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Linda S. Goldberg | Oliver Hannaoui

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Abstract

The share of U.S. dollar assets in the official foreign exchange reserve portfolios of central banks is sometimes taken as an indicator of dollar status. We show that the observed decline in the aggregate share of U.S. dollar assets does not stem from a systematic shift in currency preferences away from holding dollar assets. Instead, a small group of countries with large foreign exchange reserve balances drive the dollar share decline observed in aggregate statistics. This arises either due to countries conducting monetary policy vis-à-vis the euro or due to preference shifts away from dollars. Regression analysis shows that interest rate differentials between traditional and nontraditional reserve currencies can tilt portfolio composition, particularly in relation to the scale of investment tranches within overall central bank portfolios. Geopolitical distance from the United States and financial sanctions are associated with lower U.S. dollar shares, especially if the primary foreign currency liquidity needs of the central bank are already satisfied.

JEL classification: F3, F31, F33
Key words: foreign exchange reserves, dollar, liquidity, convenience yields, currency of international debt, foreign exchange reserve management

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Goldberg, Hannaoui: Federal Reserve Bank of New York (emails: linda.goldberg@ny.frb.org, oliverzain.hannaoui@ny.frb.org). The authors thank Hiro Ito for his database on the currency composition of central bank reserves, as well as Serkan Arslanalp, Chima Simpson Bell, and Barry Eichengreen for data, code, and comments. The authors also thank Patrick Douglass for his thoughtful discussions.

1 Introduction

Much attention is been focused on the potential loss of status of the US dollar as a primary international currency. Narratives around its decline vary over time, whether around the introduction and rise of the euro after 2000, the increased size of China in the global economy and the IMF's granting of reserve currency status to the Chinese yuan in 2015, the uncertainty associated with trade policy during the Trump presidency of the United States, or with geopolitical reactions fueled by the Russian war with Ukraine and resulting imposition of international financial sanctions. Counter-arguments emphasize the high use in trade invoicing, synergies across different roles, the continued liquidity and relative safety of U.S. official assets, convenience yields, and global demand by private and official sector participants, including in periods of elevated risk sensitivity and uncertainty.

This issue is important, as the U.S. dollar plays many roles in international finance and trade.[1] Dollar use is strong in invoicing and pricing international trade transactions, and denominating international and domestic debt issuance. The dollar continues to be widely used as the currency of international transactions, with large shares of dollar currency in circulation abroad, use on 88 percent of global foreign exchange transactions worldwide (BIS 2019), and in a robust payments infrastructure.[2] U.S. dollar assets, including Treasuries, are widely regarded as liquid and safe assets and held broadly in portfolios of domestic and foreign investors. The dollar remains the most used currency in both *de jure* and *de facto* currency pegs (IMF 2023; Ilzetzki, Reinhart, and Rogoff 2019) and in the foreign exchange reserves of central banks. As shown in Figure 1(a), these are material financial flows, at close to $12 trillion by 2022.

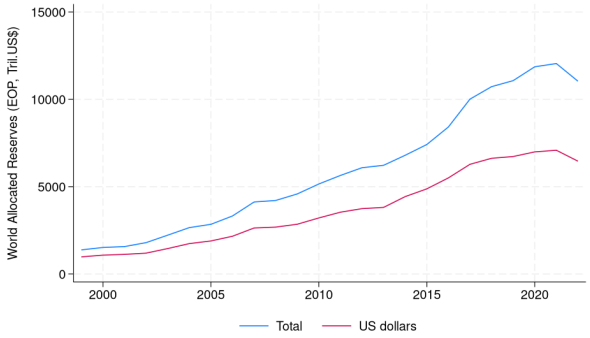
This paper provides new evidence that questions the narrative that the dollar's status has started to decline in central banks portfolios of foreign currencies. The dollar share of official foreign exchange reserves fell from a peak of over 70% of total global official foreign exchange reserves in the late 1990s to closer to 60 percent by 2022, as shown in Figure 1(b) according to the Currency Composition of Official Exchange Reserves (COFER) data published by the International Monetary Fund (IMF). These portfolios are held in part as countries hold assets to meet precautionary liquidity needs and sometimes stabilize their currencies in stress periods or in a managed or pegged exchange rate regime. Adequacy considerations for emerging markets often incorporate financing of foreign currency imports over some horizon (e.g. three months) and having sufficient

[1] See discussions in ECB (2023) and Goldberg, Lerman, and Reichgott (2022).

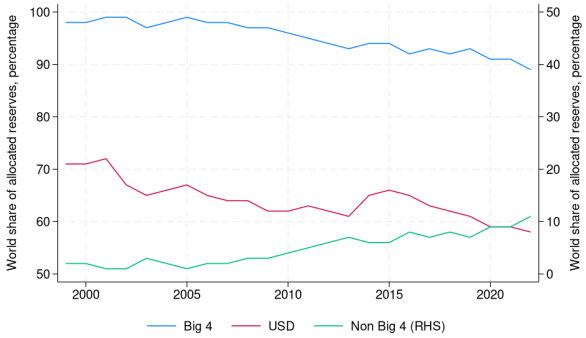
[2] US-owned Clearing House International Payment System (CHIPS) clears and settles $1.8 trillion in domestic and international payments per day. FedWire, operated by the Federal Reserve System, supports global dollar wire transfers amounting to nearly $4 trillion daily. (TheClearingHouse, 2023)

Figure 1: Global Foreign Exchange Reserves

(a) Allocated FX Reserve Levels



(b) IMF COFER Currency Shares



Source: Author's construction using IMF COFER year-end values. Big 4 currencies include USD, JPY, EUR, and GBP. COFER data covers 149 reporting countries and presents aggregated currency shares across total allocated reserves.

liquidity to cover short-term payments on external debt.[3] For advanced economies, considerations have included patterns in flexible exchange rates, the potential use of foreign exchange reserves for smoothing strains in currency markets against key reference currencies, and the potential scale of funds needed relative to carry costs (Goldberg, Hull, and Stein, 2013).[4] In the post GFC period, other considerations could include access to foreign currency swap and repo facilities of other central banks.

Our analysis on this declining dollar share of COFER uses two methodological approaches that push against the interpretation that this represents a broad shift in preferences away from holding dollar assets. The first approach utilized is an intuitive mathematical decomposition of the sources of foreign exchange reserve portfolio evolution with a distinction between shares of dollar assets (Chinn, Ito, and McCauley 2022) and sizes of specific country portfolios. The second approach is an extension of the empirical literature on currency shares in official foreign exchange portfolios (Arslanalp, Eichengreen, and Simpson-Bell 2022). We test new conjectures related to relative returns on different currencies and geopolitical considerations.[5] We introduce explicit consideration of how these forces engage with the size of reserve portfolios of central banks, divided into liquidity and investment tranches.

The first key result is that the declining dollar shares in the overall COFER over the past decade

[3]References include IMF (2016), Aizenman and Riera-Crichton (2008), Aizenman, Cheung, and Qian (2020), Bussière, Cheng, Chinn, and Lisack (2015), and Jeanne and Rancière (2011).

[4]Consistent with the recent literature focused on the global factor in international asset prices and exchange market pressure indices, US monetary policy and risk sentiment are among the most important components (Miranda-Agrippino and Rey 2020, Goldberg and Krogstrup 2023, Goldberg 2023).

[5]Established drivers include debt denomination, direction of trade by country, and exchange rate regimes.

does not reflect a systematic retreat from dollar share in official reserve portfolios. Indeed, the majority of countries maintained similar dollar shares in their portfolios over the past decade. Instead, the dollar share changes in COFER aggregates are driven by a small group of countries and are not exclusively due to changes in portfolio allocations away from dollar assets. Russia, which in 2015 had large ex ante official foreign exchange reserves and a high dollar share, sharply reduced its dollar share according to currency composition estimates. Switzerland, which has a large portfolio and had a large increase in total foreign exchange reserves during this period and has a much higher euro share of assets in its portfolio when compared with many other countries, significantly reduced the dollar share within the COFER aggregates. A small number of other countries for which portfolio composition estimates are not available, including example China and India, explain much of the remaining decline.

The second key result is establishing a larger importance of some existing drivers, and the nuanced importance of our conjectured contributors. Our results demonstrate a stronger role for euro area economic proximity, which ultimately increased euro shares in some country portfolios, consistent with ECB (2023) evidence. The relative returns on currencies play a statistically significant but quantitatively small role in tilting the composition of overall portfolios whether defined in terms of key reserve currencies or the nontraditional reserve currencies discussed by Arslanalp, Eichengreen, and Simpson-Bell (2022). US dollar shares in portfolios are lower, and roles of nontraditional currencies higher, when the investment tranche share of a portfolio (calculated using short term debt) is larger. On the margin, portfolio composition tilts away from dollars when returns on nontraditional currencies or euros are higher. Our tests do not find significant differences in this dynamic during low or zero lower bound US dollar rate periods.

The third novel result speaks to the role of geopolitics and geoeconomics as as a driver of overall official portfolio composition. Our analytics introduce geopolitics in two ways: patterns in country voting relative to the United States at the United Nations General Assembly (Voeten, Strezhnev, and Bailey, 2009), and financial sanctions applications by the United States (Felbermayr et al., 2020). Low geopolitical alignment of a country with the US based on UN voting does not, in general, imply a lower US dollar share in official reserve portfolios. Indeed, countries with lower voting with the US (or subject to financial sanctions) are more likely to have a higher - not lower - US dollar share in official reserve portfolios, all else equal. Instead, the regression results show that a country's low voting alignment with the US reduces the US dollar share of portfolios after countries have high enough stocks of reserves to meet their liquidity needs around short term external debt positions and when the investment tranches of their portfolios are larger.

Taken together, this evidence provides a different interpretation of the declining dollar share in global official reserves than implied by a narrative of a retreat from dollars in the international

monetary system.[6] Reserve accumulation by countries (mainly Switzerland) that tend to have more euros in their portfolios, increased country trade with the euro area, and some geopolitical considerations have contributed. The geopolitical considerations may bind mainly for countries already with large enough reserves to cover their precautionary liquidity needs.

Our work contributes to a rich set of literatures. These focus on the structure of the international monetary system, the international roles of the dollar, the safe haven properties and convenience yields properties of assets, and on the contributions of geoeconomics and geofragmentation.

The broader literature has been developing theory and empirics on the international roles of currencies in trade and financial transactions. Early work on invoice currency use in international trade transactions, (e.g. Bacchetta and Van Wincoop 2005, Goldberg and Tille 2008, Goldberg and Tille 2009, Ito and Chinn 2015) and more recent contributions (e.g. ECB 2023, Boz et al. 2022), show that invoicing selection is associated with the choice of currency in which goods are priced, and associated with associated rigidities and at least short run exchange rate pass through elasticities. Synergies exist across roles, with choice of currency in debt denomination and imported input denomination tied directly to producer choices of currencies for optimal invoicing. Synergies are a broader theme, as Gopinath and Stein (2021) emphasize synergies between currency use in banking and trade activities, working through currency use as safe stores of value. New evidence shows the currency composition of international financial transactions in lending by global banks (Aldasoro and Ehlers, 2018), in fund portfolios[7], and in the currency composition of debt choice (Coppola, Krishnamurthy, and Xu, 2023).

Empirical contributions on official reserves start with estimates of portfolio composition, as the IMF does not directly publish reserve portfolio composition by country, nor is a full list of the countries reported in COFER available. Researcher constructions of best estimate databases include Eichengreen and Mathieson (2000) and Ito and McCauley (2020). Complementary work considers determination of anchor or reference currencies in exchange rate regimes (Ilzetzki, Reinhart, and Rogoff, 2019).[8] Drivers of these decisions have been studied, for example with Iancu et al. (2022) showing that country financial linkages have played an increasingly important role and Arslanalp, Eichengreen, and Simpson-Bell (2022) documenting the increased use of nontraditional reserve currencies. Other research also considers the size of official reserve portfolios for precautionary demand purposes and concepts of reserve adequacy like the Greenspan-Guidotti rule (Aizenman, Cheung, and Qian 2020, Aizenman and Riera-Crichton 2008, Jeanne and Rancière 2011,IMF 2016). More historic perspectives on official reserves consider the timing and condi-

[6]The Economist (2022), J.P. Morgan (2023), and Corsetti, Eichengreen, Vives, and Zettelmeyer (2023)
[7]For example, Maggiori 2017, Maggiori, Neiman, and Schreger 2020, and Faia, Salomao, and Veghazy 2022
[8]Prasad (2019) discusses the issue of allocated versus unallocated reserves in the COFER data.

tions for a large scale change in the reserve currency status of currencies. Chiţu, Eichengreen, and Mehl (2014) on the timing of the transition from pound sterling denominated reserve portfolios towards US dollars. An expansive set of related issues are addressed in the 2023 symposium on floating exchange rates (Irwin, Obstfeld, and Posen, 2023).

A growing body of research has a focus on geopolitical and geoeconomic fragmentation for international financial markets.[9] Eichengreen, Mehl, and Chiţu (2019) argue that military alliances tilt the selection of a safe currency. Kempf, Luo, Schäfer, and Tsoutsoura (2023) show that political ideology is an important and generally omitted factor in shaping international capital allocations of syndicated corporate loans and equity mutual funds. Bianchi and Sosa-Padilla (2024) focus on how international sanctions can shape dollar dominance, while Clayton, Maggiori, and Schreger (2023) consider how economic coercion arises from a combination of strategic pressure and costly actions, and Itskhoki and Mukhin (2023) show the roles of import and export sanctions on trade and exchange rates, including under a regime of financial repression. Cipriani, Goldberg, and La Spada (2023) detail specifically how applications of financial sanctions have operated over time across multiple key international currencies, including with respect to international payments and communications systems. Sanctions imposed on countries could either reinforce or add to incentives to hold US dollars in official portfolios (Dooley, Landau, and Garber 2022 and Corsetti, Eichengreen, Vives, and Zettelmeyer 2023).

Section 2 provides a basic and intuitive mathematical decomposition of the roles of reserve portfolio expansion versus compositional shifts of portfolios. Section 3 presents key conjectures of US dollar shares of portfolios, focusing on relative return and geopolitical considerations. Section 3.3 presents specific details of the data. Section 4 provides results from revisiting the type of estimation presented in Arslanalp, Eichengreen, and Simpson-Bell (2022), using some methodological and data differences, and adding specific tests of our conjectures. Section 5 focuses on implications for research and policy questions.

2 A Basic Decomposition

This section introduces a basic decomposition that provides insights into the contributions of changing preferences for dollar assets versus other factors within global holdings of official foreign exchange reserves.

[9]The work of the IMF across this topic is discussed in Aiyar, Presbitero, and Ruta (2023).

2.1 Derivation

The basic mathematical formula for the US dollar share of the foreign official reserves across countries is the sum of the product of quantities of individual country foreign reserves and the associated portfolio allocations of these reserves to US dollar assets, across countries. Denoting R_t^c as the total level of foreign exchange reserves (minus gold) in year t for country c, and denoting σ_t^c as the US dollar share, the overall formula for the US dollar share of reserves aggregated across countries, $USRSH_t$, is given by:

$$USRSH_t = \frac{\sum_1^N \sigma_t^c R_t^c}{\sum_1^N R_t^c} \tag{1}$$

where N is the total number of countries included in the aggregation. For understanding the changes in $USRSH_t$ over time the derivative is provided by equation 2

$$d(USRSH_t) = (\frac{\sum_1^N \sigma_t^c R_t^c}{\sum_1^N R_t^c})' = \frac{(\sum_1^N d\sigma^c R_t^c + \sigma_t^c dR^c)\left(\sum_1^N R_t^c\right) - \left(\sum_1^N \sigma_t^c R^c\right)\left(\sum_1^N dR^c\right)}{\left(\sum_1^N R_t^c\right)^2} \tag{2}$$

Expanding and then combining terms, this expression can be rewritten as a neat and intuitive basic decomposition:

$$d(USRSH_t) = \frac{(\sum_1^N d\sigma^c R_t^c)}{\sum_1^N R_t^c} + \frac{\sum_1^N (\sigma_t^c - USRSH_t) dR^c}{\sum_1^N R_t^c} \tag{3}$$

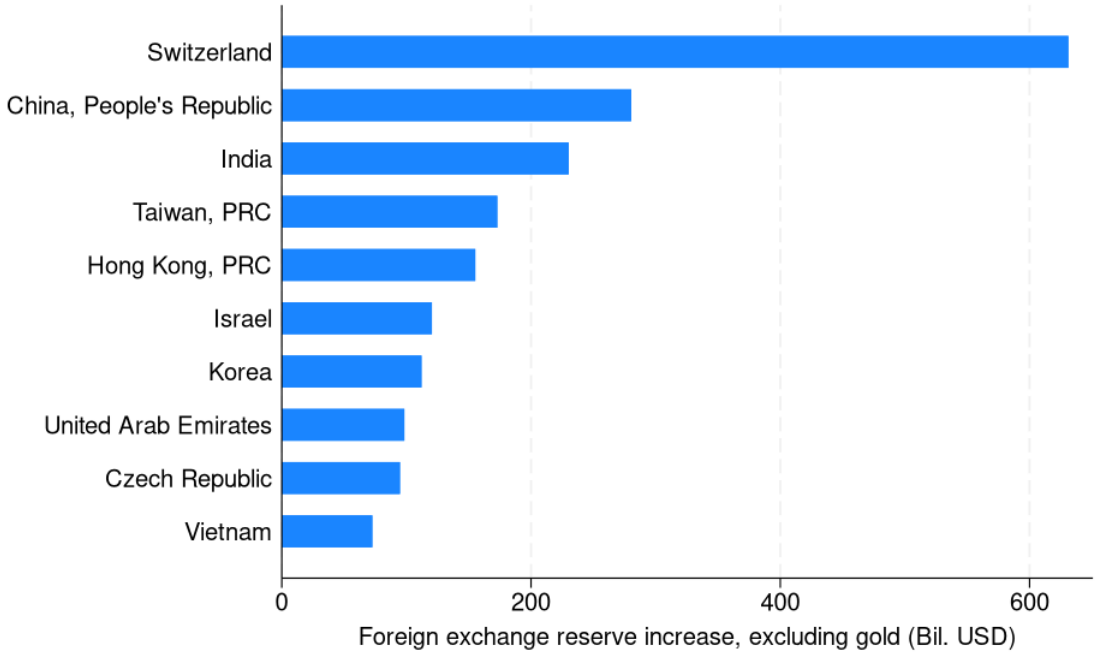
The logic of equation 3 explaining the components of the change in COFER aggregates is straightforward and has two components. The first set of contributions are associated with changes in compositional preferences of countries around holding dollar assets, which enter the expression in line with the ex ante quantity of total reserves in the country's official portfolio. These weighted changes aggregate across countries to provide the contribution of preferences for currencies to the total evolution globally. The second set of contributions are from the overall dollar asset share of aggregate reserves evolving as the volumes of reserves for each country – not the preferences – evolve. However, this component of the decomposition only plays a role in driving the aggregate global composition to the extent that the portfolio composition of each country differs *ex ante* from the weighted average currency share across countries. This is a basic but important point, as discussions that argue that the changes in COFER aggregates reflect a decline in preferences for dollar assets are ignoring the contributions of this second key driver.

2.2 Quantifying the components

Quantifying the components of equation 3 requires data on the size of official foreign currency reserve portfolios across countries and on the currency shares of assets in those portfolios. Foreign exchange reserves data are sourced from the IMF's International Financial Statistics Database (IFS). The size distribution of foreign exchange reserves across countries is very broad. Nearly 90% of the total of 181 countries for which data is available have portfolios of official foreign exchange reserves that are less than $100 billion, while three countries – China, Japan, and Switzerland – have reserve assets spanning in excess of $500 billion to upwards of $3 trillion.

These magnitudes hint at how changes in either the composition or the size of the official portfolios of larger reserve portfolios have the potential to significantly alter the overall COFER composition. Some changes have been large in absolute terms, as shown in Figure 2. Between 2010 and 2022 the values of portfolios have increased by over $600 billion for Switzerland, and by over $200 billion of additional reserves for each of China and India. More broadly, the occurrence of crises and large shocks have motivated some countries to carry extra insurance and adjust reserves (Dominguez, Hashimoto, and Ito 2012 and Bussière, Cheng, Chinn, and Lisack 2015). During the 2015 to 2021 period, the mean ratio of foreign exchange reserves to GDP ratio across reporting countries increased from 15.4% to 19.8%.

Figure 2: Country Changes in FX Reserves, 2010 to 2022



Source: Author's construction using IMF IFS data on official foreign exchange reserves.

It is more difficult to provide a comprehensive perspective on the asset composition of the individual portfolio allocations of all of these countries. The IMF does not directly publish reserve portfolio composition, nor is a full list of the countries reported in COFER. We use as a primary source the series by Ito and McCauley (2020) recently updated through 2021 and 2022, with additional data sourced from Arslanalp, Eichengreen, and Simpson-Bell (2022).[10] While many countries report the shares or breakdowns of reserve currencies in the central bank's reserve assets, this data provides shares or breakdowns in terms of "net assets", as some central banks only report the shares or breakdowns of reserve currencies for the net assets while others only report the gross assets' shares. Moreover, as some central banks have forward arrangements adjustments, the primary source incorporates adjustments to the extent that information of such arrangements are identified by those authors.

We implement the decomposition of equation 3 with data for 72 countries, selected according to the availability of estimated or reported values of the US dollar share of foreign exchange reserves at least for 2015 or 2016.[11] Of these 72 countries, 54 have US dollar share values available for both 2015 and 2021. Foreign exchange reserve stocks are available for the full sample of countries for both periods.[12]

Some of the countries with portfolio composition information for 2015 do not have estimates available for 2021. Accordingly, we can use our decomposition approach to divide the first right hand side element of equation 3 into two parts, one taking into account the 55 countries and then a separate portfolio composition term for which data on changes in US dollar share of reserves is not spanned. Taking the change $d(\cdot)$ as capturing the difference between 2015 and 2021 values of terms, and using the initial observations dated 2015, the empirical decomposition is rewritten as

$$d(USRSH_t) = \frac{\sum_1^{54} d\sigma^c R^c_{2015}}{\sum_1^{72} R^c_{2015}} + \frac{\sum_{55}^{72} d\sigma^c R^c_{2015}}{\sum_1^{72} R^c_{2015}} + \frac{\sum_1^{72} (\sigma^c_{2015} - USRSH_{2015}) dR^c}{\sum_1^{72} R^c_{2015}} \tag{4}$$

Using year end IMF COFER statistics, the change in the US dollar share of official allocated foreign exchange reserves dropped from 0.66 in 2015, to 0.59 in 2021, reflecting a decline of 7 percentage points.

Within equation 4, the first right-hand-side term reflects the contribution to the change in dollar

[10] Within the Ito and McCauley (2020) dataset, the currency share data do not incorporate SDR or gold holdings. As long as the authors find the data on SDR or gold, they recalculate shares to have a base that excludes SDR and gold.

[11] Our country sample is increased by 7 countries by using 2016 values available for countries when 2015 composition values are missing. Hereafter, we assume the 2016 weights for these countries apply to 2015 reserve stocks.

[12] For the following 6 countries: Peru, Malawi, Lesotho, Papua New Guinea, Tanzania, and Uganda, 2021 foreign exchange reserve levels are replaced with the most recent data available.

share over time across countries for which estimated composition series are available, the second term reflects countries for which there are data gaps associated with portfolio composition changes, and the third term reflects the full set of countries' growth in country reserve portfolios across these dates, interacting with *ex ante* composition of reserve portfolios. An interesting use of this expression is that we can approximate the contribution of non-reporting countries to the COFER change. As the total $d(USRSH_t)$ and two of the three right side terms in this expression are observable, we can compute as a residual the second right-side term's contribution to the decline of COFER that is associated with portfolio composition shifts. This term will capture the aggregate of the 16 countries in that grouping, which includes China, India, and Turkey, which collectively accounted for 30% of world foreign exchange reserves in 2021.

The first right-hand-side term is a negative summation of the dollar shares across 55 countries, which on average, declined over time using, as weights, the 2015 country reserve balances. This component sums to 0.26 percentage points across countries – so approximately zero overall relative to the 7 percentage point change. Across countries, the small total effects reflect the balance from both US dollar share declines and increases, each interacting with ex ante reserve levels. Drilling down within the composition, 22 countries reduced dollar shares in portfolios and 27 countries increased dollar shares. The top changes in each direction are presented in Table 1, along with *ex ante* reserve balances by country. The single most impactful country on this total is Russia, with its 29 percentage point decline in the US dollar share of its portfolio according to Ito and McCauley (2020) and with initial reserves an order of magnitude larger than those of the the other countries. Still, the increased dollar shares by the broader group of countries offset this preference component within equation 4 in aggregate.

Table 1: Reserve Portfolio Share Changes, 2015 to 2021

	Largest USD Share Declines			Largest USD Share Increases		
Rank	Country	2015 FXR Levels (Bil. USD)	USD Share Decline	Country	2015 FXR Levels (Bil. USD)	USD Share Increase
1	Macedonia	2	0.42	Kazakhstan	20	0.64
2	Portugal	5	0.37	Kyrgyz Republic	1	0.44
3	Namibia	2	0.35	Sweden	50	0.34
4	Russia Federation	309	0.29	Papua New Guinea	2	0.31
5	Spain	39	0.27	Romania	35	0.20
6	Bolivia	11	0.22	Malawi	1	0.14
7	Sri Lanka	6	0.15	Kenya	7	0.14
8	Croatia	15	0.14	South Africa	39	0.12
9	Serbia, Republic of	11	0.11	Iceland	5	0.11
10	Georgia	2	0.11	Czech Republic	63	0.11

Source: Author's construction using IMF IFS data on official foreign exchange reserves (FXR) and Chinn, Ito, and McCauley (2022) data on portfolio shares with additional observations from Arslanalp, Eichengreen, and Simpson-Bell (2022).

The last term of equation 4 provides the contribution of changes in official reserve amounts to the total aggregate dollar share across countries, computed using data over 72 countries. If countries increase reserves over this period, the US dollar share of the aggregate will increase only if the countries accumulating reserves tend to have higher dollar shares compared with the (weighted) average ex ante dollar shares in their portfolios. This last summation equals 3.8 percentage points, which can be compared with the total share change of 7 percentage points.[13]

Table 2 lists the largest increases and declines in reserves from 2015 to 2021. The strongest contributor to this overall component is Switzerland. The *ex ante* dollar share of the Swiss official portfolio is estimated at 0.32, well below the 0.65 *ex ante* average in COFER reports. Switzerland's reserves almost doubled over this period from $560 billion to over $1 trillion, with a $473 billion increase. This type of observation illustrates why changes in the COFER data. Switzerland's reserve accumulation is not analogous to a decline in preferences for US dollars. Rather, it is a byproduct of the monetary policy regime in Switzerland, as during this period foreign exchange interventions were used to limit the appreciation of the Swiss franc against the euro in the presence of inward exchange market pressures. Indeed, Switzerland's share of dollars in its overall portfolio actually rose from 7 percentage points during this time frame. According

[13]When 2015 US dollar (USD) share values are missing, 2016 USD share values are used for the following 7 countries: Ireland, Costa Rica, West Bank and Gaza, Lesotho, Mauritius, Morocco, and Seychelles, who, collectively, account for less than 0.01% of total foreign exchange reserves in our 72 country sample.

to this information on balances, Russia's accumulation of reserves through 2021 also would have pulled down the COFER share given the *ex ante* lower than average share of dollars its official foreign exchange reserve portfolio.

Table 2: Reserve balance changes, 2015 to 2021

	Largest Reserve Declines			Largest Reserve Increases		
Rank	Country	2015 USD Share	FXR Decline (Bil. USD)	Country	2015 USD Share	FXR Increase (Bil. USD)
1	China	0.58	80	Switzerland	0.32	473
2	Turkey	0.81	28	India	0.58	242
3	Brazil	0.84	18	Russia Federation	0.43	159
4	Kazakhstan	0.15	11	Hong Kong, PRC	0.87	138
5	Bolivia	0.81	10	Israel	0.68	119
6	Sweden	0.08	6	Czech Republic	0.15	106
7	Sri Lanka	0.40	4	Korea	0.67	80
8	Netherlands	0.84	4	Poland	0.39	56
9	Costa Rica	0.91	1	United Kingdom	0.40	26
10	Zambia	0.86	1	Philippines	0.89	22

Author's construction using IMF IFS data on official foreign exchange reserves (FXR) and Chinn, Ito, and McCauley (2022) data on portfolio shares and additional observations from Arslanalp, Eichengreen, and Simpson-Bell (2022). When 2015 US dollar (USD) share values are missing, 2016 USD share values are used for the 7 countries.

We next use the components for the three known components of equation 4 to compute the magnitude of the contribution of portfolio preference shifts for the remaining countries in aggregate. Using 0.070, 0.003 and 0.038, substitutions imply that: $0.070 = .003 + \frac{\sum_{55}^{72} d\sigma^c R^c_{2015}}{\sum_1^{72} R^c_{2015}} + 0.038$. The magnitude of the remaining term, which includes China, India and Turkey, among others, is $\frac{\sum_{55}^{72} d\sigma^c R^c_{2015}}{\sum_1^{72} R^c_{2015}} = 0.29$.

These computations together show that reserve level and some preference changes by a few countries with larger reserve portfolios are responsible for the COFER totals. However, across the broader span of countries, portfolio preference changes in favor of non-US dollar currencies are not, on average, large drivers of COFER patterns.

3 Conjectures and testing drivers

Researchers have used time series panels to explore the specific structural and cyclical forces associated with country preferences for currency shares in international reserve holdings. Reserve portfolio levels and the shares in portfolios of particular currencies are expected to be higher with

the coincidence of international trade and financial transactions with reserve-currency issuing countries. Analytics include within regression analytics variables to capture *de facto* or *de jure* exchange rate pegs; trade shares with the US, euro area, and Japan, among others; and the currency denomination and levels of external debt positions. Trade shares and country size are viewed as indicators of economic influence and exposure to international spillovers. Over the short to medium run, some of these channels also can capture the influence of exchange and interest rate dynamics as cyclical factors that could partly explain dollar shares without active reallocation back to strategic targets by reserve managers. For example, a net depreciation of the dollar over the past two decades, accompanied by a relative appreciation of other major currencies held in foreign exchange reserves, could drive declining dollar shares in portfolios. Returns on portfolios from interest received on sovereign holdings could also play a similar role, especially if accrued interest on foreign exchange assets are used to reinvest into assets of the same currency. The 2023 *International Role of the Euro* report provides evidence that these pure portfolio returns and valuation effects have been contributors (ECB, 2023).

3.1 New conjectures on drivers of USD share

Our new portfolio considerations start with conjectures related to relative returns offered across currencies and geopolitical considerations. On relative returns, Arslanalp, Eichengreen, and Simpson-Bell (2022) observe that overall official reserve portfolios have tilted toward smaller and nontraditional reserve currencies. They posited that some of this diversification may occur through a search for higher yield on the overall foreign currency official portfolio, and also as some of the assets denominated in nontraditional reserve currencies have trading liquidity that has improved over time. The potential magnitudes of these changes are illustrated within Figure 1(b), showing that the share of reserves allocated to currencies other than the "Big Four" (US dollar, euro, Japanese yen, and Great Britain's pound) rose from 2 percent in 2000 to 6 percent in 2015, with a further rise to 9 percent by 2020. Since 2010, small components of overall portfolios had been increasingly allocated to assets denominated in Chinese renminbi, Canadian dollars, Australian dollars, and other currencies like the Korean won.

Our tested conjectures about the roles of return differentials across currencies consider whether such roles engage with country- and environment- specific factors. Return differentials across currencies could tilt the composition of portfolios, regardless of whether these are returns on traditional or nontraditional reserve currencies. Thus, the US dollar share of official portfolios could be lower if euro area assets or non-traditional reserve currencies are offering relatively higher (relative) returns.

Conjecture 1: the share of official reserve assets allocated to US dollar assets will be lower when

returns on alternative currencies are higher. This tilt can be magnified in a low US dollar interest rate environment.

The low interest rate or zero lower bound environment might be associated with a greater desire of official portfolio managers to generate returns on the portfolio through more diversification. Sensitivities may be enhanced on portions of the foreign exchange reserve portfolios consider as part of the "investment tranche". For this conditional sensitivity point, it is possible that the roles of relative returns are diminished as the purposes of holding reserves are mainly associated with foreign currency liquidity and exchange rate stabilization goals. Foreign exchange intervention has been more actively used as a tool to manage external conditions and has played an increasing role in offsetting pressures on currencies[14]. Historically, foreign currency reserve assets are held to provide liquidity insurance against sudden stops in the availability of global liquidity needed for funding international trade and making payments on foreign currency debt. Reserve adequacy concepts precisely consider these types of forces (IMF, 2016).

Thus, relative returns may play a larger role in reserve manager allocations, particularly outside of the "Big Four" (USD, EUR, JPY, and GBP), only after the strategic allocations for currency liquidity purposes are satisfied. This effect might be especially pronounced for countries whose reserve managers have access to an "investment tranche", which we define to be the amount of excess foreign exchange reserves held by a country above the "liquidity tranche" portion associated with the standard considerations around access to emergency liquidity and exchange rate stabilization. As portfolio managers have access to more funds and increased risk-bearing capacity, they may be expected to switch away from safe assets, the majority of which tend to be denominated in dollars due to the strength and liquidity of US Treasury markets and in the next deepest market in euros. Further, the tendencies to diversify may be more pronounced during a low-interest rate environment among the "Big Four", inducing managers to diversify into high yielding nontraditional reserve currencies assets. Indeed prior work has discussed the tendency of central banks to broaden the range of currencies in their portfolio to diversify risks and to avoid low, and even negative, interest rates (Schanz, 2019).

Next, consider how geopolitics and geoeconomic fragmentation influence country portfolio allocations. Reducing the dominance of the US dollar in the international monetary system has been an explicit statement of objectives for some countries, leading to numerous announcements surveyed in ECB (2023). Geopolitical tensions, fueled especially by the Ukraine war and tensions between the United States and China, have the potential to alter portfolio reserve allocation. Arslanalp, Eichengreen, and Simpson-Bell (2022) note that financial sanctions imposed on the

[14]See Blanchard, Adler, and de Carvalho Filho (2015), Fratzscher, Gloede, Menkhoff, Sarno, and Stöhr (2019), and Adler, Chang, Mano, and Shao (2021), and Goldberg and Krogstrup (2023).

US via SWIFT may have spurred non-US allied countries to rethink their reliance on the dollar and American-based payment systems. Weiss (2022) argues that geopolitical fragmentation may reduce the role of dollar reserves via export invoice switching as non-Western countries look to reduce their reliance on the US dollar via trade. BRICs expansion has been widely discussed as a bid to end dollar dominance. Nonetheless, the ECB (2023) views evidence to date supporting this development as weak and mainly in official statements. We formally investigate within the official reserves data.

Conjecture 2: the share of official reserve assets allocated to US dollar assets will be lower for countries that are geopolitically distant from the United States, relative to shares that would otherwise be suggested by standard drivers such as patterns of international trade, debt finance, and currency regimes.

We further consider whether geopolitical considerations play a stronger role only after countries have sufficient reserves to meet their liquidity and exchange rate stabilization needs.

3.2 Empirical Methods

Our empirical methods start with the approach of Arslanalp, Eichengreen, and Simpson-Bell (2022), although we focus our reported analytics on the changing US dollar share of portfolios instead of on each Big Four currency. Our empirical tests introduce variations in estimators relative to that study's baseline approach, and include broader variables, conditional considerations, and extended data coverage. The starting empirical specification is:

$$\sigma_t^c = \beta_0 + \beta_1^{'}\mathbf{X}_t^c + \epsilon_t^c \tag{5}$$

where σ_t^c is the US dollar share of official foreign exchange reserves, R_t^c, of country c at year t. The standard right hand side variables for determinants of currency composition are subsumed by the vector $\mathbf{X_t^c}$ and includes: the exchange rate regime in year t defined as a dummy variable for a US dollar, euro, or Other country peg; the shares of country trade with all Big Four currency issuer countries; and the country's currency composition of external debt in US dollars and euros. Specifics on data sources and distributions are covered in Section 3.3.

Our variations directly address the strength of evidence from these established channels and introduce evidence on conjectures 1 and 2. Accordingly we test several variations of the saturated model, provided as equation 6:

$$\sigma_t^c = \beta_0 + \beta_1^{'}\mathbf{X}_t^c + \beta_2\mathbf{Ret}_t + \beta_3\mathbf{InvTr}_t^c + \beta_4\mathbf{Ret}_t \times \mathbf{InvTr}_t^c + \beta_5\mathbf{GP}_t^c + \epsilon_t^c \tag{6}$$

We extend the specification to embed considerations of relative returns on official US dollar assets versus euro asset returns, and further consider differentials between the returns on USD assets and those of nontraditional reserve currencies. The vector $\mathbf{Ret}_t$ includes two variations of measures of currency returns. One variation of the model includes the US and EU short-term shadow rates. The other variation includes the interaction between the US zero lower bound (ZLB) and a non-traditional (NRC) differential which captures the excess return of non-traditional reserve currencies relative to the US shadow rate. Tests allow for the possibility that the effects of higher nontraditional reserve currency returns are pronounced only when the reserve currencies are at at the zero lower bound.

As the conjecture allows for the possibility of the effects of return differentials and geoeconomic forces to be stronger on the investment tranche portion of the portfolio than on the liquidity tranche portion of reserves, some specifications introduce interactions with the investment tranche $InvTr_t^c$ share of the portfolio, as well as allowing a level effect of having a higher investment tranche. The investment tranche is constructed as the fraction of total reserves that is in excess of that part of the portfolio needed for foreign currency liquidity. Liq_t^c denotes a measure used by reserve managers to assess their foreign exchange reserve liquidity; These liquidity needs are alternatively proxied by standard measures associated with short-term foreign currency debt or 3 months of import coverage. Thus, $InvTr_t^c$ is a piece-wise measure defined as:

$$InvTr_t^c = \begin{cases} 0 & R_t^c < Liq_t^c \\ \frac{R_t^c - Liq_t^c}{R_t^c} & R_t^c > Liq_t^c \end{cases} \tag{7}$$

Specifications include a vector of geoeconomic variables **GP**. We employ a linear probability model (LPM) with robust standard errors to address potential heteroskedasticity. Given the lack of corner cases in US currency composition holdings, the estimated coefficients are nearly identical as those estimated using a Tobit model. Ordinary least squares allows for ease of interpretation of coefficients and conventional goodness of fit calculation, although it also allows for the possibility of estimated US dollar shares below zero or above one. We start our analytics by exactly replicating the results of Arslanalp, Eichengreen, and Simpson-Bell (2022), then extending that database in time and several directions, and sequentially compare the results using different estimation techniques. We perform similar incremental comparisons as we change the mix of country-time observations and variables included in specifications.

3.3 Data

The countries and years included in this section's empirical estimations are determined by the availability of estimates of US dollar shares of official reserve portfolios across countries. We rely heavily on Ito and McCauley (2020), with their updated data through 2021 and some adjustments to earlier share estimates by country-date. Some supplemental observations for countries absent from that database are from Arslanalp, Eichengreen, and Simpson-Bell (2022). Our final dataset is a panel with a total of 1160 country-year observations, with up to 23 years covered (1999-2021) and spanning 75 countries from all continents.[15]

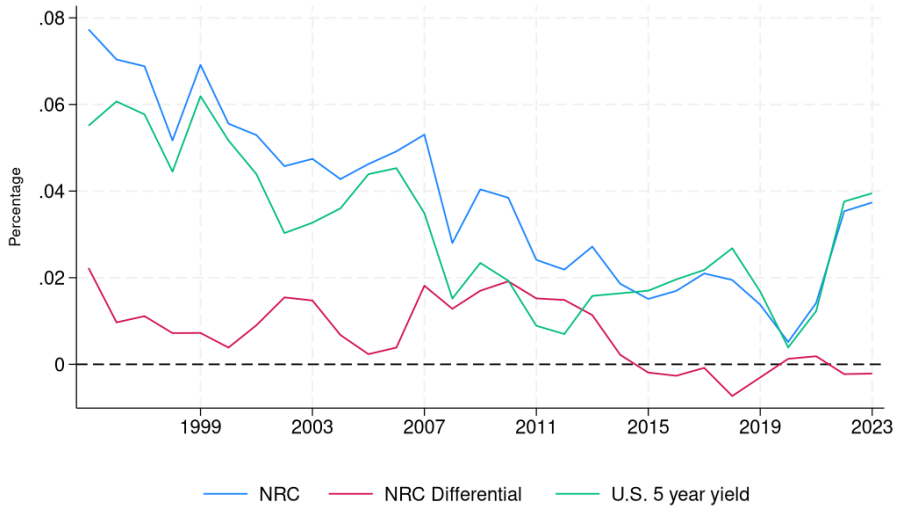
The traditional explanatory variables included in specifications for US dollar shares of official reserve portfolios exactly follow the data and data construction methods of Arslanalp, Eichengreen, and Simpson-Bell (2022). For monthly or quarterly data, we take the last period available in a given year. All variables vary by year and country unless otherwise stated. Currency Regime refers to the reserve currency to which a country pegs its exchange rate. Following Ilzetzki, Reinhart, and Rogoff (2019), this includes three separate indicator variables: *Dollar peg*, *Euro peg*, or *Other peg*. Share of Bilateral Trade refers to the share of external trade (exports plus imports) with each Big Four currency country issuer, sourced from the IMF Direction of Trade statistics, spanning *Trade with US*, *Trade with euro area*, *Trade with Japan*, and *Trade with UK*. The distribution of countries included in the full sample disproportionately represents Europe, and implies higher trade shares with the euro area and lower trade shares with the United States compared with other regions. Currency composition of external debt is the share of each country's external debt service payments denominated in US dollars and euros, *Dollar debt share* and *Euro debt share*, sourced from the World Bank International Debt Statistics (IDS). Across countries, dollars are the dominant currency of denomination of external debt, but the dollar shares have evolved over time with country conditions and institutional strength in line with evidence on "original sin" and market access in external finance. Summary statistics are presented in Table A1.

We introduce series that proxy relative returns on currencies for official portfolios, indicate the investment tranche (versus liquidity tranche) share of official reserves, and indicate the zero lower bound period. First, Shadow Short Interest Rate (SSR) measures the stance of monetary policy in the presence of a zero lower bound environment from Krippner (2016) and available from LJK Macro Finance Analysis for all Big Four currencies, represented by *US shadow rate* and *EA shadow rate*. A Zero Lower Bound (ZLB) indicator variable is constructed for the US and euro area and takes on the value of one if the shadow rate is at or below zero, and the value is zero

[15]Table A2 provides details on the span of countries, sorted by size of foreign exchange reserve portfolios in 2015. For insights into this data, we also present the scale of reserves by country in 2021, and indicate US dollar reserve shares using these indicated sources, noting whether those shares are in Ito and McCauley (2020),Arslanalp, Eichengreen, and Simpson-Bell (2022), and in our final sample used in estimation.

otherwise. As nontraditional reserve currencies entered official portfolios in the post GFC time frame, we construct a measure of nontraditional Reserve Currency (NRC) return to consider this as a driver of potentially lower US dollar shares in portfolios. Nontraditional reserve currency return, *NRC return*, is calculated by taking a weighted average of 5-year government bond yields from Australia, Canada, and South Korea with weights of 40%, 45%, and 10%, respectively.[16] A nontraditional reserve currency differential *NRC return differential* is calculated by subtracting the U.S. 5-Year yield from the nontraditional reserve currency return. In addition, for robustness checks, we construct a risk-adjusted return measure as a Sharpe Ratio measure computed by dividing yearly excess returns of nontraditional reserve currencies by the yearly standard deviation of excess returns of NRCs. Patterns in these returns are presented in Figure 3.

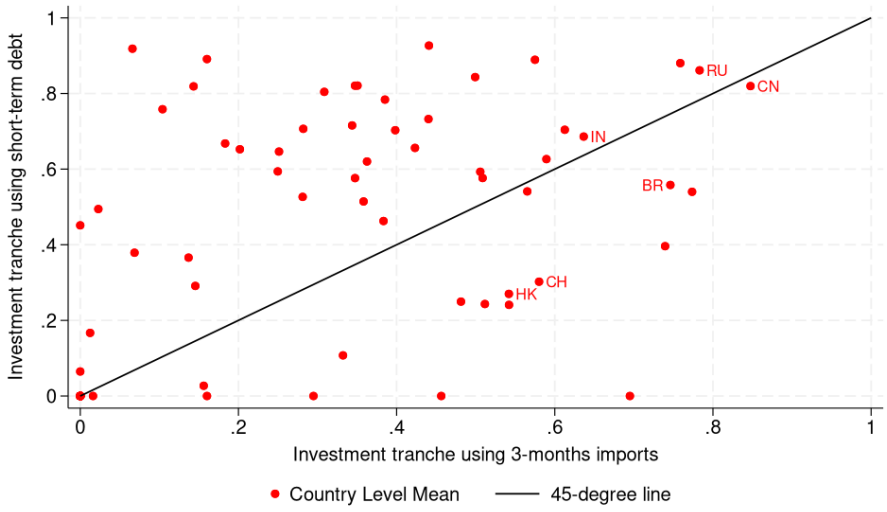
Figure 3: Nontraditional Reserve Currency Interest Rate Differential



Source: Author's construction using data from the Reserve Bank of Australia, Central Bank of Canada, Bank of Korea, United States Treasury, and LJF Macro Analysis.

[16] Weights are derived from Table 5, on nontraditional reserve currencies in global foreign exchange reserves, end-2020 from Arslanalp, Eichengreen, and Simpson-Bell (2022).

Figure 4: Investment Tranche Using Imports or Short-Term Debt



Source: Author's construction using data from the BIS JEDH and the IMF IFS.

Our measure of the share of the official reserves portfolio in the investment tranche is a residual (share) in excess of the liquidity tranche proxied in two alternative ways. We leverage the World Bank Joint External Data Hub (JEDH) to obtain short-term debt data. For each country we define short-term debt as the sum of short-term liabilities to BIS banks and short-term international debt securities by year (in millions of dollars). Bussière, Cheng, Chinn, and Lisack (2015) find that countries with higher reserves saw a smaller decline in growth during the great recession, with the ratio of reserves to short-term debt being the most significant reserve adequacy ratio. The second measure is the traditional indicator of reserve adequacy constructed using 3 months of total goods and services imports.[17] A survey of reserve managers conducted by UBS corroborates this measurement of reserve adequacy citing the two most prevalent ways reserve managers measure their reserve adequacy as months or percentages of imports and as percentage of short-term external debt (Castelli and Salman, 2022).

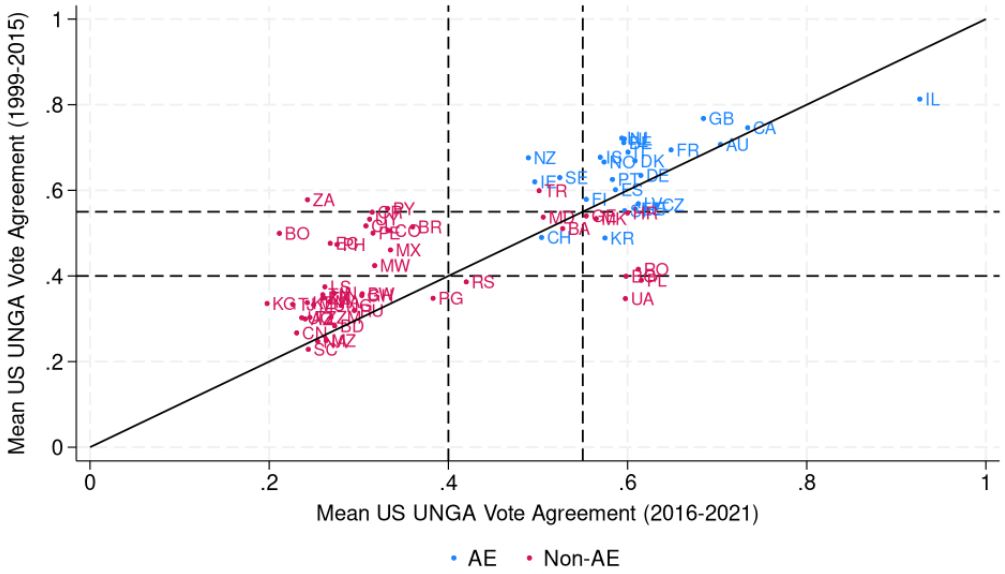
Accordingly, equation 7 is computed either using short-term debt or imports, and both measures are considered in respective regression specifications for the roles of the piecewise $InvTr_t^c$.[18] The two types of investment tranche variables are positively correlated, but not tightly aligned, as shown in Figure 4.

The final data items are geopolitical series, representing a measure of geopolitical alignment with

[17] Yearly totals are divided by four to create a measure of 3 month total imports (in millions of US dollars) sourced from the IMF International Financial Statistics (IFS).

[18] While the IMF publishes reserve adequacy metrics, we opt not to use it for our estimates due its scarce coverage of advanced economies.

Figure 5: Country Voting Alignment with United States at UNGA



Source: Author's construction using data from the UN General Assembly voting data described in Voeten, Strezhnev, and Bailey (2009).

or distance from the United States. The first series is an annual series for the percent of voting in line with the United States on resolutions in the United Nations General Assembly (UNGA) with the original source as Mosler and Potrafke (2020) and Voeten, Strezhnev, and Bailey (2009). Patterns in alignment for the period from the late 1990s through 2015, shown on the vertical axis, are positively correlated with, but also higher for, emerging market countries compared to alignment in the period from 2016 onwards. We use thresholds from observing the data of Figure 5 for assigning countries into discrete groups of voting alignment, which has the advantage of being less sensitive to the specific items brought up for voting at different points in time. Similarly, Table A3 contains a time-invariant binning of countries, using the median annual US vote agreement over the full sample period. Countries in the *Low US UN Vote Agreement* group have a median US UNGA vote agreement below 0.4, while *Medium* is between 0.4 and 0.55, and *High*, greater than 0.55. Associated regressions introduce the *Low* and *Medium* using a time-varying 3 year moving average of US UNGA vote agreement according to the above thresholds. The effects of residual country-time observations are included in constant terms of regression specifications.

We also introduce variables to reflect whether countries are subject to financial sanctions imposed by the United States during specific years, using data from Syropoulos, Felbermayr, Kirilakha, Yalcin, and Yotov (2022) and Kirikakha, Felbermayr, Syropoulos, Yalcin, and Yotov (2021). The incidence of financial sanctions in our sample is presented in Table A5. Sanctions are defined as

binding restrictive measures applied by individual nations, country groups, the United Nations, and other international organizations with the intent of inducing a change in behavior, or a constraint in action, from the targeted country towards the targeted country. Financial sanctions, specifically, are restrictive measures conducted with the intent of restricting, or exerting pressure, on the sanctioned party through financial means. Examples of financial sanctions include freezing foreign assets, restricting direct investment, and reducing the availability of credit for payments in the exchange of commodities. Additionally, recent decades have seen a rise in the prominence of sanctions imposed via infrastructures and institutions, like SWIFT, giving rise to a particularly disruptive mode of financial sanctions as described in Cipriani, Goldberg, and La Spada (2023). Twenty seven countries have, at times, been subject to US (and sometimes joint with other countries) financial sanctions in our sample [19].

4 Regression Results: Drivers of US Dollar Share of Reserves

US dollar shares in portfolios across countries and over time have been well informed by prior analytical work. We use Arslanalp, Eichengreen, and Simpson-Bell (2022) specifications and data as our jumping off point and then introduce differences in data inclusion and empirical methods in order to create a new baseline specification. Most of our baseline results align with their findings, however differences in in our baselines stem from the composition of countries and time period included for estimation. The baseline work is followed by specific tests of the roles of new conjectured drivers.

Baseline. The changes that we introduce are sequenced through the respective columns of Table 3. Column (1) exactly replicates the Arslanalp, Eichengreen, and Simpson-Bell (2022) dollar share results, showing the importance for country portfolio allocations of currency pegs, trade with different countries, external debt shares, and being within the euro area. Our first modification is dropping the United States from the estimation sample. Shown in column (2), this exclusion sharply reduces the coefficient on trade with the United States, and raises the marginal significance of trade with the euro area. Columns (3) and (4) are more about the regression specification, first dropping year fixed effects and then considering an ordinary least squares (OLS) estimator in lieu of the Tobit estimator. These changes do not have incremental material effects.

We also observe that the inclusion of yen and pound debt shares in the initial specification led to a significant decline in the country observations included in the analytics. Accordingly, Table 3 columns (5) through (7) replicate columns (2) to (4), except now excluding yen and

[19] Table A5 describes the full coverage of financial sanctions in our estimation.

pound debt shares. This modification adds 14 countries and about 350 country-year observations to the specifications and generates significant differences in the pattern of significance across explanatory variables. *Trade with US* is not statistically important, while *Trade with Euro Area* has a more prominent role in reducing dollar shares of country portfolios. The importance of financial considerations through dollar debt share and euro debt share are elevated, now entering with positive signs and stronger statistical significance, consistent with financial arguments about reserve composition to meeting financial liquidity needs of countries. This type of change in result is consistent with the observations from Section 2 that the composition of countries in the analytical sample matters for the interpretation of dollar share evolution over time. Finally, column (8) presents the incremental effects of including 122 additional country-year observations made feasible by data updates at least through 2021 for most countries by Ito and McCauley (2020) and the inclusion of some additional earlier observations that were not previously available. Inclusion of these extra observations (with updates to all other input series) does not materially change results relative to columns (5) through (7).

Countries hold a higher share of reserves in dollars as their share of debt denominated in dollars increases. The exchange rate regime matters significantly, as countries that *de facto* peg to the dollar hold a higher share of dollars, while those that *de facto* peg to a currency beside dollar tend to hold lower shares of dollars. Compared with Arslanalp, Eichengreen, and Simpson-Bell (2022), our baseline results yield larger roles in driving reserve portfolio allocations to financial variables like the share of US dollar and euro currencies in country debt, and weaker roles for the US share of country trade. Geographic proximity is also important, with a particular role for closeness to the euro area in raising euros shares in country portfolio while lowering dollar shares, all else equal. Official liquidity holdings from strategic allocations tilt portfolios towards the currencies where it is needed, consistent with potential interventions when exchange market pressure is high (Goldberg and Krogstrup, 2023). This final column (8) serves as our baseline empirical model, and will be used as a jumping off point for testing the new conjectures on additional contributions of portfolio returns, investment versus liquidity tranches, and geopolitical contributions.

Table 3: Baseline specification for US dollar share of official foreign currency reserves

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
U.S. dollar share of official reserves								
Dollar peg	0.104***	0.0856***	0.0869***	0.0853***	0.129***	0.130***	0.129***	0.118***
	(5.23)	(4.67)	(4.47)	(4.42)	(7.63)	(7.35)	(7.34)	(7.02)
Euro peg	-0.424***	-0.421***	-0.407***	-0.404***	-0.395***	-0.391***	-0.376***	-0.353***
	(-14.70)	(-15.19)	(-14.73)	(-14.83)	(-18.80)	(-18.56)	(-19.52)	(-17.89)
Other peg	-0.141***	-0.152***	-0.126***	-0.126***	-0.153***	-0.140***	-0.140***	-0.160***
	(-3.65)	(-4.27)	(-3.38)	(-3.34)	(-4.36)	(-3.74)	(-3.72)	(-4.15)
Trade with US	1.034***	0.457***	0.482***	0.484***	0.0562	0.0706	0.0735	0.0846
	(6.17)	(4.01)	(4.49)	(4.47)	(1.17)	(1.41)	(1.47)	(1.72)
Trade with Euro Area	-0.156	-0.212*	-0.253**	-0.248**	-0.282***	-0.293***	-0.289***	-0.338***
	(-1.76)	(-2.50)	(-3.02)	(-2.94)	(-4.70)	(-5.01)	(-4.95)	(-5.95)
Trade with Japan	-1.037*	0.343	0.256	0.252	-0.203	-0.251	-0.255	-0.302
	(-2.57)	(1.17)	(0.85)	(0.84)	(-0.88)	(-1.11)	(-1.13)	(-1.39)
Trade with UK	-1.283*	-0.817	-0.731	-0.709	-0.521*	-0.517*	-0.475	-0.654**
	(-2.03)	(-1.43)	(-1.30)	(-1.25)	(-2.02)	(-2.08)	(-1.94)	(-2.77)
Dollar debt share	-0.189*	0.0557	0.0819	0.0838	0.191***	0.197***	0.197***	0.197***
	(-2.46)	(0.91)	(1.33)	(1.35)	(7.31)	(7.58)	(7.78)	(7.86)
Euro debt share	-0.184*	-0.0243	0.00785	0.00457	0.0677*	0.0759*	0.0668*	0.0710*
	(-2.08)	(-0.31)	(0.10)	(0.06)	(2.16)	(2.48)	(2.25)	(2.52)
Yen debt share	-0.0210	-0.165	-0.196	-0.195				
	(-0.17)	(-1.41)	(-1.64)	(-1.62)				
Pound debt share	-2.920	-3.889	-4.211*	-4.242*				
	(-1.21)	(-1.90)	(-2.04)	(-2.03)				
Euro Area dummy	0.256***	0.268***	0.278***	0.279***	0.313***	0.317***	0.317***	0.353***
	(6.26)	(6.76)	(7.34)	(7.32)	(13.70)	(14.16)	(14.29)	(16.82)
Constant	0.735***	0.548***	0.630***	0.628***	0.544***	0.553***	0.552***	0.573***
	(7.33)	(7.02)	(11.88)	(11.78)	(8.85)	(16.80)	(16.95)	(17.62)
N obs	696	675	675	675	1030	1030	1030	1160
N countries	62	61	61	61	75	75	75	75
Year FE	Yes	Yes	No	No	Yes	No	No	No
Estimation Method	Tobit	Tobit	Tobit	OLS	Tobit	Tobit	OLS	OLS
US included	Yes	No	No	No	No	No	No	No
GBP and JPY Debt Shares	Yes	Yes	Yes	Yes	No	No	No	No
Extended Sample	No	No	No	No	No	No	No	Yes

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Arslanalp, Eichengreen, and Simpson-Bell (2022) baseline is specification (1). Specification (2) drops observations for the US. Specifications (5) - (8) drop yen debt share and pound debt share, accordingly adding observations for the following countries: Australia, Belgium, Canada, Chile, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Korea Rep, Luxembourg, Namibia, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom, and Uruguay. Our baseline specification (8) includes an extended sample through 2021, and with added prior country-time observations.

Initial contributions of new explanatory variables. Before testing conjectures, we present the results of contributions to the US dollar share specifications from new explanatory variables. Table 4 shows sequential findings using a waterfall view of regressions to the baseline reproduced in column (1).

Table 4 columns are first screened for statistical significance and increments to the adjusted R^2 of specifications. Column (2) shows that the non-traditional reserve currency (NRC) return is not statistically important, although the sign is consistent with the interpretation that higher NRC returns are associated with marginally lower shares of dollars in country portfolios. Column (3) shows that the NRC reserve returns relative to US dollar returns are a more significant contributor. Likewise, column (4) provides a potential role for reserve portfolios to tilt across dollars with euros, depending on the returns across these currencies and with shadow interest rates introduced to capture more unconventional monetary policy, finding that the dollar share rises with higher US returns, and declines with higher euro area returns. The overall explanatory power of the regression is little changed. The results are similar for introducing zero lower bound indicators for the US and euro area (column 5).

Columns (6) and (7) introduce the two alternative ways of measuring the size of the investment tranche of official reserve portfolios. Both measures are correlated with other regression variables and change the size of coefficients. The investment tranche construction in particular raises the R^2 of specifications, with the tranche constructed using imports data also statistically significant, while increasing the precision of estimates on trade and debt share estimates. Columns (8) present a first pass at introducing the roles of geopolitical variables. First, when country observations are placed in buckets of low or middle voting alignment, there is strong statistical significance for low alignment countries, relative to the baseline of high alignment countries. The positive sign on this term shows the importance of investigating mechanisms further, as the lower political alignment countries have higher dollar share, on the margin, all else equal. The coefficients of other regression coefficients also change. The last column introduces financial sanctions application, with this term neither entering with statistical significance or adding explanatory power to specifications.

Table 4: Baseline for USD share of official foreign exchange reserves, with waterfall of added determinants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
U.S dollar share of official reserves									
NRC return		-0.325							
		(-0.79)							
NRC return differential			-2.519***						
			(-3.68)						
US shadow rate				1.037***					
				(3.82)					
EA shadow rate				-0.784*					
				(-2.34)					
US ZLB					-0.041***				
					(-3.66)				
EA ZLB					0.012				
					(0.99)				
InvTr						0.101***	0.044		
						(4.17)	(1.83)		
Low US UN vote agreement								0.110***	
								(6.70)	
Middle US UN vote agreement								-0.014	
								(-0.94)	
Financial sanction									0.025
									(1.51)
Constant	0.573***	0.580***	0.592***	0.573***	0.591***	0.563***	0.624***	0.494***	0.574***
	(17.62)	(17.98)	(18.51)	(17.32)	(16.78)	(17.15)	(15.97)	(14.27)	(17.72)
N obs	1160	1160	1160	1160	1160	1144	1052	1137	1160
N countries	75	75	75	75	75	75	70	74	75
R2	0.54	0.54	0.54	0.54	0.54	0.55	0.57	0.55	0.54
Adj R2	0.53	0.53	0.54	0.54	0.54	0.54	0.56	0.55	0.53
AIC	-550.53	-549.20	-562.03	-560.36	-560.18	-566.57	-540.11	-572.12	-550.78
BIC	-494.91	-488.52	-501.36	-494.63	-494.45	-506.07	-480.61	-506.65	-490.11
Tranche Measure	N/A	N/A	N/A	N/A	N/A	Imports (3M)	ST Debt	N/A	N/A
p-val: b[Low UN] = b[Medium UN]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: All variables from Table 3 column (8) are included in these specifications. Specifically these are: *Dollar peg*, *Euro peg*, *Other peg*, *Trade with US*, *Trade with Euro Area*, *Trade with Japan*, *Trade with UK*, *Dollar debt share*, *Euro debt share*, *Yen debt share*, *Pound debt share*, and *Euro Area dummy*.

Conjectures for Nontraditional Reserve Currency Returns. We conjecture that the share of official reserve assets allocated to US dollar assets will be lower when returns on al-

ternative currencies are higher. We test this point, and that this tilt could be magnified in a low US dollar interest rate environment or at the zero lower bound, or when foreign exchange reserve managers have a larger investment tranche. Table 5 presents the results of related tests. A parallel set of testing results (Table A8) instead utilize a risk-adjusted nontraditional reserve currency return constructed as a Sharpe Ratio measure computed by dividing yearly excess returns of nontraditional reserve currencies by the yearly standard deviation of excess returns of NRCs. Text tables present only results for the relevant variables, and suppress reporting of the estimated coefficients on the traditional drivers of US dollar share. The full specifications are provided in Appendix materials. All specifications shown use OLS estimation, and have columns that vary over which investment tranche is utilized (using 3 months of imports or short term debt criteria).

Statistically significant roles of NRC returns appears in Table 5 columns (1) and (4). A higher return on NRCs works in the direction of reducing the dollar share of the central bank reserves portfolio, consistent with the conjecture of substituting away from dollars in this situation. However, the size and significance of this type of effect are not large or robust across specifications. The main increase in regression explanatory power comes from having investment tranches included in the specifications. NRC return differentials *per se* do not contribute much explanatory power, and are only weakly magnified when countries have higher investment tranches of their portfolios using the debt criteria and do not have magnified consequences at the US zero lower bound. Specifications using the risk-adjusted nontraditional reserve currency return yield similar results.

Conjectures for Traditional Reserve Currency Returns. Conjecture 1 also considers whether the US dollar shares of portfolios rise with US asset returns, and decline with higher euro area returns. Such results could be due to active portfolio investment decisions, or could be passive results if managers do not optimize portfolios to return to *ex ante* strategic targets. The roles of returns could potentially be different in periods of low interest rates or at the zero lower bound, or stronger on the investment tranches of official portfolios. Columns of Table 6 explore the potential interactions. A first observation is that the shadow rate on euro assets does not play a significant role on dollar shares in central bank portfolios. The US shadow rate, however, consistently enters with a positive sign (column 1), and it's importance is weakly magnified on the investment tranche of portfolios when the investment tranche is computed using short term debt (column 4). The shadow rates do not enter with altered significance at the zero lower bound. Quantitatively, these traditional reserve currency returns do not appear as important drivers of portfolio allocations.

Table 5: USD share of foreign exchange reserves and nontraditional reserve currency returns

	(1)	(2)	(3)	(4)	(5)	(6)
U.S dollar share of official reserves						
NRC return differential	-2.361***	-2.219	-1.364	0.457	-1.688*	-1.330
	(-3.46)	(-1.96)	(-1.91)	(0.38)	(-1.98)	(-1.24)
InvTr	0.098***	0.101***	0.041	0.066*		
	(4.08)	(3.49)	(1.72)	(2.48)		
InvTr x NRC return differential		-0.469		-4.642*		
		(-0.18)		(-2.26)		
US ZLB					-0.025	-0.017
					(-1.78)	(-0.84)
NRC return differential x US ZLB						-1.001
						(-0.58)
Constant	0.581***	0.580***	0.632***	0.626***	0.602***	0.602***
	(17.96)	(17.28)	(16.21)	(16.17)	(18.41)	(18.42)
N obs	1144	1144	1052	1052	1160	1160
N countries	75	75	70	70	75	75
R2	0.55	0.55	0.57	0.57	0.54	0.54
Adj R2	0.55	0.55	0.57	0.57	0.54	0.54
AIC	-576.63	-574.67	-541.78	-544.95	-563.35	-561.71
BIC	-511.08	-504.07	-477.32	-475.53	-497.62	-490.92
Tranche Measure	Imports (3M)	Imports (3M)	ST Debt	ST Debt	N/A	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: All variables from Table 3 column (8) are included in these specifications. Specifically these are: *Dollar peg*, *Euro peg*, *Other peg*, *Trade with US*, *Trade with Euro Area*, *Trade with Japan*, *Trade with UK*, *Dollar debt share*, *Euro debt share*, *Yen debt share*, *Pound debt share*, and *Euro Area dummy*.

Table 6: USD share of foreign exchange reserves and reserve currency returns

	(1)	(2)	(3)	(4)	(5)	(6)
U.S dollar share of official reserves						
US shadow rate	1.065***	1.209**	0.827**	0.159	0.529	0.628
	(3.94)	(2.76)	(2.94)	(0.36)	(1.11)	(0.93)
EA shadow rate	-0.590	-0.665	-0.168	0.408	-0.656	-0.426
	(-1.74)	(-1.25)	(-0.48)	(0.72)	(-1.09)	(-0.38)
InvTr	0.104***	0.107***	0.044	0.032		
	(4.22)	(4.25)	(1.86)	(1.31)		
InvTr x US shadow rate		-0.503		1.707*		
		(-0.50)		(2.14)		
InvTr x EA shadow rate		0.247		-1.423		
		(0.21)		(-1.44)		
US ZLB					-0.027	-0.034
					(-1.30)	(-1.54)
EA ZLB					-0.002	-0.021
					(-0.10)	(-0.66)
US shadow rate x US ZLB						-0.819
						(-0.78)
EA shadow rate x EA ZLB						-1.356
						(-0.93)
Constant	0.565***	0.565***	0.629***	0.635***	0.589***	0.586***
	(16.98)	(16.97)	(15.87)	(15.86)	(15.43)	(14.52)
N obs	1144	1144	1052	1052	1160	1160
N countries	75	75	70	70	75	75
R2	0.55	0.55	0.57	0.57	0.54	0.54
Adj R2	0.55	0.55	0.57	0.57	0.54	0.54
AIC	-577.11	-573.35	-545.75	-546.14	-558.29	-556.51
BIC	-506.52	-492.67	-476.33	-466.81	-482.44	-470.56
Tranche Measure	Imports (3M)	Imports (3M)	ST Debt	ST Debt	N/A	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS

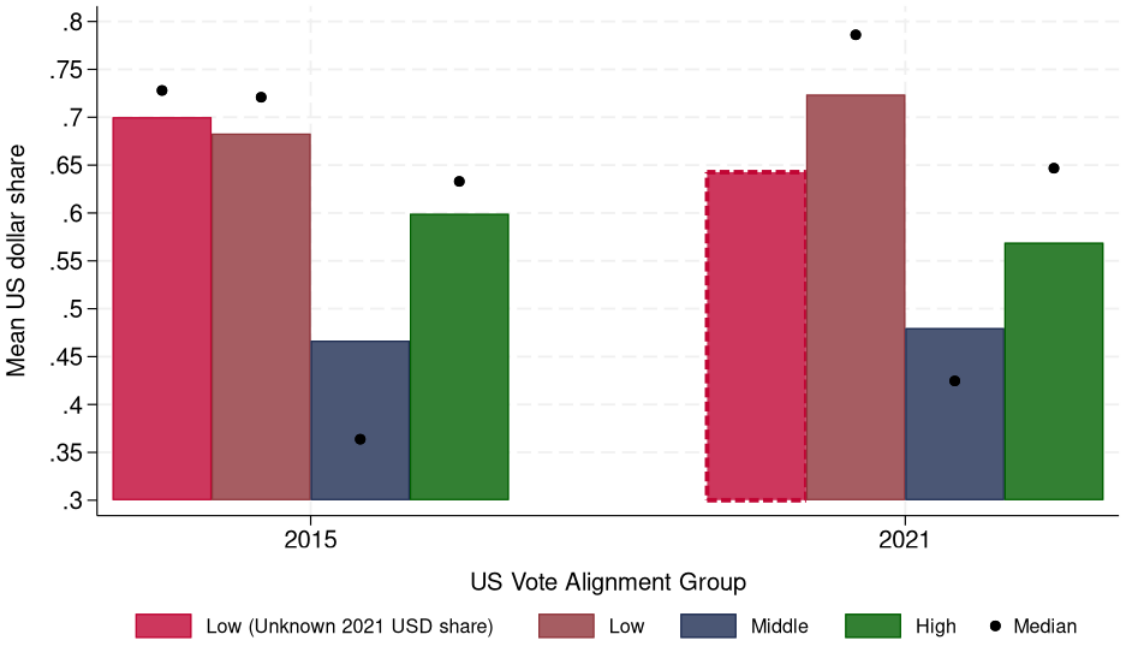
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: All variables from Table 3 column (8) are included in these specifications. Specifically these are: *Dollar peg*, *Euro peg*, *Other peg*, *Trade with US*, *Trade with Euro Area*, *Trade with Japan*, *Trade with UK*, *Dollar debt share*, *Euro debt share*, *Yen debt share*, *Pound debt share*, and *Euro Area dummy*.

Conjectures for Geopolitical Drivers. The final set of tests consider the roles of geopolitical considerations, both reflecting distance from the United States. First, for context, voting group and dollar shares patterns are visualized in Figure 6. These exhibits show unweighted average dollar portfolio shares of countries. As dollar shares are missing for 2021 for some countries, we present separate bars for the countries where there is data on shares across the two dates versus those without data in 2021. For this latter group, we use the logic of equations (1) and (4), and construct an estimate of the weighted average dollar share for the group with unknown shares in 2021. The majority of unknown observations for 2021, and the vast majority of reserves of this group, are in the *Low* alignment group, so we assign the resulting value to this category and the red bar for 2021 (in contrast to unweighted averages for the other bars). The mean US dollar portfolio shares of High alignment countries are lower and for the Middle alignment group countries slightly higher. Low alignment group countries with known US dollar share in 2021 increased their (unweighted) dollar shares over time, while estimated (weighted) 2021 US dollar share for countries with unknown 2021 values may have declined by 5 percentage points.

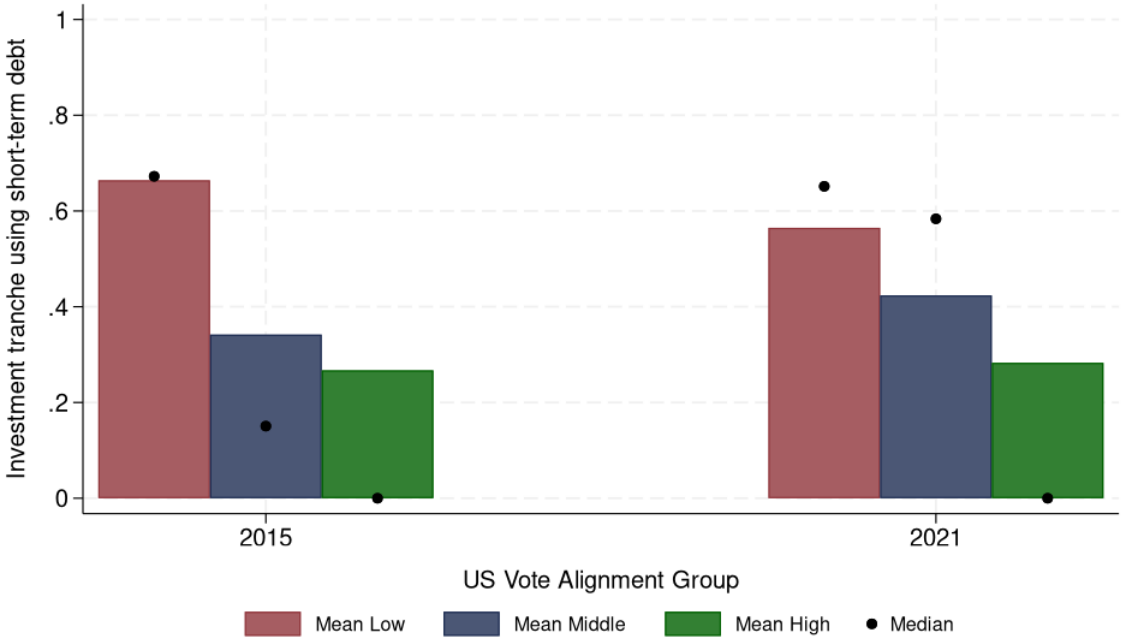
Figure 6: Average US dollar share, by US UN Vote alignment group



Source: Author's construction using country-level US dollar share data from Ito and McCauley (2020) with additional observations from Arslanalp, Eichengreen, and Simpson-Bell (2022) and UN General Assembly voting data described in Voeten, Strezhnev, and Bailey (2009). Dashed bar outline indicates estimated quantity.

Additional context for geopolitical results is provided by considering the relative size of the investment tranches for countries sorted according to geopolitical alignment with the United States. Using unweighted averages, Figure 7 shows that the investment tranche share tends to be highest for the *Low* voting alignment group. This type of observation reinforce the potential relevance of having regression specifications that introduce geopolitical considerations in relationship to a portion of reserves that might have differential treatment by portfolio managers.

Figure 7: Investment tranche using short-term debt, by US UN Vote alignment group



Author's construction using short-term debt data from the BIS Joint External Debt Hub (JEDH) and UN General Assembly voting data described in Voeten, Strezhnev, and Bailey (2009).

The empirical results provided in columns of Table 7 respectively introduce the alternative geopolitical alignment terms independently, then interacted with investment tranches, and with or without controls for nontraditional returns or U.S. shadow rates[20]. The most interesting results from these specifications arise from columns (1) and (3). Column (1) results show statistical significance of voting alignment wherein the *Low* alignment countries are distinguished from other countries. On average, the *Low* US UN Vote Agreement group of countries tends to hold *higher*, not *lower*, shares of dollars relative to the *High* group, while the *Middle* group is slightly but not significantly holding lower dollar shares than *High*. Indeed, tests of equality of coefficients

[20]Our preferred specifications, provided in this table, bucket countries into *Low*, *Medium*, or *High* voting alignment with the United States. Specifications using a continuous voting measure provide weaker results and are provided in Table A11.

between *Low* and *Middle* vote agreement groups are rejected across all specifications in our main results.Building on the visual representation from Figure 6, the differences between middle alignment countries and high alignment countries are not statistically significant once controls are in place for the other drivers of portfolio choice.

Columns (2) and (3) of Table 7 consider interactions with the investment tranche share of country portfolios, alternatively constructed using import shares or short-term debt. While both forms enter with a negative sign, statistical significance is clear only with the short-term debt investment tranche construct. Columns (4) and (5) show that these particular relationships are unchanged when nontraditional returns or US interest rates are included in specifications along with investment tranche considerations.

These results provide an interesting and novel insight into the role of geopolitical considerations for official reserve portfolio allocations to US dollar assets. Countries with low geopolitical alignment with the United States have higher dollar shares of portfolios compared with other countries included in the regression analytics. These countries also tend to have higher investment tranches as shares of their reserve portfolios, especially relative to higher alignment countries. Comparing coefficient on low agreement non-interacted (0.24) and interacted with investment tranche (-0.21), countries with low alignment with the US only appear to move away from dollar share in portfolios when the investment tranche share is significantly higher. However, descriptive statistics for investment tranche share show the median for this group of Low alignment countries is close to 70 percent. The countries with higher reserves can reduce some of the "excess" share of portfolios held in dollars, but cannot eliminate this gap. The low alignment may be associated with overall worse access to external funding markets in US dollars, leading countries to have higher dollar shares even while accumulating more reserves.

We perform similar analytics that instead use financial sanctions as an alternate measure of geopolitical alignment. Financial sanctions are a country-year level indicator variable indicating if a country had a financial sanction imposed by the United States: 183 financial sanction observations that overlap with the coverage of US dollar portfolio shares enter our estimation sample with values equal to 1 (Table A5). Financial sanction incidence *per se* is not correlated with dollar share of portfolios after controlling for other regression drivers. The incidence of financial sanctions is only statistically important when defined using short-term imports, with patterns consistent with the voting agreement results: sanctioned countries have higher dollar shares, or close to otherwise predicted values when investment tranche is in the range of median values for low alignment countries (Table A12). Compared with the geopolitical indicators, financial sanctions indicators are not as robustly related to dollar shares of reserve portfolios.

Table 7: USD share of foreign exchange reserves and geopolitical alignment

	(1)	(2)	(3)	(4)	(5)
U.S dollar share of official reserves					
Low US UN vote agreement	0.110***	0.105***	0.236***	0.240***	0.228***
	(6.20)	(4.14)	(7.73)	(7.88)	(7.33)
Middle US UN vote agreement	-0.014	-0.016	-0.010	-0.017	-0.012
	(-0.93)	(-0.82)	(-0.56)	(-0.92)	(-0.62)
InvTr		0.075	0.081*	0.105**	0.077*
		(1.61)	(2.42)	(3.05)	(2.32)
InvTr x Low US UN vote agreement		-0.013	-0.209***	-0.207***	-0.202***
		(-0.21)	(-4.20)	(-4.15)	(-4.02)
InvTr x Middle US UN vote agreement		0.014	-0.006	0.022	-0.009
		(0.24)	(-0.13)	(0.50)	(-0.20)
NRC return differential				1.612	
				(1.48)	
InvTr x NRC return differential				-6.354**	
				(-3.10)	
US shadow rate					0.072
					(0.20)
InvTr x US shadow rate					1.056
					(1.48)
Constant	0.494***	0.490***	0.546***	0.542***	0.553***
	(14.46)	(13.43)	(14.07)	(13.94)	(14.14)
N obs	1137	1121	1029	1029	1029
N countries	74	74	69	69	69
R2	0.55	0.56	0.60	0.60	0.60
Adj R2	0.55	0.55	0.59	0.60	0.59
AIC	-572.12	-573.29	-587.06	-594.53	-588.78
BIC	-506.65	-492.94	-508.08	-505.68	-499.93
Tranche Measure	N/A	Imports (3M)	ST Debt	ST Debt	ST Debt
Estimation method	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: All variables from Table 3 column (8) are included in these specifications. Specifically these are: *Dollar peg*, *Euro peg*, *Other peg*, *Trade with US*, *Trade with Euro Area*, *Trade with Japan*, *Trade with UK*, *Dollar debt share*, *Euro debt share*, *Yen debt share*, *Pound debt share*, and *Euro Area dummy*.

5 Concluding remarks

Countries hold official foreign exchange reserve portfolios to meet liquidity and international capital needs in the event of disruptions to market access or for spot foreign exchange intervention purposes. While the majority of official reserve holdings is allocated to assets in the big four currencies (dollars, yen, euros, pounds), commentary has tended to focus on the reduced share of US dollar assets in an aggregate from across countries as an indicator of a declining role of the dollar in the international monetary system. Our analytics provide a more nuanced, and somewhat different, interpretation of the aggregates. The analytics rely on country-level data on official reserves and estimates of portfolio composition, a simple and intuitive accounting approach, and regression analysis.

First, we show that across individual countries there has not been a widespread shift in portfolio composition away from US dollar asset shares in central bank reserves. Instead, the declines in the aggregate dollar share of COFER from 2015 through 2021 has been driven by a combination of factors. One factor is reserve accumulation by countries with a lower *ex ante* dollar share. Most notably, Switzerland accumulated nearly $500 billion of additional reserves as a result of managing monetary policy and accumulating euros. The broader message is that large portfolio size changes upward or downward by countries with different portfolio allocations than the average across countries will tend to tilt global aggregates of the dollar share of reserve portfolios. This is a basic mechanical result, rather than a shift in preferences around holding US dollar assets.

Looking across a broad set of countries the data show a distribution of increases and decreases in dollar portfolio shares, not a systematic decline in shares across countries. A few countries with low geopolitical alignment with the U.S. are responsible for much of the decline in dollar shares. In addition, proximity to the euro area in trade and debt continues to tilt some portfolios away from dollars. By contrast, the relative returns on sovereign assets – whether of traditional or nontraditional reserve currencies – have not played a large role in portfolio tilts. Geopolitical considerations do play a role in some of the longer term regression analytics, with these considerations driving some movement away from dollar assets mainly when country reserve portfolios are already large enough to meet their potential foreign currency liquidity needs. These countries start out with higher than average dollar shares in their portfolios.

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A Appendix

Table A1: Summary statistics: all variables

	Mean	Median	Min	Max	SD
U.S dollar share of official reserves	0.59	0.62	-0.09	1.26	0.28
Dollar peg (0-1)	0.08	0.00	0.00	1.00	0.27
Euro peg (0-1)	0.11	0.00	0.00	1.00	0.31
Other peg (0-1)	0.02	0.00	0.00	1.00	0.15
Share of trade with US	0.08	0.05	0.01	0.74	0.10
Share of trade with Euro Area	0.31	0.29	0.01	0.80	0.20
Share of trade with Japan	0.03	0.02	0.00	0.17	0.03
Share of trade with UK	0.04	0.03	0.00	0.20	0.03
Dollar debt share	0.49	0.54	0.00	1.00	0.32
Euro debt share	0.30	0.16	0.00	1.00	0.34
Euro Area (indicator)	0.17	0.00	0.00	1.00	0.38
US shadow rate	0.00	0.00	-0.04	0.06	0.02
EA shadow rate	-0.00	-0.01	-0.03	0.04	0.02
US UN vote agreement share	0.44	0.46	0.09	0.97	0.18
Financial sanction (0-1)	0.43	0.00	0.00	1.00	0.50
Investment tranche with short term debt	0.39	0.43	0.00	1.00	0.35
Investment tranche with 3-months imports	0.29	0.27	0.00	0.89	0.27
NRC return differential (percentage)	0.01	0.00	-0.01	0.02	0.01
NRC return (percentage)	0.03	0.02	0.01	0.07	0.01
Risk adjusted NRC return	2.83	2.15	-4.07	12.24	4.39
Observations	1160				

Notes: Statistics across the full sample consist of 75 countries, with observations at the year-country level. Most countries do not have observations that span the full 1999-2021 period. Indicator variables take on a value of either 0 or 1.

Table A2: Country Coverage in USD Share

Country-year Observations				USD Share		FX Reserves ($Bil)	
Country	C-I-M	A-E-S	G-H	2015	2021	2015	2021
China	1	3	3	0.58	N/A	3330.36	3250.17
Switzerland	16	16	16	0.32	0.39	560.63	1033.80
Hong Kong, China	23	22	23	0.87	0.87	358.66	496.73
Korea, Rep.	15	14	15	0.67	0.68	358.51	438.32
Brazil	20	19	20	0.84	0.82	348.86	330.86
India	3	3	3	0.58	N/A	327.84	569.89
Russian Federation	15	14	15	0.43	0.14	309.39	468.07
Mexico	0	1	1	N/A	N/A	168.37	180.77
United Kingdom	22	22	22	0.40	0.46	101.59	127.80
Turkey	14	14	14	0.81	N/A	91.43	63.18
Poland	21	20	21	0.39	0.36	89.42	145.15
Israel	11	10	11	0.68	0.67	88.94	208.32
Philippines	16	16	17	0.89	0.91	72.35	94.72
Canada	19	18	19	0.68	0.70	69.08	78.15
Czech Republic	23	22	23	0.15	0.25	62.63	168.67
Denmark	23	22	23	0.00	0.00	60.10	70.64
Peru	22	21	22	0.77	0.71	59.40	71.44
Norway	21	21	21	0.53	0.54	54.58	75.33
Sweden	23	22	23	0.08	0.42	49.83	43.62
Colombia	22	21	22	0.89	0.87	44.78	53.47
South Africa	18	17	18	0.50	0.62	38.92	43.15
Spain	23	22	23	0.94	0.67	38.71	54.86
Chile	22	22	23	0.72	0.71	37.21	47.13
Australia	23	22	23	0.55	0.55	37.19	37.42
Germany	21	20	21	0.92	0.86	36.39	36.98
France	4	3	4	N/A	0.81	36.37	53.63
Romania	23	22	23	0.12	0.33	35.16	41.99
Italy	17	16	17	0.68	0.71	34.44	48.60
Nigeria	6	6	6	0.84	N/A	25.96	34.91
Bangladesh	16	15	16	0.83	0.86	25.80	42.85
Morocco	0	5	5	0.40	N/A	21.14	32.10
Bulgaria	23	22	23	0.01	1.00	19.89	34.59
Kazakhstan	23	22	23	0.15	0.79	19.79	8.51
Uruguay	0	11	11	0.94	N/A	15.16	15.91
Croatia	22	21	22	0.25	0.11	14.54	26.92
New Zealand	14	13	14	0.24	0.28	13.10	12.66
Ukraine	21	20	21	0.82	0.85	12.36	29.36
Bolivia	19	18	19	0.81	0.59	11.36	1.65
Serbia, Rep. of	16	15	16	0.36	0.25	10.71	15.47
Netherlands	23	22	23	0.84	0.74	8.84	5.29
Belgium	23	22	23	0.86	0.87	8.45	11.20

Source: Author's construction using IMF IFS, Ito and McCauley (2020), and Arslanalp, Eichengreen, and Simpson-Bell (2022). C-I-M (Chinn-Ito-McCauley) sample denotes data from Ito and McCauley (2020) and Chinn, Ito, and McCauley (2022), A-E-S (Arslanalp-Eichengreen-Simpson-Bell) denotes data from Arslanalp, Eichengreen, and Simpson-Bell (2022), and G-H (Goldberg-Hannaoui) is the final sample used in regression specifications.

Table A2 continued

Country-year Observations				USD Share		FX Reserves ($Bil)	
Country	C-I-M	A-E-S	G-H	2015	2021	2015	2021
Costa Rica	0	5	5	0.91	N/A	7.62	6.21
Kenya	19	18	19	0.64	0.79	7.48	8.78
Botswana	0	2	2	N/A	N/A	7.39	4.38
Tunisia	10	9	10	0.37	0.45	7.08	8.22
Sri Lanka	14	13	14	0.40	0.26	6.47	2.77
Finland	21	20	21	0.77	0.86	6.23	8.20
Azerbaijan	20	20	20	0.79	N/A	6.08	7.57
Paraguay	0	19	19	0.87	N/A	5.48	8.98
Ghana	19	18	19	0.96	0.97	5.20	8.30
Portugal	10	9	10	1.00	0.63	4.98	5.73
Iceland	17	16	17	0.43	0.54	4.79	6.27
Bosnia and Herzegovina	21	20	21	0.02	0.00	4.69	9.30
Tanzania	14	13	14	0.68	0.74	3.94	4.94
Mauritius	0	5	5	0.67	N/A	3.77	7.47
Latvia	17	16	17	0.60	0.70	3.05	4.49
Uganda	16	15	16	0.55	1.07	2.84	3.30
Zambia	18	17	18	0.86	0.95	2.53	1.26
Georgia	21	20	21	0.82	0.71	2.32	3.78
Mozambique	15	14	15	0.72	0.73	2.30	3.20
Macedonia, FYR	14	13	14	0.59	0.17	2.23	3.72
Ecuador	0	3	3	N/A	N/A	2.02	6.02
Moldova	10	10	10	0.62	N/A	1.74	3.89
Namibia	15	14	15	0.64	0.29	1.68	2.51
Papua New Guinea	17	16	17	0.44	0.75	1.68	2.23
Kyrgyz Republic	19	18	19	0.36	0.80	1.45	2.01
Lithuania	5	4	5	N/A	0.70	1.31	4.28
Lesotho	0	5	5	0.35	N/A	0.93	0.74
Ireland	0	5	5	0.00	N/A	0.74	5.89
Malawi	13	12	13	0.85	1.00	0.67	0.58
Seychelles	0	5	5	0.93	N/A	0.53	0.66
Slovenia	14	13	14	0.99	0.96	0.35	0.73
Estonia	12	11	12	0.55	0.52	0.30	1.91
Luxembourg	18	18	18	0.93	N/A	0.19	0.19
Tajikistan	14	13	14	0.98	0.97	0.03	2.12

Table A3: US UNGA vote agreement country groupings

Agreement Level	Country	N
Low ($Agreement \leq 0.4$)	Kyrgyz Republic, Tajikistan, Bolivia, Azerbaijan, Lesotho, South Africa, Morocco, Uganda, Ecuador, Bangladesh, Seychelles, Botswana, Mauritius, Sri Lanka, Tunisia, Ghana, Namibia, Zambia, Mozambique, Philippines, Tanzania, China, Kenya, Costa Rica, Kazakhstan, Malawi, Mexico, Brazil, Chile, Paraguay, Uruguay, Peru, India, Colombia, Nigeria, Russia, Papua New Guinea	37
Middle ($0.4 < Agreement < 0.55$)	Serbia, Turkey, Ireland, Switzerland, New Zealand, Georgia, Bosnia and Herzegovina, Sweden, Ukraine, Finland, Croatia, Moldova, Luxembourg, Norway, Germany	15
High ($0.55 \leq Agreement$)	Iceland, Belgium, Spain, Netherlands, Bulgaria, Romania, Italy, Poland, Denmark, Macedonia, Korea Republic, Portugal, Lithuania, Latvia, Czech Republic, Slovenia, France, Estonia, United Kingdom, Australia, Canada, Israel	22

Source: Author's groupings using UN General Assembly voting data described in Voeten, Strezhnev, and Bailey (2009). Time-invariant groupings constructed using median US UNGA vote agreement from 1999-2021. Countries displayed in ascending order of vote agreement. Time-varying groupings in regression specifications constructed using annual 3-year moving average of US UNGA vote agreement.

Table A4: Correlation table across key regression variables

	USDShare	PegUSD	PegEUR	TradeUS	TradeEA	DebtUSD	DebtEUR	EuroArea	ssrUS	ssrEA	VoteUS	InvTrTrade	InvTrDebt	NRCretdiff
USDShare	1.00													
PegUSD	0.19***	1.00												
PegEUR	-0.58***	-0.10***	1.00											
TradeUS	0.16***	0.05	-0.17***	1.00										
TradeEA	-0.26***	-0.23***	0.34***	-0.34***	1.00									
DebtUSD	0.21***	0.22***	-0.16***	0.21***	-0.65***	1.00								
DebtEUR	-0.07*	-0.21***	0.22***	-0.20***	0.72***	-0.70***	1.00							
EuroArea	0.35***	-0.13***	-0.16***	-0.12***	0.49***	-0.46***	0.59***	1.00						
ssrUS	0.01	-0.00	0.01	0.05	0.08**	-0.09**	0.03	0.01	1.00					
ssrEA	-0.09**	-0.00	0.00	0.05	0.11***	-0.16***	0.03	-0.02	0.56***	1.00				
VoteUS	-0.19***	-0.22***	0.20***	0.06*	0.48***	-0.46***	0.46***	0.32***	-0.14***	-0.12***	1.00			
InvTrTrade	-0.12***	0.15***	0.20***	0.09**	-0.20***	0.33***	-0.25***	-0.49***	-0.08**	-0.12***	-0.17***	1.00		
InvTrDebt	-0.06	0.18***	0.09**	-0.10**	-0.30***	0.43***	-0.28***	-0.50***	-0.09**	-0.16***	-0.37***	0.50***	1.00	
NRCretdiff	-0.11***	-0.01	-0.02	-0.01	0.03	-0.08**	-0.01	-0.04	-0.36***	0.51***	0.02	-0.02	-0.08**	1.00
Observations	1160													

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Author construction. Statistics across full sample consisting of 75 countries using observations at the year-country level per inclusion in regression sample. USDShare denotes U.S dollar share of official foreign exchange reserves; PegUSD denotes a dollar peg indicator; PegEUR denoets a euro peg indicator; TradeUS denotes share of Trade with US; TradeEU denotes share of trade with euro area; DebtUSD denotes debt denominated in dollars; DebtEUR denotes debt denominated in euros; EuroArea denotes a Euro Area indicator variable; ssrUS denotes the US shadow rate; ssrEA denotes the euro area shadow rate; VoteUS denotes UN general assembly vote agreement with US; InvTrTrade denotes investment tranche measured with 3-months imports; InvTrDebt denotes investment tranche measured with short-term debt; NRCretdiff denotes the NRC return differential.

Table A5: Countries subject to financial sanctions, by inclusion date in regression sample

Sanctioned State	Years Sanctioned
Azerbaijan	2001, 2002
Bangladesh	2021
Bolivia	2011-2021
Bosnia and Herzegovina	2001-2021
Brazil	2021
Bulgaria	2001-2021
Colombia	2010-2021
Costa Rica	2016-2020
Ghana	2018-2021
Hong Kong	2020, 2021
Kenya	2012-2014, 2017-2021
Kyrgyzstan	2020, 2021
Latvia	2019, 2020, 2021
Lesotho	2020
Macedonia	2008-2021
Morocco	2016-2020
Mozambique	2021
Nigeria	2013, 2014, 2015
Philippines	2005-2021
Russia	2014-2021
Serbia	2006-2021
South Africa	2019, 2020, 2021
Tanzania	2016, 2021
Tunisia	2012-2021
Turkey	2018
Uganda	2021
Ukraine	2014-2021

Source: Author's construction using data from Kirikakha et al. (2021), and Syropoulos et al. (2022).

Table A6: Full regression specifications, baseline for USD share of official foreign exchange reserves with waterfall of added determinants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
U.S dollar share of official reserves									
Dollar peg	0.118***	0.118***	0.118***	0.117***	0.116***	0.110***	0.104***	0.071***	0.115***
	(7.02)	(7.06)	(7.13)	(7.08)	(7.08)	(6.48)	(5.78)	(3.94)	(6.82)
Euro peg	-0.353***	-0.354***	-0.357***	-0.355***	-0.356***	-0.366***	-0.348***	-0.335***	-0.364***
	(-17.89)	(-18.04)	(-18.25)	(-18.07)	(-18.17)	(-18.93)	(-17.45)	(-17.35)	(-17.69)
Other peg	-0.160***	-0.161***	-0.168***	-0.167***	-0.165***	-0.151***	-0.194***	-0.195***	-0.159***
	(-4.15)	(-4.22)	(-4.60)	(-4.56)	(-4.46)	(-4.17)	(-3.99)	(-5.30)	(-4.11)
Trade with US	0.085	0.089	0.084	0.080	0.076	0.090*	0.062	0.167***	0.084
	(1.72)	(1.80)	(1.75)	(1.61)	(1.53)	(1.96)	(1.13)	(3.63)	(1.72)
Trade with Euro Area	-0.338***	-0.330***	-0.328***	-0.339***	-0.342***	-0.348***	-0.420***	-0.229***	-0.342***
	(-5.95)	(-5.69)	(-5.74)	(-5.84)	(-5.92)	(-6.16)	(-6.96)	(-3.96)	(-6.03)
Trade with Japan	-0.302	-0.269	-0.254	-0.309	-0.311	-0.460*	-0.595*	-0.287	-0.329
	(-1.39)	(-1.21)	(-1.20)	(-1.41)	(-1.42)	(-2.18)	(-2.57)	(-1.40)	(-1.58)
Trade with UK	-0.654**	-0.635**	-0.649**	-0.669**	-0.688**	-0.667**	-0.743**	-0.528*	-0.621**
	(-2.77)	(-2.62)	(-2.71)	(-2.73)	(-2.83)	(-2.82)	(-2.79)	(-2.20)	(-2.60)
Dollar debt share	0.197***	0.196***	0.188***	0.192***	0.191***	0.172***	0.158***	0.163***	0.192***
	(7.86)	(7.86)	(7.51)	(7.71)	(7.65)	(6.52)	(5.82)	(6.28)	(7.68)
Euro debt share	0.071*	0.069*	0.066*	0.069*	0.070*	0.058*	0.051	0.090**	0.069*
	(2.52)	(2.44)	(2.30)	(2.43)	(2.45)	(2.06)	(1.72)	(3.19)	(2.46)
Euro Area dummy	0.353***	0.351***	0.347***	0.350***	0.350***	0.382***	0.376***	0.361***	0.355***
	(16.82)	(16.46)	(16.39)	(16.46)	(16.37)	(16.31)	(14.82)	(17.02)	(16.87)
NRC return		-0.325							
		(-0.79)							
NRC return differential			-2.519***						
			(-3.68)						
US shadow rate				1.037***					
				(3.82)					
EA shadow rate				-0.784*					
				(-2.34)					
US ZLB					-0.041***				
					(-3.66)				
EA ZLB					0.012				
					(0.99)				
InvTr						0.101***	0.044		
						(4.17)	(1.83)		
Low US UN vote agreement								0.110***	
								(6.70)	
Middle US UN vote agreement								-0.014	
								(-0.94)	
Financial sanction									0.025
									(1.51)
Constant	0.573***	0.580***	0.592***	0.573***	0.591***	0.563***	0.624***	0.494***	0.574***
	(17.62)	(17.98)	(18.51)	(17.32)	(16.78)	(17.15)	(15.97)	(14.27)	(17.72)
N obs	1160	1160	1160	1160	1160	1144	1052	1137	1160
N countries	75	75	75	75	75	75	70	74	75
R2	0.54	0.54	0.54	0.54	0.54	0.55	0.57	0.55	0.54
Adj R2	0.53	0.53	0.54	0.54	0.54	0.54	0.56	0.55	0.53
AIC	-550.53	-549.20	-562.03	-560.36	-560.18	-566.57	-540.11	-572.12	-550.78
BIC	-494.91	-488.52	-501.36	-494.63	-494.45	-506.07	-480.61	-506.65	-490.11
Tranche Measure	N/A	N/A	N/A	N/A	N/A	Imports (3M)	ST Debt	N/A	N/A
p-val: b[Low UN] = b[Medium UN]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: Full regression specifications, USD share of foreign exchange reserves and nontraditional reserve currency returns

	(1)	(2)	(3)	(4)	(5)	(6)
U.S dollar share of official reserves						
Dollar peg	0.110***	0.110***	0.106***	0.110***	0.117***	0.116***
	(6.58)	(6.57)	(5.94)	(6.09)	(7.12)	(7.11)
Euro peg	-0.370***	-0.370***	-0.350***	-0.352***	-0.357***	-0.357***
	(-19.33)	(-19.30)	(-17.62)	(-17.91)	(-18.17)	(-18.16)
Other peg	-0.158***	-0.159***	-0.194***	-0.190***	-0.168***	-0.168***
	(-4.61)	(-4.63)	(-4.15)	(-3.95)	(-4.59)	(-4.58)
Trade with US	0.089*	0.089*	0.062	0.062	0.076	0.074
	(1.98)	(1.98)	(1.14)	(1.13)	(1.56)	(1.51)
Trade with Euro Area	-0.339***	-0.338***	-0.413***	-0.418***	-0.338***	-0.340***
	(-5.97)	(-5.91)	(-6.79)	(-6.90)	(-5.86)	(-5.88)
Trade with Japan	-0.413*	-0.410*	-0.562*	-0.579*	-0.296	-0.301
	(-1.99)	(-1.97)	(-2.43)	(-2.49)	(-1.37)	(-1.40)
Trade with UK	-0.664**	-0.664**	-0.740**	-0.754**	-0.681**	-0.687**
	(-2.77)	(-2.77)	(-2.75)	(-2.84)	(-2.81)	(-2.83)
Dollar debt share	0.164***	0.164***	0.154***	0.151***	0.189***	0.189***
	(6.24)	(6.22)	(5.74)	(5.64)	(7.59)	(7.59)
Euro debt share	0.054	0.054	0.049	0.047	0.068*	0.068*
	(1.86)	(1.87)	(1.67)	(1.59)	(2.37)	(2.37)
Euro Area dummy	0.376***	0.376***	0.371***	0.373***	0.349***	0.349***
	(15.87)	(15.84)	(14.52)	(14.62)	(16.41)	(16.40)
NRC return differential	-2.361***	-2.219	-1.364	0.457	-1.688*	-1.330
	(-3.46)	(-1.96)	(-1.91)	(0.38)	(-1.98)	(-1.24)
InvTr	0.098***	0.101***	0.041	0.066*		
	(4.08)	(3.49)	(1.72)	(2.48)		
InvTr x NRC return differential		-0.469		-4.642*		
		(-0.18)		(-2.26)		
US ZLB					-0.025	-0.017
					(-1.78)	(-0.84)
NRC return differential x US ZLB						-1.001
						(-0.58)
Constant	0.581***	0.580***	0.632***	0.626***	0.602***	0.602***
	(17.96)	(17.28)	(16.21)	(16.17)	(18.41)	(18.42)
N obs	1144	1144	1052	1052	1160	1160
N countries	75	75	70	70	75	75
R2	0.55	0.55	0.57	0.57	0.54	0.54
Adj R2	0.55	0.55	0.57	0.57	0.54	0.54
AIC	-576.63	-574.67	-541.78	-544.95	-563.35	-561.71
BIC	-511.08	-504.07	-477.32	-475.53	-497.62	-490.92
Tranche Measure	Imports (3M)	Imports (3M)	ST Debt	ST Debt	N/A	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A8: Full regression specifications, US dollar share of foreign exchange reserves and risk-adjusted NRC returns

	(1)	(2)	(3)	(4)	(5)	(6)
U.S dollar share of official reserves						
Dollar peg	0.110***	0.110***	0.105***	0.109***	0.116***	0.116***
	(6.54)	(6.53)	(5.92)	(6.02)	(7.09)	(7.08)
Euro peg	-0.369***	-0.369***	-0.350***	-0.353***	-0.356***	-0.356***
	(-19.23)	(-19.21)	(-17.58)	(-17.87)	(-18.08)	(-18.05)
Other peg	-0.159***	-0.160***	-0.195***	-0.192***	-0.168***	-0.168***
	(-4.61)	(-4.62)	(-4.18)	(-3.98)	(-4.58)	(-4.55)
Trade with US	0.086	0.086	0.061	0.061	0.075	0.073
	(1.91)	(1.91)	(1.11)	(1.10)	(1.54)	(1.48)
Trade with Euro Area	-0.343***	-0.343***	-0.415***	-0.419***	-0.341***	-0.343***
	(-6.06)	(-6.00)	(-6.82)	(-6.94)	(-5.90)	(-5.92)
Trade with Japan	-0.437*	-0.436*	-0.574*	-0.592*	-0.310	-0.318
	(-2.11)	(-2.09)	(-2.50)	(-2.56)	(-1.44)	(-1.47)
Trade with UK	-0.669**	-0.669**	-0.744**	-0.752**	-0.681**	-0.687**
	(-2.79)	(-2.79)	(-2.76)	(-2.84)	(-2.81)	(-2.81)
Dollar debt share	0.165***	0.166***	0.155***	0.153***	0.191***	0.191***
	(6.27)	(6.24)	(5.74)	(5.68)	(7.63)	(7.66)
Euro debt share	0.054	0.054	0.049	0.048	0.068*	0.068*
	(1.88)	(1.88)	(1.66)	(1.62)	(2.39)	(2.40)
Euro Area dummy	0.378***	0.378***	0.372***	0.373***	0.350***	0.350***
	(16.04)	(16.02)	(14.62)	(14.69)	(16.57)	(16.55)
Risk Adjusted NRC return	-0.005***	-0.004*	-0.003*	0.001	-0.003	-0.002
	(-3.71)	(-2.20)	(-2.32)	(0.26)	(-1.94)	(-0.90)
InvTr	0.099***	0.100***	0.041	0.063*		
	(4.12)	(3.65)	(1.73)	(2.44)		
InvTr x Risk adjusted NRC return		-0.000		-0.009*		
		(-0.09)		(-2.40)		
US ZLB					-0.022	-0.017
					(-1.43)	(-0.95)
Risk adjusted NRC return x US ZLB						-0.002
						(-0.48)
Constant	0.581***	0.580***	0.633***	0.627***	0.600***	0.600***
	(17.95)	(17.42)	(16.28)	(16.23)	(18.21)	(18.19)
N obs	1144	1144	1052	1052	1160	1160
N countries	75	75	70	70	75	75
R2	0.55	0.55	0.57	0.57	0.54	0.54
Adj R2	0.55	0.55	0.57	0.57	0.54	0.54
AIC	-577.77	-575.78	-543.30	-546.63	-563.07	-561.32
BIC	-512.22	-505.18	-478.84	-477.21	-497.34	-490.53
Tranche Measure	Imports (3M)	Imports (3M)	ST Debt	ST Debt	N/A	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A9: Full regression specifications, USD share of foreign exchange reserves and reserve currency returns

	(1)	(2)	(3)	(4)	(5)	(6)
U.S dollar share of official reserves						
Dollar peg	0.109***	0.109***	0.103***	0.106***	0.117***	0.116***
	(6.49)	(6.48)	(5.79)	(5.92)	(7.09)	(7.08)
Euro peg	-0.368***	-0.368***	-0.348***	-0.350***	-0.356***	-0.356***
	(-19.12)	(-19.09)	(-17.37)	(-17.58)	(-18.19)	(-18.14)
Other peg	-0.158***	-0.158***	-0.195***	-0.192***	-0.167***	-0.168***
	(-4.55)	(-4.54)	(-4.08)	(-3.92)	(-4.57)	(-4.60)
Trade with US	0.080	0.080	0.050	0.052	0.077	0.072
	(1.73)	(1.72)	(0.90)	(0.93)	(1.55)	(1.46)
Trade with Euro Area	-0.356***	-0.358***	-0.437***	-0.438***	-0.340***	-0.343***
	(-6.14)	(-6.12)	(-7.06)	(-7.07)	(-5.85)	(-5.91)
Trade with Japan	-0.503*	-0.508*	-0.672**	-0.682**	-0.305	-0.314
	(-2.34)	(-2.35)	(-2.84)	(-2.82)	(-1.39)	(-1.43)
Trade with UK	-0.697**	-0.700**	-0.789**	-0.794**	-0.679**	-0.695**
	(-2.85)	(-2.84)	(-2.89)	(-2.90)	(-2.77)	(-2.82)
Dollar debt share	0.168***	0.167***	0.157***	0.155***	0.191***	0.190***
	(6.43)	(6.37)	(5.86)	(5.77)	(7.61)	(7.61)
Euro debt share	0.057*	0.057*	0.053	0.051	0.069*	0.069*
	(1.99)	(2.00)	(1.79)	(1.73)	(2.41)	(2.43)
Euro Area dummy	0.382***	0.382***	0.377***	0.377***	0.350***	0.350***
	(15.84)	(15.73)	(14.68)	(14.64)	(16.35)	(16.38)
US shadow rate	1.065***	1.209**	0.827**	0.159	0.529	0.628
	(3.94)	(2.76)	(2.94)	(0.36)	(1.11)	(0.93)
EA shadow rate	-0.590	-0.665	-0.168	0.408	-0.656	-0.426
	(-1.74)	(-1.25)	(-0.48)	(0.72)	(-1.09)	(-0.38)
InvTr	0.104***	0.107***	0.044	0.032		
	(4.22)	(4.25)	(1.86)	(1.31)		
InvTr x US shadow rate		-0.503		1.707*		
		(-0.50)		(2.14)		
InvTr x EA shadow rate		0.247		-1.423		
		(0.21)		(-1.44)		
US ZLB					-0.027	-0.034
					(-1.30)	(-1.54)
EA ZLB					-0.002	-0.021
					(-0.10)	(-0.66)
US shadow rate x US ZLB						-0.819
						(-0.78)
EA shadow rate x EA ZLB						-1.356
						(-0.93)
Constant	0.565***	0.565***	0.629***	0.635***	0.589***	0.586***
	(16.98)	(16.97)	(15.87)	(15.86)	(15.43)	(14.52)
N obs	1144	1144	1052	1052	1160	1160
N countries	75	75	70	70	75	75
R2	0.55	0.55	0.57	0.57	0.54	0.54
Adj R2	0.55	0.55	0.57	0.57	0.54	0.54
AIC	-577.11	-573.35	-545.75	-546.14	-558.29	-556.51
BIC	-506.52	-492.67	-476.33	-466.81	-482.44	-470.56
Tranche Measure	Imports (3M)	Imports (3M)	ST Debt	ST Debt	N/A	N/A
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A10: Full regression specifications, USD share of foreign exchange reserves and geopolitical alignment

	(1)	(2)	(3)	(4)	(5)
U.S dollar share of official reserves					
Dollar peg	0.071**	0.071**	0.071**	0.078**	0.070**
	(2.92)	(2.91)	(2.71)	(3.00)	(2.69)
Euro peg	-0.335***	-0.346***	-0.328***	-0.332***	-0.330***
	(-15.92)	(-16.14)	(-16.00)	(-16.23)	(-16.10)
Other peg	-0.195***	-0.183***	-0.221***	-0.216***	-0.219***
	(-4.93)	(-4.56)	(-5.11)	(-5.01)	(-5.08)
Trade with US	0.167**	0.173**	0.137*	0.140*	0.130*
	(2.76)	(2.74)	(2.14)	(2.20)	(2.03)
Trade with Euro Area	-0.229***	-0.242***	-0.299***	-0.298***	-0.310***
	(-4.38)	(-4.51)	(-5.34)	(-5.34)	(-5.48)
Trade with Japan	-0.287	-0.389	-0.550*	-0.548*	-0.588*
	(-1.24)	(-1.62)	(-2.26)	(-2.25)	(-2.39)
Trade with UK	-0.528**	-0.555**	-0.698***	-0.703***	-0.710***
	(-2.71)	(-2.80)	(-3.41)	(-3.45)	(-3.46)
Dollar debt share	0.163***	0.150***	0.098**	0.090**	0.100**
	(5.59)	(5.02)	(3.22)	(2.96)	(3.28)
Euro debt share	0.090**	0.079**	0.044	0.040	0.045
	(3.10)	(2.71)	(1.48)	(1.35)	(1.52)
Euro Area dummy	0.361***	0.384***	0.401***	0.401***	0.400***
	(17.95)	(16.23)	(17.99)	(17.95)	(17.98)
Low US UN vote agreement	0.110***	0.105***	0.236***	0.240***	0.228***
	(6.20)	(4.14)	(7.73)	(7.88)	(7.33)
Middle US UN vote agreement	-0.014	-0.016	-0.010	-0.017	-0.012
	(-0.93)	(-0.82)	(-0.56)	(-0.92)	(-0.62)
InvTr		0.075	0.081*	0.105**	0.077*
		(1.61)	(2.42)	(3.05)	(2.32)
InvTr x Low US UN vote agreement		-0.013	-0.209***	-0.207***	-0.202***
		(-0.21)	(-4.20)	(-4.15)	(-4.02)
InvTr x Middle US UN vote agreement		0.014	-0.006	0.022	-0.009
		(0.24)	(-0.13)	(0.50)	(-0.20)
NRC return differential				1.612	
				(1.48)	
InvTr x NRC return differential				-6.354**	
				(-3.10)	
US shadow rate					0.072
					(0.20)
InvTr x US shadow rate					1.056
					(1.48)
Constant	0.494***	0.490***	0.546***	0.542***	0.553***
	(14.46)	(13.43)	(14.07)	(13.94)	(14.14)
N obs	1137	1121	1029	1029	1029
N countries	74	74	69	69	69
R2	0.55	0.56	0.60	0.60	0.60
Adj R2	0.55	0.55	0.59	0.60	0.59
AIC	-572.12	-573.29	-587.06	-594.53	-588.78
BIC	-506.65	-492.94	-508.08	-505.68	-499.93
Tranche Measure	N/A	Imports (3M)	ST Debt	ST Debt	ST Debt
Estimation method	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A11: USD share of foreign exchange reserves and geopolitical alignment using continuous *US UN vote agreement* measure

	(1)	(2)	(3)	(4)	(5)
U.S dollar share of official reserves					
Dollar peg	0.078**	0.075**	0.064*	0.070**	0.065*
	(3.15)	(3.05)	(2.39)	(2.62)	(2.45)
Euro peg	-0.345***	-0.358***	-0.339***	-0.343***	-0.341***
	(-16.33)	(-16.85)	(-16.27)	(-16.48)	(-16.39)
Other peg	-0.178***	-0.168***	-0.209***	-0.205***	-0.204***
	(-4.46)	(-4.16)	(-4.72)	(-4.66)	(-4.62)
Trade with US	0.162**	0.166**	0.154*	0.154*	0.152*
	(2.59)	(2.58)	(2.33)	(2.35)	(2.28)
Trade with Euro Area	-0.283***	-0.295***	-0.363***	-0.360***	-0.366***
	(-5.43)	(-5.60)	(-6.43)	(-6.39)	(-6.40)
Trade with Japan	-0.331	-0.470	-0.632*	-0.618*	-0.633*
	(-1.42)	(-1.96)	(-2.55)	(-2.50)	(-2.53)
Trade with UK	-0.635**	-0.662***	-0.835***	-0.849***	-0.830***
	(-3.23)	(-3.30)	(-3.98)	(-4.05)	(-3.95)
Dollar debt share	0.190***	0.167***	0.135***	0.128***	0.135***
	(6.53)	(5.58)	(4.40)	(4.17)	(4.40)
Euro debt share	0.083**	0.071*	0.048	0.044	0.047
	(2.85)	(2.39)	(1.60)	(1.47)	(1.55)
Euro Area dummy	0.358***	0.385***	0.390***	0.387***	0.390***
	(17.66)	(16.85)	(17.56)	(17.39)	(17.62)
US UN vote agreement	-0.182***	-0.180**	-0.336***	-0.338***	-0.335***
	(-4.59)	(-3.14)	(-5.13)	(-5.19)	(-4.89)
InvTr		0.078	-0.086	-0.062	-0.098
		(1.33)	(-1.54)	(-1.11)	(-1.71)
InvTr x US UN vote agreement		0.029	0.255*	0.256*	0.275*
		(0.23)	(2.36)	(2.38)	(2.48)
NRC return differential				0.563	
				(0.52)	
InvTr x NRC return differential				-4.878*	
				(-2.39)	
US shadow rate					-0.222
					(-0.59)
InvTr x US shadow rate					1.498*
					(2.05)
Constant	0.629***	0.621***	0.773***	0.777***	0.776***
	(17.99)	(15.87)	(15.30)	(15.36)	(15.20)
N obs	1137	1121	1029	1029	1029
N countries	74	74	69	69	69
R2	0.54	0.55	0.58	0.58	0.58
Adj R2	0.54	0.54	0.57	0.58	0.57
AIC	-542.64	-552.69	-542.52	-547.94	-544.45
BIC	-482.21	-482.38	-473.41	-468.95	-465.47
Tranche Measure	N/A	Imports (3M)	ST Debt	ST Debt	ST Debt
Estimation method	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A12: USD share of foreign exchange reserves and geopolitical alignment using financial sanctions

	(1)	(2)	(3)	(4)	(5)
Dollar peg	0.115***	0.106***	0.104***	0.110***	0.102***
	(5.33)	(4.93)	(4.60)	(4.87)	(4.51)
Euro peg	-0.364***	-0.375***	-0.352***	-0.353***	-0.355***
	(-16.38)	(-16.99)	(-15.91)	(-16.02)	(-16.08)
Other peg	-0.159***	-0.147***	-0.192***	-0.190***	-0.191***
	(-4.00)	(-3.67)	(-4.35)	(-4.30)	(-4.33)
Trade with US	0.084	0.097	0.059	0.063	0.048
	(1.40)	(1.63)	(0.91)	(0.98)	(0.73)
Trade with Euro Area	-0.342***	-0.355***	-0.424***	-0.416***	-0.442***
	(-6.70)	(-6.96)	(-7.48)	(-7.35)	(-7.76)
Trade with Japan	-0.329	-0.395	-0.615*	-0.575*	-0.697**
	(-1.42)	(-1.69)	(-2.45)	(-2.29)	(-2.76)
Trade with UK	-0.621**	-0.663***	-0.737***	-0.748***	-0.766***
	(-3.14)	(-3.39)	(-3.51)	(-3.58)	(-3.64)
Dollar debt share	0.192***	0.168***	0.157***	0.151***	0.157***
	(6.82)	(5.89)	(5.35)	(5.14)	(5.38)
Euro debt share	0.069*	0.057*	0.051	0.046	0.053
	(2.37)	(1.97)	(1.74)	(1.56)	(1.82)
Euro Area dummy	0.355***	0.395***	0.375***	0.373***	0.376***
	(17.51)	(18.12)	(17.12)	(17.03)	(17.23)
Financial sanction	0.025	0.127***	0.004	0.018	0.004
	(1.50)	(3.76)	(0.08)	(0.39)	(0.08)
InvTr		0.130***	0.039	0.068*	0.034
		(4.98)	(1.59)	(2.45)	(1.40)
InvTr x Financial sanction		-0.246***	0.009	-0.022	0.016
		(-3.58)	(0.13)	(-0.32)	(0.23)
NRC return differential				0.488	
				(0.45)	
InvTr x NRC return differential				-4.714*	
				(-2.27)	
US shadow rate					0.369
					(1.04)
InvTr x US shadow rate					1.098
					(1.52)
Constant	0.574***	0.553***	0.626***	0.624***	0.634***
	(18.17)	(17.47)	(16.34)	(16.17)	(16.58)
N obs	1160	1144	1052	1052	1052
N countries	75	75	70	70	70
R2	0.54	0.55	0.57	0.57	0.57
Adj R2	0.53	0.55	0.56	0.57	0.57
AIC	-550.78	-577.22	-536.43	-541.11	-544.40
BIC	-490.11	-506.63	-467.01	-461.78	-465.06
Tranche Measure	N/A	Imports (3M)	ST Debt	ST Debt	ST Debt
Estimation method	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$