	-0.08*
Euro debt share	-0.26**	-0.34***	-0.39***	-0.46***	-0.05
Yen debt share	0.03	0.04	0.01	-0.01	-0.02
Pound debt share	-3.97	-7.80	-5.47	-8.02*	1.85
Euro Area dummy	0.18***	0.17***	0.18***	0.20***	0.00
Lagged valuation effect					
L1.		-0.01	0.01	0.10	
L2.			-0.05	0.11	
L3.				-0.61	
Lagged USD share					0.90***
Constant	0.97***	0.99***	0.95***	0.98***	0.21**
Statistics					
N	573	527	480	435	573
Pseudo R^2	1.09	1.11	1.12	1.18	3.89

* p<0.10; ** p<0.05; *** p<0.01

Note: This table displays estimates for the determinants of country level US dollar shares, controlling for the valuation effect which reflects exchange rate and interest rate fluctuations. All specifications are estimated using Tobit models with lower limit of 0 and an upper limit of 1 imposed on the dependent variable. All specifications include year dummies, for which the coefficients are omitted; the dummies are jointly significant in all specifications. Standard errors are robust to heterogeneity.

VII. Conclusion

This paper provides an overview of the currency composition of global foreign exchange reserves in the twenty-first century. It shows that the fall in the share of US dollar reserves held by central banks has not been accompanied by an increase in the shares of other traditional reserve currencies, namely the euro, pound sterling and the yen. Rather, it has been matched by an increase in the share of nontraditional reserve currencies, such as the Australian dollar, Canadian dollar, Chinese renminbi, Korean won, Singapore dollar, and Swedish krona. This shift is broad based: we identify 46 active diversifiers that have shifted their portfolios in this direction, such that they now hold at least 5 percent of their reserves in nontraditional currencies.

Reserve currency competition is usually framed as a battle of giants. Toward the beginning of the period, the question was whether the dollar would be “dethroned” by the euro, the currency of the only other economy whose size rivaled that of the United States and engaged in a comparable volume of international transactions. More recently, the question posed is whether the dollar will be surpassed by the renminbi, as China overtakes the US in terms of aggregate GDP and volume of international transactions. Our results challenge this framing. The euro has gained little ground as a reserve currency since its creation in 1999. While the renminbi has gained some ground, it remains leagues behind the dollar as a form of international reserves. The most notable trend in recent decades has been the rise of nontraditional reserve currencies—the currencies of countries without the economic scale and volume of cross-border transactions that distinguished traditional reserve-currency issuers.

Historically, the international dominance of the dollar, and to a lesser extent the euro, sterling and yen, was supported by the fact that there existed well organized markets between many local currencies and only these Big Four currencies. This required those seeking to trade other currency pairs to use the dollar or another member of the Big Four as a vehicle or intermediary currency, requiring the investor to pay an additional transaction cost in the form of a second bid-ask spread. Today, in contrast, there exist direct markets in a larger number of currency pairs in a larger number of financial centers. This is reflected in bid-ask spreads on foreign exchange transactions in nontraditional currencies that differ little from those on the majors. At the same time, central bank reserve managers have become more active in managing the investment tranche of their portfolios, whose magnitude has been growing, while many nontraditional currencies display attractive volatility-adjusted returns compared to their traditional competitors. Together, these factors have made for a shift out of the Big Four currencies (in practice mainly the dollar, which dominates the Big Four share).

All this suggests that if dollar dominance comes to an end (a scenario, not a prediction), then the greenback could be felled not by the dollar’s main rivals but by a broad group of alternative currencies (Eichengreen 2021).

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