

Re-scaling global imbalances: key currency zones and renminbi management

Hiro Ito and Robert McCauley¹

Abstract

That exchange rates are disconnected from macroeconomics in general and current accounts in particular puzzles economists (Obstfeld and Rogoff (2001)). We take a fresh look at this disconnect by shifting the unit of analysis from nation to currency (Avdjiev et al (2016)). Grouping nations into currency zones inductively (Haldane and Hall (1991) and Frankel and Wei (1996)), we find that the US and the dollar zone current accounts diverged after the Asian financial crisis. The dollar zone's current account was approaching balance in the mid-2000s, in striking contrast to predictions of dollar crisis based on the US current account. Since the currency composition of external positions lines up with zone membership, portfolio balance theory predicts that a currency zone's current account should connect better to the currency's value than the national one. We find that this holds for the US dollar. In this framework, China's intention to manage the renminbi against its trade-weighted currency basket promises to shrink the dollar zone and its current account.

Keywords: Global imbalances, current accounts, currency zones

JEL classification: F31, F32, F33, F41

¹ Respectively, Department of Economics, Portland State University, 1721 SW Broadway, Portland, OR 97201, USA, email: ito@pdx.edu and Senior Adviser, Monetary and Economic Department, Bank for International Settlements (BIS), Centralbahnplatz 2, CH-4002, Basel, Switzerland, email: Robert.McCauley@bis.org. The authors thank Tracy Chan and Alan Villegas for research assistance. The views expressed are those of the authors and not necessarily those of Portland State University or the BIS.

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1. Introduction

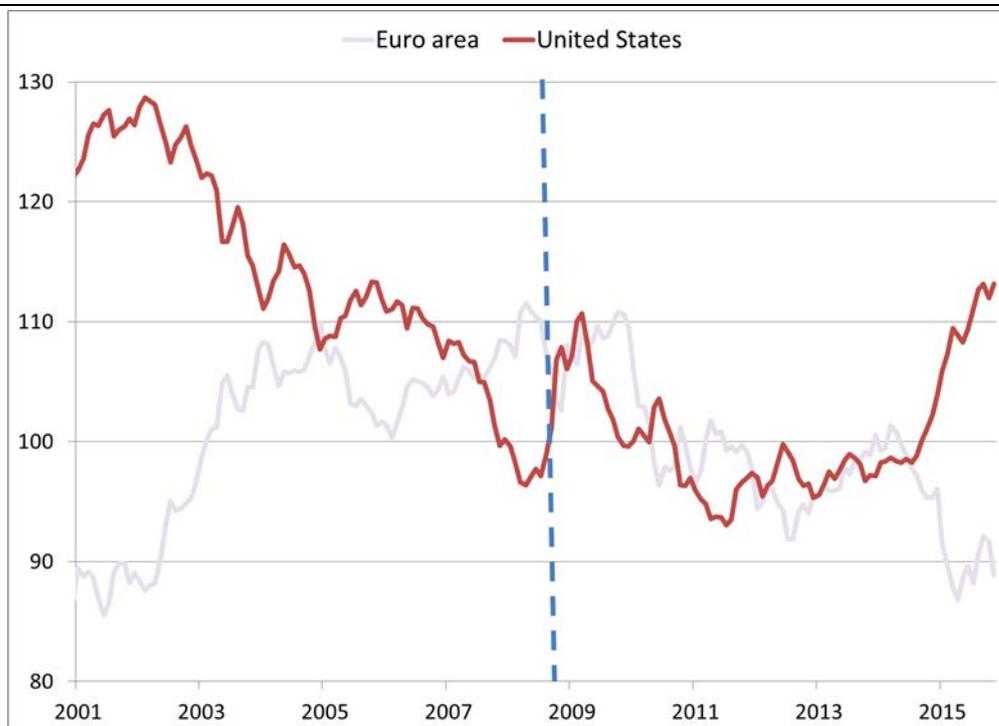
International economists are puzzled by the *exchange rate disconnect* (Obstfeld and Rogoff (2001)). Movements of exchange rates seem disconnected from macroeconomics. In particular, there seems to be little relationship between the US dollar's value and the US current account.

Despite the disconnect, international economists predicted in the mid-2000s that the wide US current account would lead to a sharp decline in the value of the US dollar, or even a dollar crisis. Krugman (2007) foresaw the dollar reaching its Wylie E Coyote moment, when its lack of fundamental support would become evident and its fall would be rapid. The prediction was widely echoed: Summers (2004), Edwards (2005), Obstfeld and Rogoff (2005), and Setser and Roubini (2005), among others.

In the event, the dollar appreciated sharply in 2008 in the acute phase of a Great Financial Crisis centred on US housing finance. Compared to the pre-crisis period, the dollar appreciated by 15% by March 2009, as European banks bought dollars to square their books after they marked toxic dollar assets to market (Graph 1; McCauley and McGuire (2009)).² Borio and Disyatat (2011,2015) and Shin (2012) and have argued that global financial vulnerabilities could only be understood in terms of gross financial flows, not in terms of net financial flows as implied by current account imbalances. Obstfeld (2012) recognised as much.

Real effective exchange rate of the euro and the dollar, 2001-2015

Graph 1



² The vertical dashed line indicates September 2008 when the global financial crisis broke out after the collapse of Lehman Brothers in mid-September.

We argue that the apparent disconnect and the widespread predictive failure of the mid-2000s both arise from an inappropriate choice of the unit of analysis. Graph 2 is often used to depict global imbalances (as shares of world GDP), here for the period of 1973 through 2020.³ Since the early 1980s, the United States has persistently run a current account deficit and Japan a current account surplus. After the Asian financial crisis in the late 1990s, China, emerging market economies in Asia, and oil exporters emerged as major current account surplus countries.

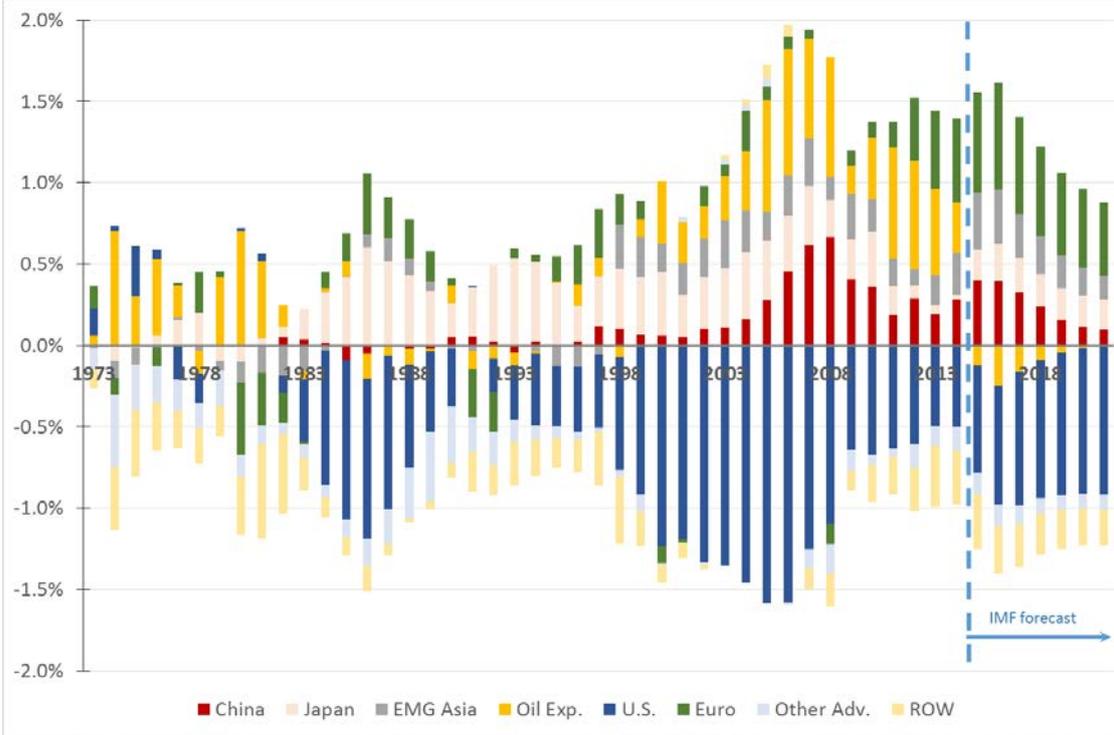
Like Avdjiev et al (2015), we insist that the use of the major currencies, notably the dollar and the euro, span national borders and require a zonal rather than national analysis. Our contribution is to calculate and to analyse the current account and international investment positions of the dollar, euro, yen and sterling zones. Using the inductive technique of Haldane and Hall (1991) and Frankel and Wei (1996), we follow Kawai and Akiyama (2000), McCauley and Chan (2014), BIS (2015) and Ito and Kawai (2015) in dividing the world economy into currency zones according to the co-movement of currencies. Each economy’s external accounts are allocated to the four zones according to its currency’s loading on the major currencies⁴. We thereby reduce the dimension of global imbalances from N economies to four currency zones.

We argue that the zonal view makes sense in a portfolio balance model because external assets and liabilities within a zone are strongly biased. In such a world, the shifts of current accounts within a zone do not create portfolio imbalances across the

Standard view of global imbalances by country, 1973-2021

In percent of world GDP

Graph 2



Note: The current account balance after 2015 are forecasts by the International Monetary Fund (2016).

³ Current account balances after 2015 are IMF estimates as of April 2016 (IMF, 2016).

⁴ By contrast, Iizetki et al (2016) adopt a winner-take-all approach to currency anchoring: a currency is placed in the zone of the key currency against which it moves the least. Bracke and Bunda (2011) are not exhaustive: free floating currencies are not associated with key currencies..

major currencies that require exchange rate or interest rate changes to balance. In other words, the value of the dollar could be more related to the current account balance of the "dollar zone" than to the current account balance of the United States.

With a zonal perspective, we find a connection between the dollar zone's current account and the dollar's exchange rate. This finding arises from the divergence of the dollar zone's current account from that of the US current account in the aftermath of the Asian financial crisis of 1997-98. Moreover, the dollar zone's current account makes it easy to understand the failure of prediction of dollar depreciation or crisis in the mid-2000s. Surpluses elsewhere in the dollar zone offset the US current account deficits of the mid-2000s.

Looking forward, the projected widening of the US current account deficit through 2021 may coincide with smaller projected surpluses elsewhere in the dollar zone. The prospect is for substantial cross-zone financing in which the creditor or the debtor takes substantial exchange rate risk. On this projection, the main fault-line in international finance, the dollar/euro, would have to be crossed to an extent not seen in the short life of the euro.

The dollar zone current account could prove wider if the dollar zone were to shrink. In particular, the announced policy of the Chinese authorities to manage the renminbi against a basket of trading partner currencies implies a dollar zone of a reduced size, with a reduced current account and with a reduced international investment position. "The international role of the dollar: does it matter if it changes?" (Goldberg (2011)) is an apt question.

The rest of this paper is in six sections. Section 2 provides the rationale for currency zones as a unit of analysis. Section 3 describes how we estimate the weights of the four major currencies, the dollar, the euro, the British pound, and the yen for each currency other than these four. These weights reflect some combination of currency management, interest rate followership and market responses given trade shares. We combine these to generate currency zones from exchange rate data. Section 4 divides the current accounts of the sample countries into the four currency zones, presenting our results for "currency-zone current account balances (CZ-CABs)" for the period of 1970–2014. The CZ-CAB gives us quite a different picture of the relationship between the currency values and current account balances, especially for the dollar: the dollar's exchange rate from this perspective looks much more macro-economically connected. Section 5 applies the same methodology to net and gross investment positions and reports our results for zone international asset positions. Section 6 reports on an "experiment": how management of the renminbi against a basket of currencies, as indicated explicitly by the Chinese authorities in December 2015 and generally viewed as having been since implemented to some extent, would reduce the dollar zone, its current account and its international investment position. Section 7 concludes.

2. Currency zones and portfolio balance

Under what condition does a currency zone group countries by portfolio behaviour? Is that condition met? These two questions are addressed by this section.

It may be helpful to recall the portfolio balance argument for why current accounts matter to exchange rates. The basic idea is that current accounts redistribute international wealth from deficit to surplus countries. If the investment and borrowing

habitats of the two were the same, this would not necessarily have any portfolio balance implication for exchange rates. But if both deficit and surplus country investors show home bias in their investments, then the redistribution of wealth means less demand for assets denominated in the debtor's currency and more demand for assets denominated in the creditor's currency. Portfolio balance is re-achieved through some combination of higher interest rates on the bonds of the deficit country and a depreciation of the deficit country's exchange rate.

A historical analogy is the old sterling area that came into existence in the 1930s and persisted into the 1960s (Schenk (2010)). If countries like Australia, India, New Zealand and so on borrowed in sterling, held official reserves in sterling, and placed private investments in sterling, then the relevant current account for sterling would be that of the sterling area, not of the United Kingdom (Drummond (2008)).

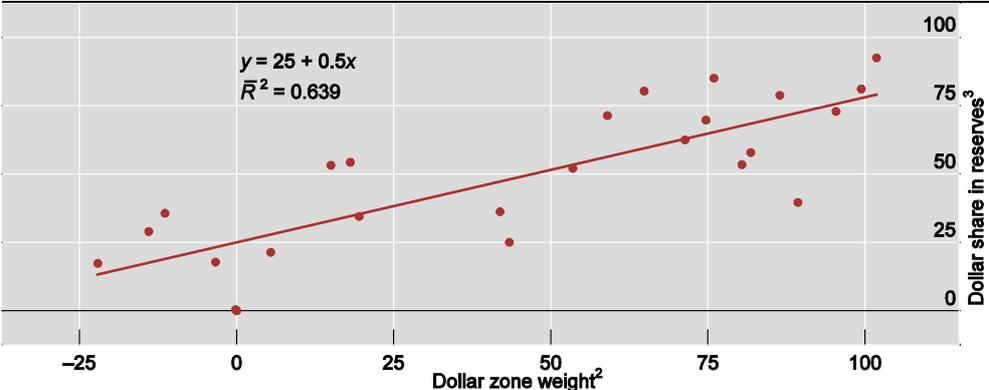
The burden of our argument is that currency zone current accounts are more consequential for currency values than national current accounts. Recall that current accounts are thought to affect currency values through the portfolio balance channel if investors in different countries have different portfolio weights. For example, a US current account deficit redistributes wealth from US investors with a strong home bias toward dollar investments to the rest of the world, where investors place a lower weight on the dollar. So some combination of a lower dollar or higher US interest rates is thought necessary to maintain portfolio balance.

Thus, shifting the unit of analysis from national to currency zone current accounts makes sense if international portfolios line up with currency zones. Dollar zone members must favour the dollar in investing and borrowing abroad debts, while euro zone members must similarly favour the euro. Do they?

Portfolios do line up with currency zone membership. This is evident in the limited national data on official foreign exchange holdings and in broader available data on international bank deposits and loans on international bond issuance.

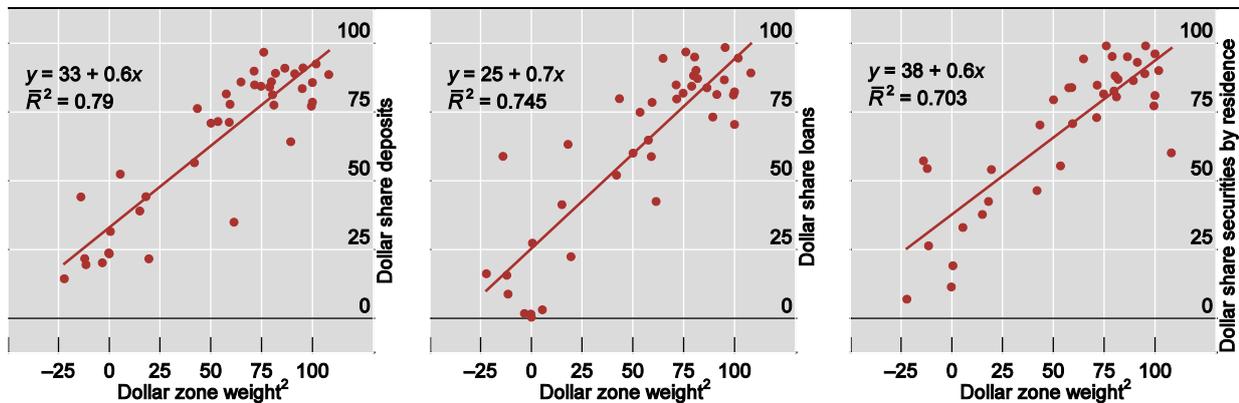
For 25 economies that disclose at least the US dollar share of official foreign exchange reserves, the co-movement with the dollar of the respective domestic currency accounts for two-thirds of the variation in the dollar share of reserves (Graph 3, McCauley and Chan (2014)). Thus, dollar zone economies like those in Latin America or in East Asia mostly accumulate dollar reserves. Economies with currencies that move more in tandem with the euro show lower shares of dollars in their reserves.

The dollar's pulling power influences FX reserves allocation¹ Graph 3



¹ Country-specific dollar-zone weights plotted against the dollar's share in the country's FX reserves, 2014. ² Average over four years. ³ For Colombia, New Zealand, Philippines and Turkey, earlier data used.

Sources: National data; BIS calculations.



¹ Country-specific dollar-zone weights plotted against the share of bank deposits, bank loans and resident's debt securities in the corresponding foreign currency totals, 2014. Includes the public sector. ² Average over four years.

Sources: National data; BIS international debt securities; BIS locational banking statistics; BIS calculations.

For broader samples, the co-movement of domestic currencies with the dollar lines up with the currency composition of external assets and liabilities. In particular, dollar zone membership lines up with the dollar share of cross-border holdings of bank deposits, of the dollar share of cross-border bank loans and the dollar share of international bonds outstanding (Graph 4).

Why are these relationships between currency movements and the currency composition of international assets and liabilities so strong? One interpretation is that investing and borrowing in the key currency of one's zone leads to a lower variance of returns, whether on assets or liabilities.

3. Estimating currency zones

We first need to estimate how much weight each currency's fluctuations place on the major currencies. To do so, we hypothesise that each currency's movements can be related to those of the US dollar, the euro (or the Deutsche mark and the French franc before the introduction of the euro in 1999), the British pound, and the Japanese yen. Our choice of these major currencies is a prior that reflects their status as the most traded currencies, as shown in the Triennial Survey of foreign exchange volumes, as well as their comprising the IMF's Special Drawing Right (SDR), its numeraire.

The co-movement of currencies arises from exchange rate policy, monetary policy and underlying trade relations. The easiest weights to interpret are those of the Hong Kong dollar or the Bulgarian lev, where the central banks maintain fixed exchange rates against the dollar and the euro, respectively. A variation on this policy theme is the Singapore dollar, which the Monetary Authority of Singapore manages against a trade-weighted basket that includes all four of the major currencies. For currencies without an explicit exchange rate policy, the policy interest rate can be set by reference to that of a major central bank, with the result of co-movement of the two exchange rates. For instance, the Norges Bank explicitly discusses the spread of its policy rate over that of the ECB, which is consistent with the Norwegian kroner's tendency to co-move with the euro against the dollar. Underlying trading relations

seem to matter as well: the Mexican peso and the Polish zloty tend to co-move with the dollar and euro, respectively, consistent with the predominant trading partners of the two countries.

The key currency weights for each currency for each time period are estimated using the widely-used method developed by Haldane and Hall (1991) and Frankel and Wei (1996).⁵ The estimated weights are taken to measure to what extent a given economy belongs to each of the dollar, euro, pound, and yen zones.⁶

More specifically, we run the following estimation model:

$$\Delta e_{it}^{USD} = \alpha_i + \beta_{iJYt} \Delta e_{it}^{JY} + \beta_{iBPt} \Delta e_{it}^{UKP} + \beta_{iEUROt} \Delta e_{it}^{EURO} + \varepsilon_{it} \quad (1)$$

Here, e_{it} is the nominal exchange rate of home currency i , against the dollar (USD), yen (JP), pound (BP), and the euro (EURO) – or Deutsche mark (DM) and French franc (FF) before 1999. The movements of each currency against the dollar on the left-hand side of the estimation equation is reduced to a weighted average of the movements of the euro, yen and pound against the dollar on the right-hand side, leaving a residual of idiosyncratic movement. Thus, $\hat{\beta}_{ih}$, the estimated coefficient on the rate of change in the exchange rate of major currency h vis-à-vis the U.S. dollar, represents the weight of currency h in the implicit basket. The weight of the dollar can be calculated as $\hat{\beta}_{iUS} = 1 - (\hat{\beta}_{iJY} + \hat{\beta}_{iBP} + \hat{\beta}_{iDM} + \hat{\beta}_{iFF})$. If the home currency is pegged to the U.S. dollar (e.g., Hong Kong), then $\sum_{h=1}^H \hat{\beta}_{ih} = 0$ so that $\hat{\beta}_{iUS} = 1$. Similarly, for an economy with its currency pegged to the euro (such as the Bulgarian lev), $\hat{\beta}_{iDM} = 1$.

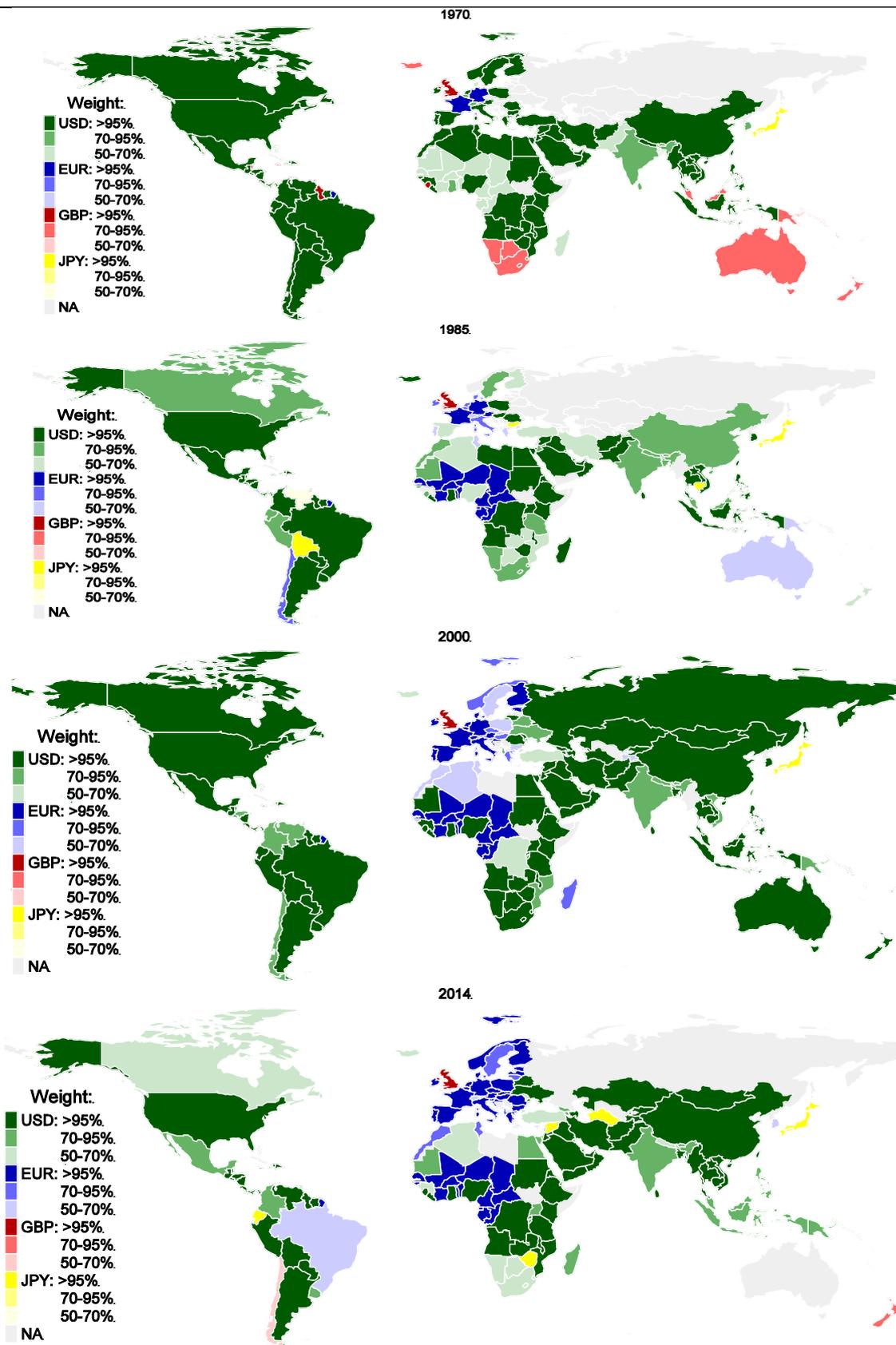
We apply the estimation model to each of our 172 sample economies (see Appendix 1) for 1970-2021 over rolling windows of 36 months.⁷ Hence, the coefficients $\hat{\beta}_{ih}$'s are time-varying in monthly frequency. This rolling regression is not run for the SDR currencies; instead their currency weights are set at the value of one. That is, each of the issuer countries of the major currencies is assumed to constitute its own currency zone without depending on other major-currency exchange rates.

Graph 5 shows currency geography as of four dates spanning the years since the breakdown of the Bretton Woods system: 1974, 1985, 2000 and 2015. Comparison of the first two graphs shows the disappearance of the shrinkage of the sterling zone (Schenk (2009, 2010); Schenk and Singleton (2015)). The yen zone in effect never gains ground outside of Japan. The Deutsche mark/euro zone, however, solidifies its hold in Western Europe and spreads eastward in the 1990s and 2000s. Late in the 1990s

⁵ Haldane and Hall (1991) applied their technique to sterling over a period that included both Bank of England management and more free floating, while Frankel and Wei (1996) intended to discover weights in an undisclosed official basket. Among many others, Bénassy-Quéré et al (2006), Kawai and Akiyama (1998, 2000), and Kawai and Pontines (2014) applied this method.

⁶ Before the introduction of the euro in 1999, we sum the weights of the Deutsche mark and the French franc and consider the sum as the euro zone weight.

⁷ For the time period after 2014, we assume the currency weights as of 2014 to stay constant for the 2015-2020 period and apply the currency weights to current account balances forecasted by the IMF.



Source: IMF, *International Financial Statistics*, authors' estimates. ...

the commodity currencies tended to move from a position squarely in the dollar zone to a more intermediate position between the dollar and the euro. Despite the geographical extension of the euro, the combination of fast growth in East Asia and the fact that it started in the dollar zone and moved only gradually into an intermediate position means that the dollar zone has retained a 50-60% share of global activity (BIS (2005, Graph V.1)). (For individual views of the four currency zones, see Appendix 3.)

4. Currency-zone current accounts and external positions

This first section presents and discusses current accounts of the four currency zones. Then we use them to re-interpret the evidence that current accounts in aggregate have grown in size in the global economy. Then we show how the net international investment positions of the currency areas reinforce the evidence of the currency zone current accounts that concern for a hard landing or crisis for the dollar were misplaced. Finally, we draw the implications of the IMF forecasts for current accounts through 2021 for the current accounts of the four currency zones.

4.1 Currency-zone current accounts

Using the estimated weights for country i in year t for currency zone h as $\hat{\beta}_{iht}$ where $\sum_{h=1}^H \hat{\beta}_{iht} = 1$, we can divide the current account balance of country i into the four key currency zones (i.e., $CAB_{it} = \sum_h \hat{\beta}_{iht} \cdot CAB_{it}$). For currency zone h , country i 's currency-zone current account balance (CZ-CAB) is $\hat{\beta}_{iht} \cdot CAB_{it}$.

Graph 6 presents the current account balances (as percentages of world GDP) for China, Japan, United States, the Euro area, the other advanced economies, oil exporters, emerging Asia, and the rest of the world (ROW) for the four currency zones: the U.S. dollar zone, the euro zone, the yen zone, and the pound zone.⁸ That is,

$$\left(\text{i.e., } \frac{\sum_j \hat{\beta}_{jht} \cdot CAB_{jt}}{\text{World GDP}} \text{ where a country group is composed of } J \text{ economies and } \frac{\hat{\beta}_{iht} \cdot CAB_{it}}{\text{World GDP}}\right)$$

for major country i) for the dollar, the euro, the yen, and the pound zones.

In each panel of the figure, the solid black line in the graph indicates the current account balances of each currency zone. We can make interesting observations about the currency zone current account balances: the look of the four zones; the contrast between the dollar zone and US current accounts; the profile of crises within the dollar zone; and the profile of the euro zone balances.

First of all, the current accounts for the dollar and Deutsche mark/euro zones extend well beyond the US and euro area economies, respectively; but the yen and sterling zones do not extend much beyond Japan and the United Kingdom. This contrast is a straightforward implication of the currency zone weights displayed in Graph 5 above. However, the gap between the dollar zone, relative to the US economy and the euro zone relative to the euro area economy is striking. Indeed the

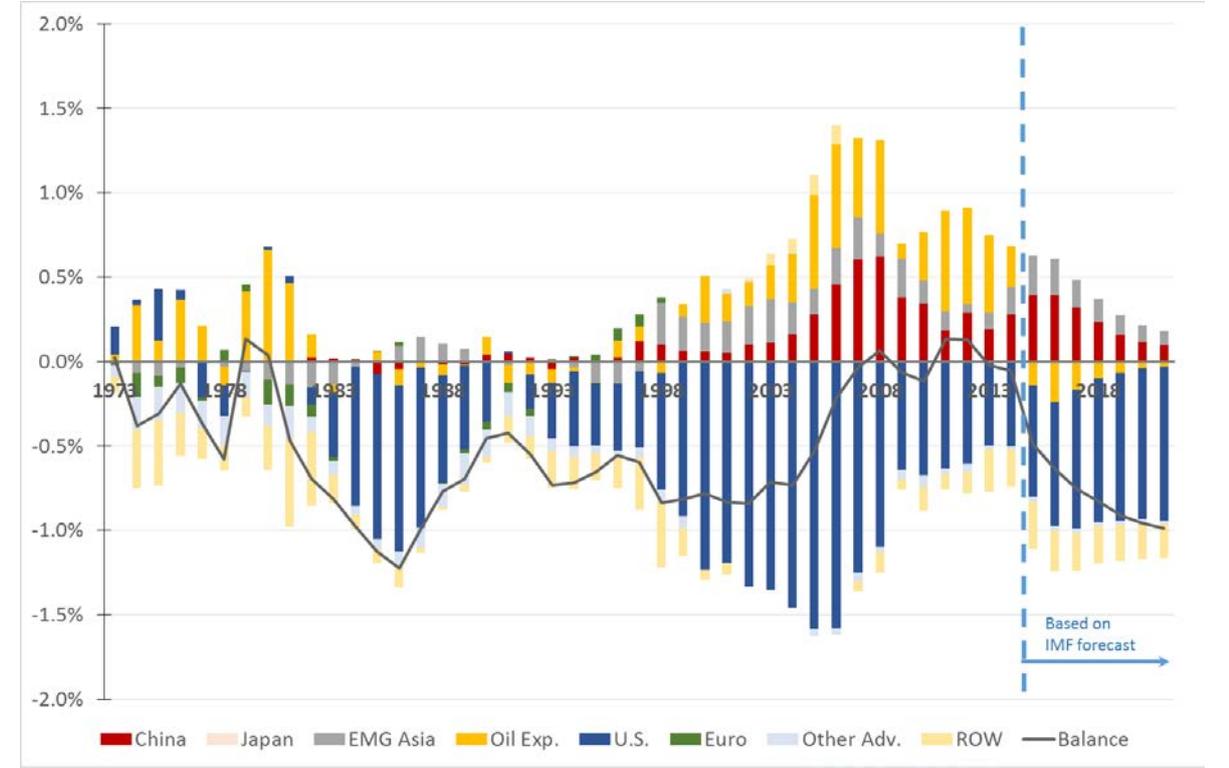
⁸ We follow the IMF's definition of country groups. Appendix 1 lists our sample countries.

Current account balances for the key currency zones, 1973-2021

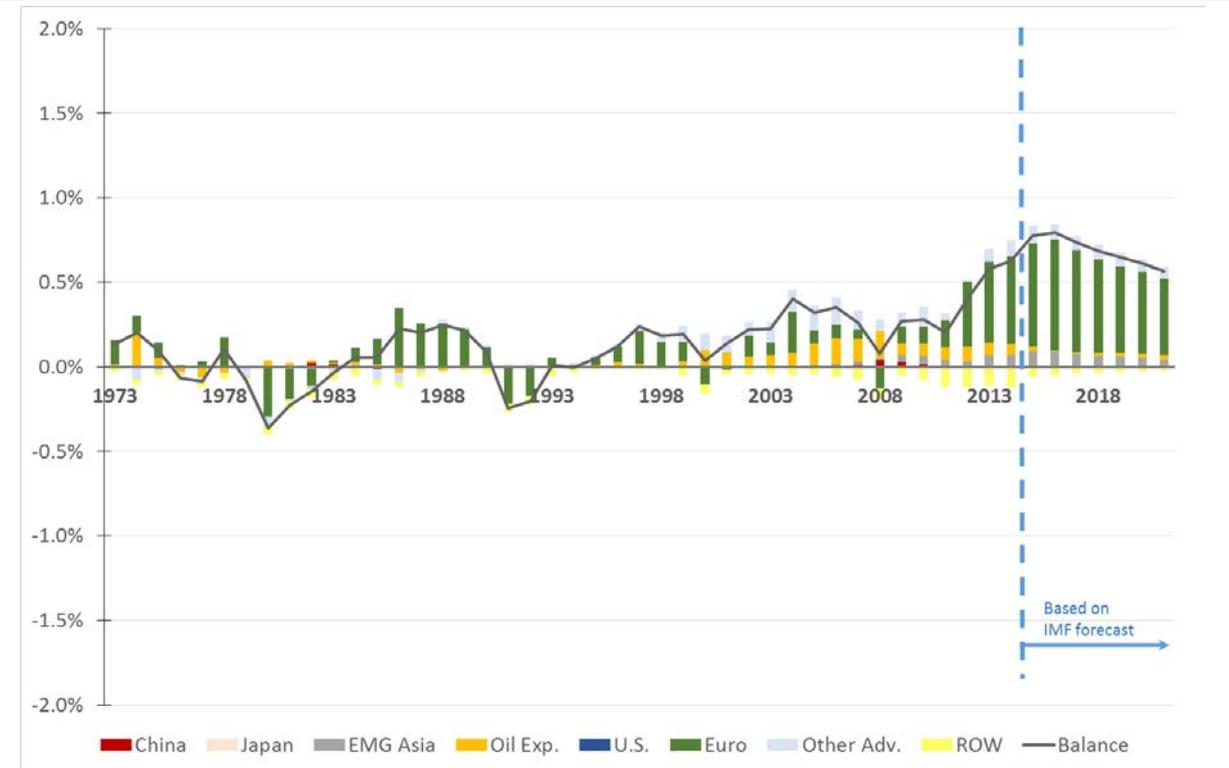
In percent of world GDP

Graph 6

(a) Dollar zone



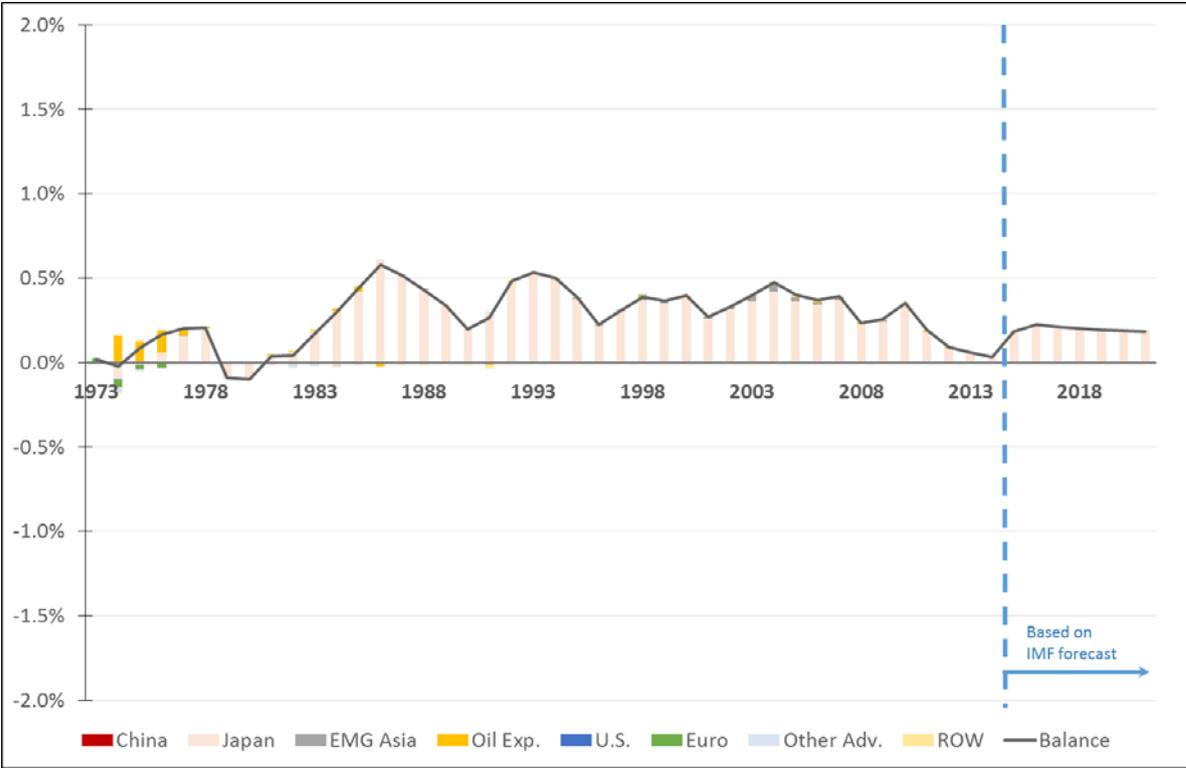
(b) Euro zone



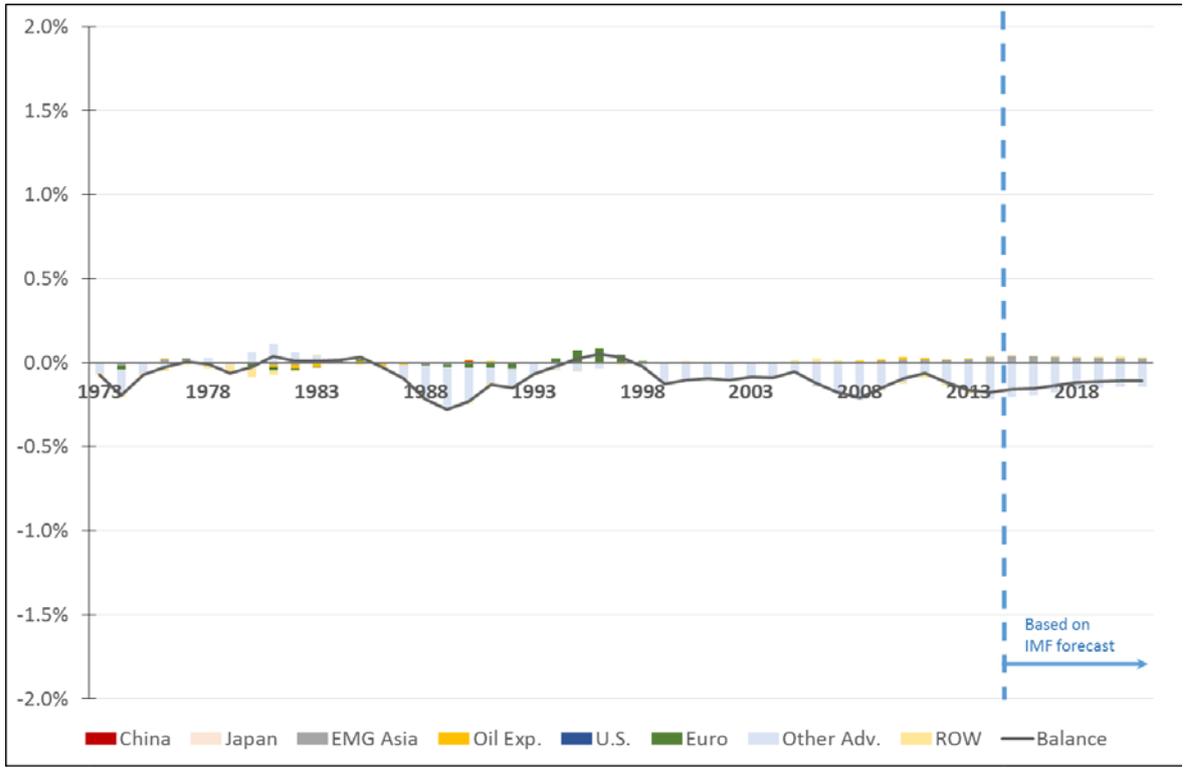
Current account balances for the key currency zones, 1973-2021 (con'd)

In percent of world GDP

(c) Yen zone



(d) Pound zone



graph for the dollar zone resembles Graph 2's rendering of conventional, nation-based current account balances. This highlights the dollar zone's predominance.

Second, the narrowing of the dollar zone current account in 2002-07 contrasts with the widening in the US current account deficit then and casts new light on forecast error of many economists. To be sure, the United States began to run current account deficits in the early 1980s and the deficits widened in the years leading up to the Great Financial Crisis of 2008. Graphs 2 and 5(a) show that US current account deficit became greater in the years from 2003 through 2007, averaging about 1.3 to 1.4 of world GDP. This is the time period when international economists started sounding the alarm about the sustainability of the US current account deficit and the possibility of a dollar plunge and unemployment in services on the way back to current account sustainability.

However, the dollar zone current account balance flattened out at less than 1% of global balance on the eve of the crisis. However, according to Panel (a) of Graph 5, the current account of the dollar zone flattened out at less than 1% of global GDP after the Asian Financial Crisis and narrowed in the mid-2000s to approach balance in 2007 on the eve of the crisis.⁹ In the years before and after the global financial crisis, the US current account deficits are financed by the surpluses of China, oil exporters, and emerging Asia. In other words, cross-financing within the dollar zone helped the current account of the zone to be balanced. The cross-financing in the dollar zone started becoming evident in the early 2000s and has been a big contributor since then.¹⁰

On this view of global imbalances, the rapid appreciation of the dollar in the aftermath of the Great Financial Crisis should not have surprised because the dollar zone in aggregate was running a balanced current account. Moreover, as we demonstrate below, the international investment position of the dollar zone was also near balance, similarly rendering a hard landing for the US dollar an unlikely scenario.

Third, dollar zone current accounts highlight similarities and differences in the major international crises. 1982 and 1997 were crises of non-US dollar borrowers, one might say crises in the dollar zone periphery. In 1980, Latin American and to a lesser extent, emerging East Asia were running current account deficits while the US current account was about balanced. The 1982 developing country debt crisis forced the current accounts of Mexico, Brazil, Argentina and the Philippines to narrow sharply. By 1984-85, the US current account deficit had grown to account for almost the entire dollar zone deficit and there was little in the way of surpluses elsewhere in the dollar zone to offset it. Similarly, the 1997 Asian financial crisis saw current accounts in emerging Asia swing from deficits to surpluses; the US current account deficit widened to absorb much of the shift. However, the Asian financial crisis differed in that it was followed by surpluses in emerging Asia in the dollar zone, as noted above.¹¹ These subsequently offset the widening of the US current account. Thus, while the national US current account reached its all-time widest in 2006, the dollar zone current account reached its widest in 1986.

⁹ Current account balances are subject to errors and omissions, so that current accounts in Graph 3 do not add up at zero. Currency zones balances may also be affected by errors and omissions.

¹⁰ Contrast to the savings glut of Bernanke (2005), a non-monetary model with unspecified source of Asian preference for US investment.

¹¹ Gruber and Kamin (2007) use a crisis dummy to explain the post-1997 widening of current account surpluses in East Asia.

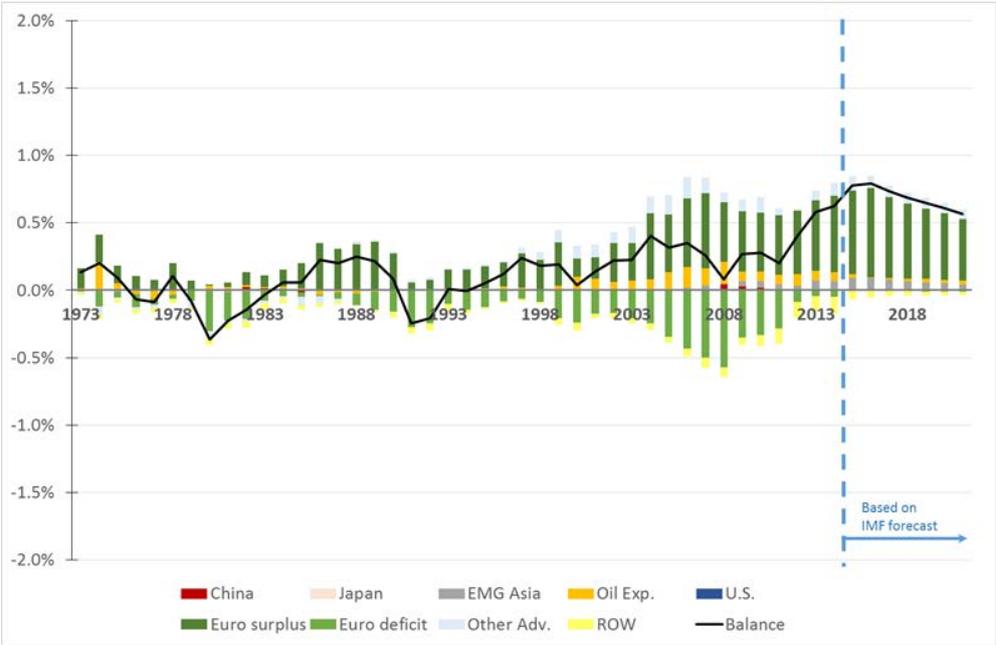
The Great Financial Crisis, by contrast, started as a crisis in the centre of the dollar zone, the United States. While the “Asian savings glut” pointed to trans-Pacific financing, the sub-prime crisis proved to be the undoing of European banks that had borrowed in dollars to finance holdings of securities backed by highly leveraged mortgages (Borio and Disyatat (2011, 2015), Shin (2012), Borio (2016)). The intra-dollar zone financing from China and other Asian economies sought genuinely safe assets like US Treasury and agency securities (Ma and McCauley (2013)). By contrast, dollar-funded financing by European banks proved hazardous, and when the banks realised the scale of their losses they found themselves with unintended short dollar positions and had to sell euros and sterling against the dollar. The sharp appreciation of the dollar against European currencies at the worst moments of the crisis is the sign that leveraged dollar assets, not long dollar positions, blew up.

After US house prices fell, the US current account narrowed, but the dollar zone current account remained near balance. This occurred because of the narrowing of China’s and emerging Asia’ surpluses and widening of deficits in emerging market economies. From the usual global imbalances perspective, a narrowing of current account surpluses points to greater global stability. However, it has been argued that the very accommodative monetary policies adopted in the United States, euro area, Japan and the United Kingdom have resulted in rapid accumulation of debt, both domestic currency and dollar-denominated, that leave the periphery of the dollar zone vulnerable. The risk is another financial crisis there BIS (2014, 2015).

Fourth, the eurozone (and DMzone) has run surpluses except after second oil shock and German re-unification. That said, its 2014-2015 surpluses were unprecedented, as a result of developments within the euro area. If we break out the euro area between surplus and deficit countries (Graph 7)¹², it is evident that the

Euro zone current account with surpluses and deficits in euro area

In percent of world GDP Graph 7



Sources: IMF, WEO; authors’ calculations.

¹² The currency-zone current account balances are divided into surplus country-years and deficit country-years, and the averages for each group are calculated.

eurozone's near balance in 2008 arose from the pattern of surpluses in the north of euro area being matched by deficits in the south of the euro area. These deficits narrowed after the outbreak of the Great Financial Crisis and narrowed further under the pressure of the European sovereign and bank strains of 2010-11. Again the crisis of 2010-11 was a crisis at the centre of a currency zone. The smaller size of the euro zone, in relation to the euro area itself, meant that the shift to surplus of the euro area was not offset by developments elsewhere in the euro zone. Thus while the narrowing of the post-crisis US current account left the dollar zone near balance, the similar increase in the euro area's surplus has left the euro zone in large surplus.

4.2 "Expanding universe"? Mostly within currency zones

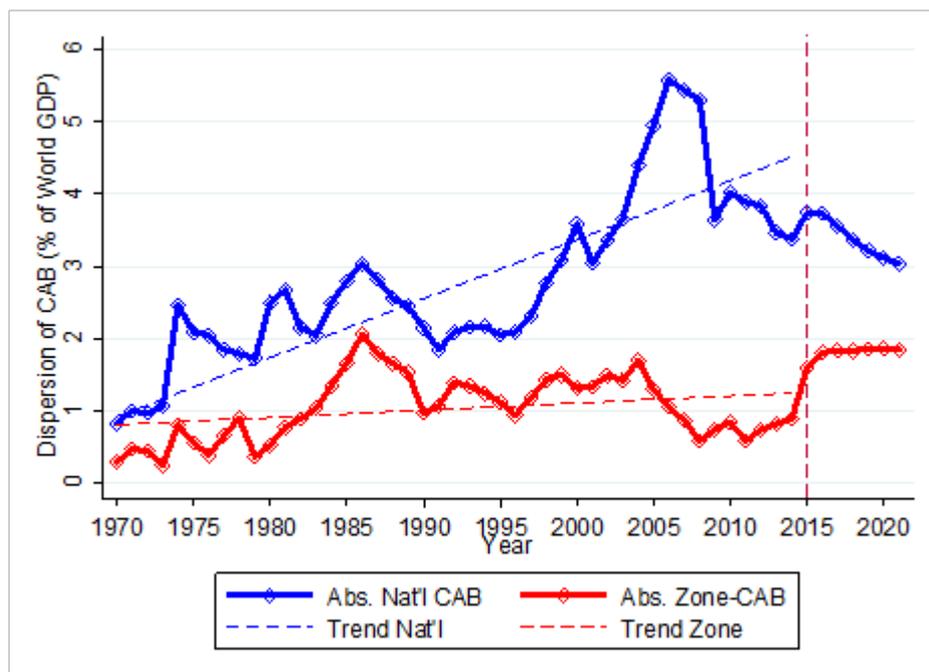
Greenspan (2003) famously mused that an "expanding universe" of portfolios subject to decreasing home bias had made it far easier for countries to finance current account deficits. Faruqee and Lee (2009) found that indeed, the dispersion of current accounts had been trending higher. In particular, they found that in the 45 years, 1960-2005 that the sum of absolute values of current accounts as a ratio of global GDP had been trending higher (Graph 8, solid blue line). We have updated their data through 2015, and the trend line (dashed blue line) suggests that aggregate current accounts are getting larger at the rate of 0.81% of global GDP per decade (p -value 0.000). Thus, our 10-year update supports the finding of Faruqee and Lee (2009), notwithstanding the sharp contraction in aggregate current accounts since 2006.

On the basis of our currency zone current accounts, however, we can say that the universe has expanded almost exclusively within currency zones. On Graph 8 the red line shows the sum of the absolute values of currency zone current accounts as a

Aggregate current account imbalances

As a percent of world GDP

Graph 8



Sources: IMF, WEO and IFS; authors' calculations.

share of global GDP. These show a statistically significant trend, but at the rate of only 0.010% per decade (p -value 0.049), one eighth that of national current accounts. Thus, one can almost say that the universe has expanded within but not across currency zones.

This fits in with what we know about Japan. There, between the foreign exchange reserves and the Government Pension Fund, there has been a shift of the long foreign exchange position arising from the accumulation of current account surpluses to the government sector. Given that there is little yen zone outside of Japan, the private sector has had a limited menu of yen bonds issued by those resident outside of Japan. And the volatility of the yen has made it hard for private insurance companies, pension funds, mutual funds and households to hold foreign currency bonds and thereby to extend financing across currency zones. Cross currency zone financing has not been an expanding universe in Japan.

4.3 Currency zone investment positions

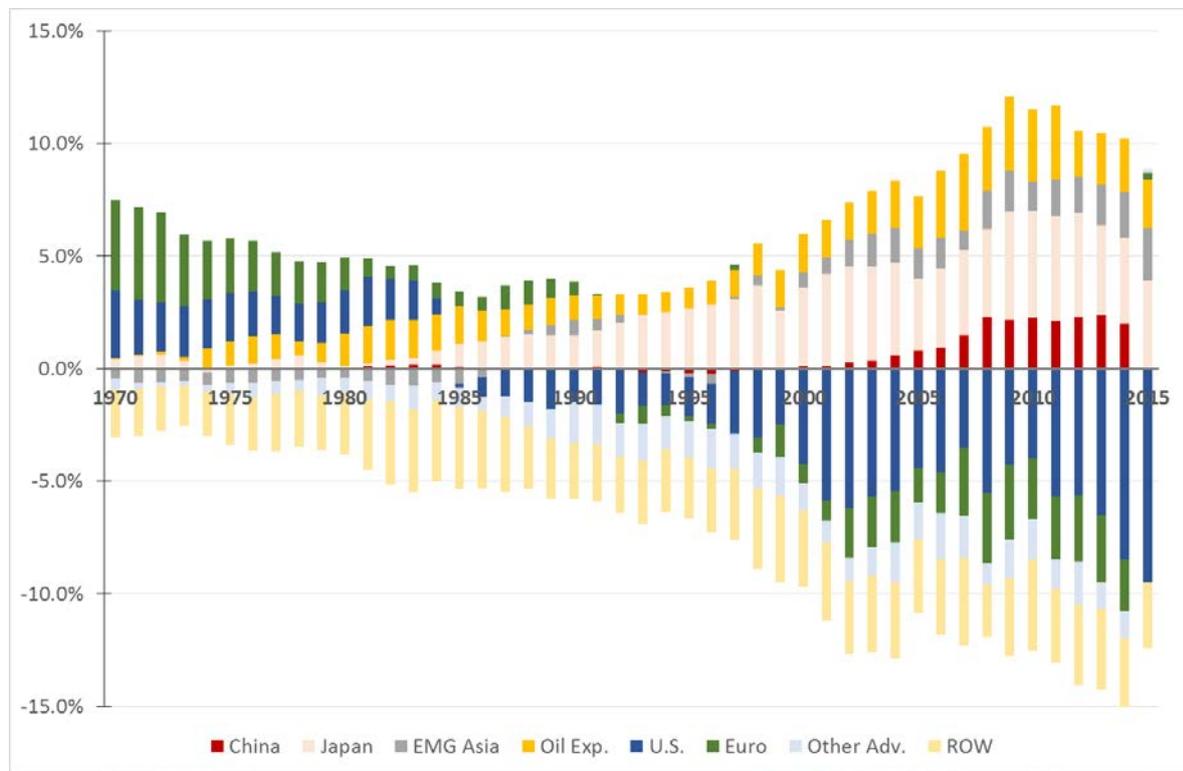
When we use the same method to derive net investment positions for currency zones,¹³ the finding above of near balance in the dollar zone current account on the eve of the Great Financial Crisis in 2007 is strongly reinforced. It makes sense to look at net investment positions—stocks rather than flows—because portfolio theory points us to the interaction of home bias in portfolio allocation and the distribution of wealth. Roughly speaking, current account balances are comparable to the increments to net investment positions. Even if the dollar zone was running a (flow) current account near balance in 2007, if it had a large (stock) net international investment liability, its financing might be more vulnerable to changes in investors' expectations.

Before showing the currency-zone net investment positions, Graph 9, similar to Graph 1, illustrates the net investment positions of the same countries and country groups as before. For the data on net investment positions, we use the dataset developed by Lane and Milesi-Ferretti (2001; 2007; and updates).¹⁴

Graph 9 illustrates that the United States became a debtor country in 1985 (strictly speaking a country with net international investment liabilities, including equity positions), and that its position has since become unevenly more negative. That is consistent with its running current account deficits persistently (except for 1991) while valuation effects of the fluctuating value of the dollar have contributed to cyclical ups and downs of the net investment position as recognized by Tille (2003). To some extent, Japan's position has been a mirror image of the United States, as its creditor position has unevenly increased since the early 1980s. Oil exporters have been persistent creditors since the first oil shock of 1973, and their position improved especially in the second half of the 2000s. In aggregate, the euro area has been a debtor since German re-unification in the early 1990s, and the extent of indebtedness increased since 2007. China became a noticeable creditor in the mid-2000s, but the scale of its creditor position has not reached that of Japan.

¹³ See Appendix 4 for gross investment positions by currency zone.

¹⁴ We update the data for the years after 2011 through 2015 using investment position data of the IMF *International Financial Statistics*.



Source: IMF, WEO.

Now, we partition each economy's net investment of positions into the four currency zones. In Graph 10, we present the net investment positions of dollar and euro zones. In panel (a), the net investment position of the dollar zone was approaching balance before the Great Financial Crisis is more or less balanced, after a long deterioration in the 1980s and 1990s. The currency-zone net investment positions is another compelling piece of evidence that the emphasis on global imbalances before the Great Financial Crisis was misplaced, at least as far as the dollar zone is concerned. Within the dollar zone, creditor countries financed debtor countries, so that inter-currency-zone financing was not much of an issue.¹⁵

Panel (b) shows the euro zone international investment position. It is easier to discern but on inspection does not differ much from that of the euro on Graph 9.

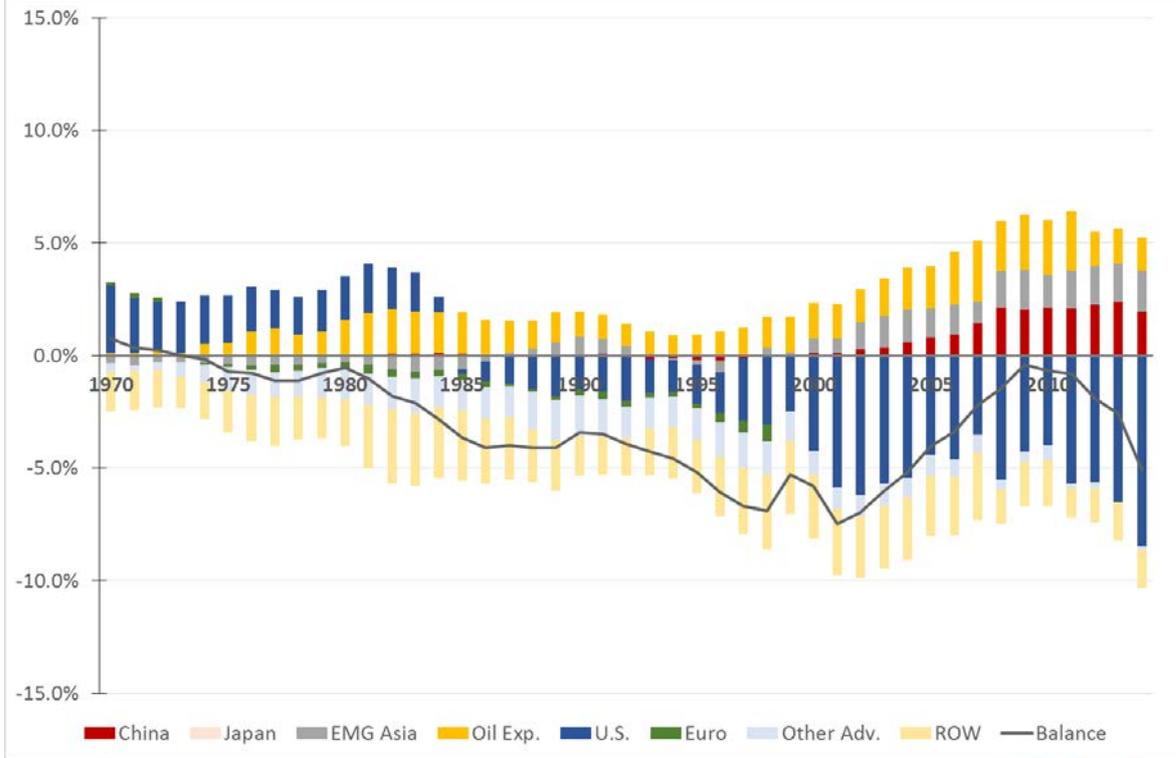
¹⁵ By contrast, in the late 1990s and the early 2000, when crises occurred in the periphery of the dollar zone in emerging markets in Asia, Brazil, Russia, and Argentina the dollar zone was heavily indebted. Ito and McCauley, Currency zones

Net investment position by currency zones, 1970-2015

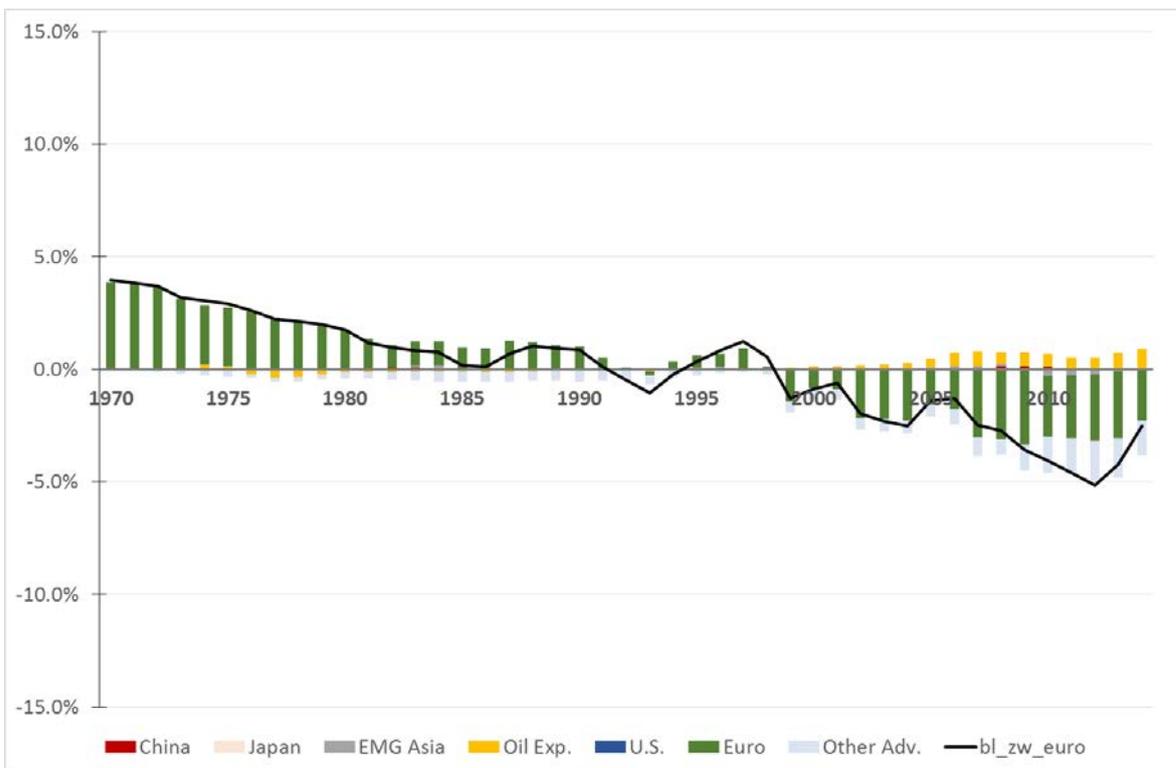
In percent of world GDP

Graph 10

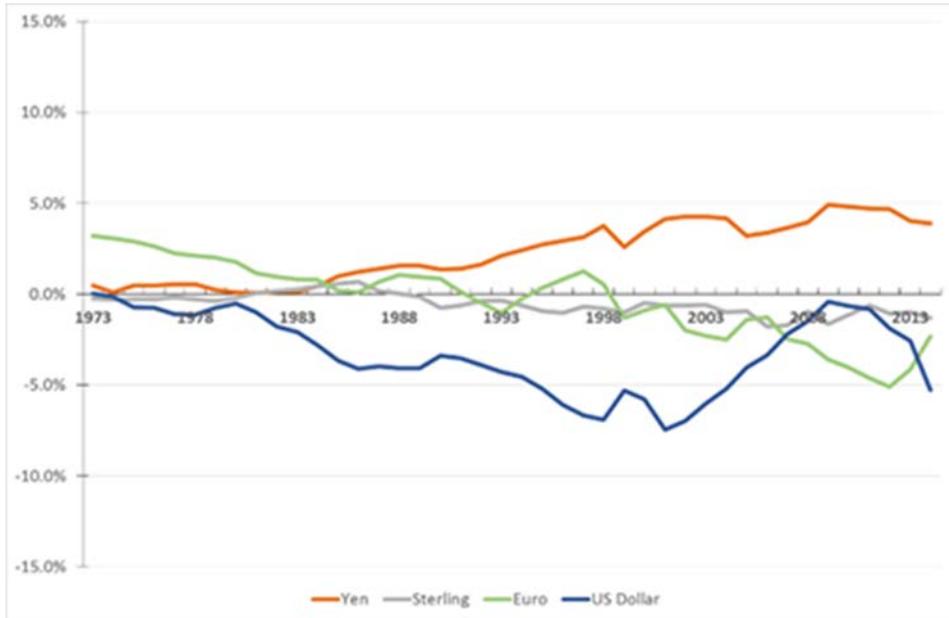
(a) Dollar zone



(b) Euro zone



(c) Currency-zone net investment positions

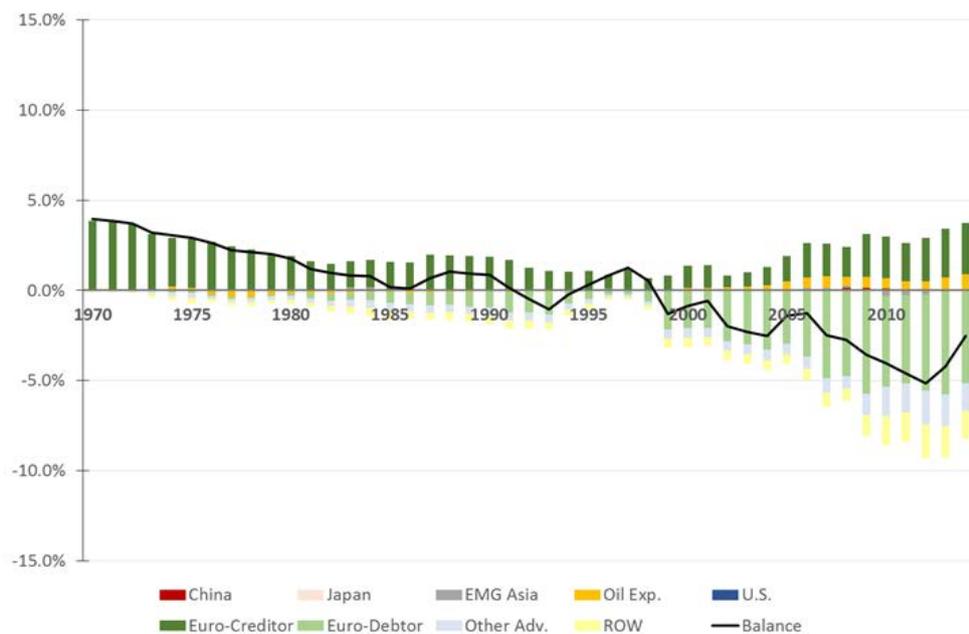


Graph 11 breaks out creditor and debtor countries separately for the euro area. Debtor positions in the south of Europe grew after monetary union until 2013. The reduction of the negative position in 2014, along with the ongoing growth of creditor position in north Europe has seen a quick improvement in the currency zone’s net investment position since 2012.

Euro zone net investment position with net positions in euro area

In percent of world GDP

Graph 11



Sources: IMF and authors' calculations

4.4 Outlook for currency zone current accounts

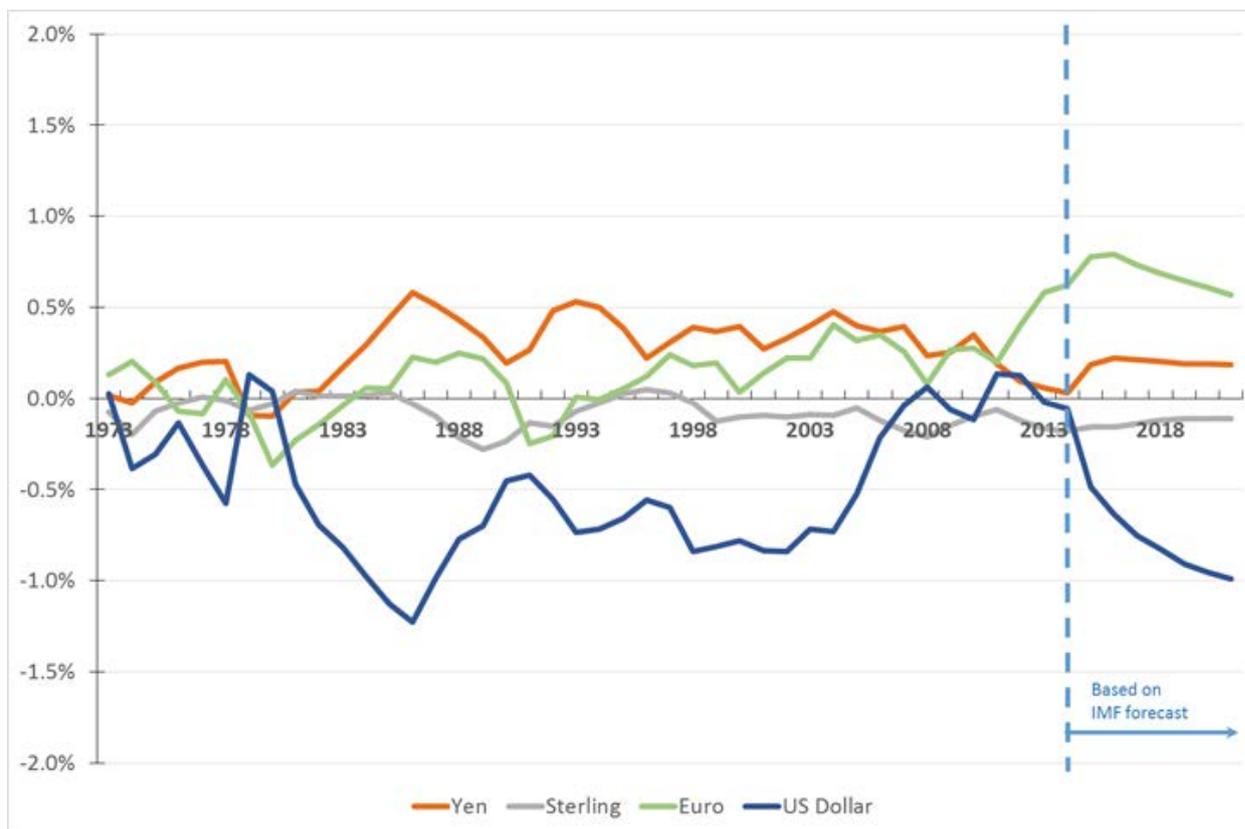
Looking forward, the IMF's forecasts of current accounts, along with unchanged currency zone weights, imply that the dollar zone's current account balances are on a sharply downward path from 2015-2021. That is mainly owing to predicted deficits by oil exporters, reflecting the decline in oil prices. In addition, the IMF projects the Chinese current account surplus to gradually diminish towards 2021, while the US deficit expands. Based on these assumptions, the dollar zone's current deficit may widen to a share of world GDP last seen in the mid-1980s.

As when the dollar zone ran current account deficits in the 1980s and 1990s, private investors and borrowers will have to provide the financing across the euro and yen zones, on the one hand, and the dollar zone on the other (Graph 12). In other words, in a few years we may look back on years when the dollar zone current account was near balance, as the late 1970s and around the Great Financial Crisis, as exceptional in retrospect. Moreover, the yen-zone (essentially the Japanese) current account surplus is forecast to dwindle over time. This leaves the bulk of the financing for the projected dollar zone current account to come from the euro area. If the IMF's projections prove accurate, the dynamics of the dollar/euro exchange rate will have an importance in international finance that it has mostly not had in the years since the introduction of the euro in 1999.

The dollar zone current account could prove even larger in the years ahead if the Chinese authorities fulfill their stated intention to manage the renminbi with respect to a basket of currencies. We consider this scenario in Section 6, below.

Currency-zone current account balances, 1973-2021

Graph 12



Source: IMF, WEO; authors' calculations.

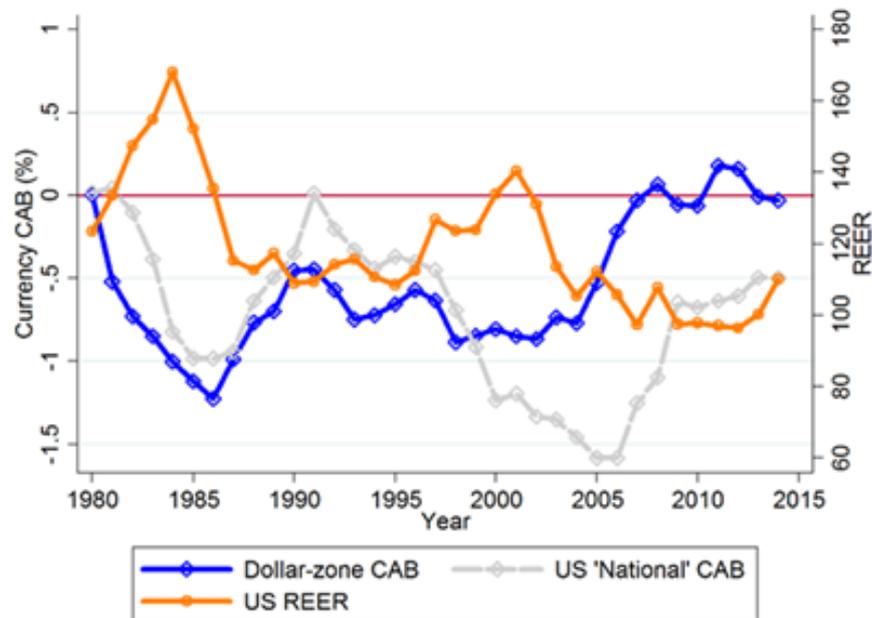
5 Connection of current accounts and exchange rates

Conceptually, the exchange rate of a currency should be negatively correlated with the currency issuer's current account. Such thinking formed the basis for the mid-2000s predictions that U.S. persistent current account deficits should lead to a significant decline of the dollar. Such was the case in the mid- to late-1980s, when first a strong dollar accompanied a wide current account deficit and then a depreciated dollar accompanied a relatively narrow current account deficit. The correlation broke down in the early 2000s, however, as the dollar depreciated after its peak in 2001 but the US current account kept widening.

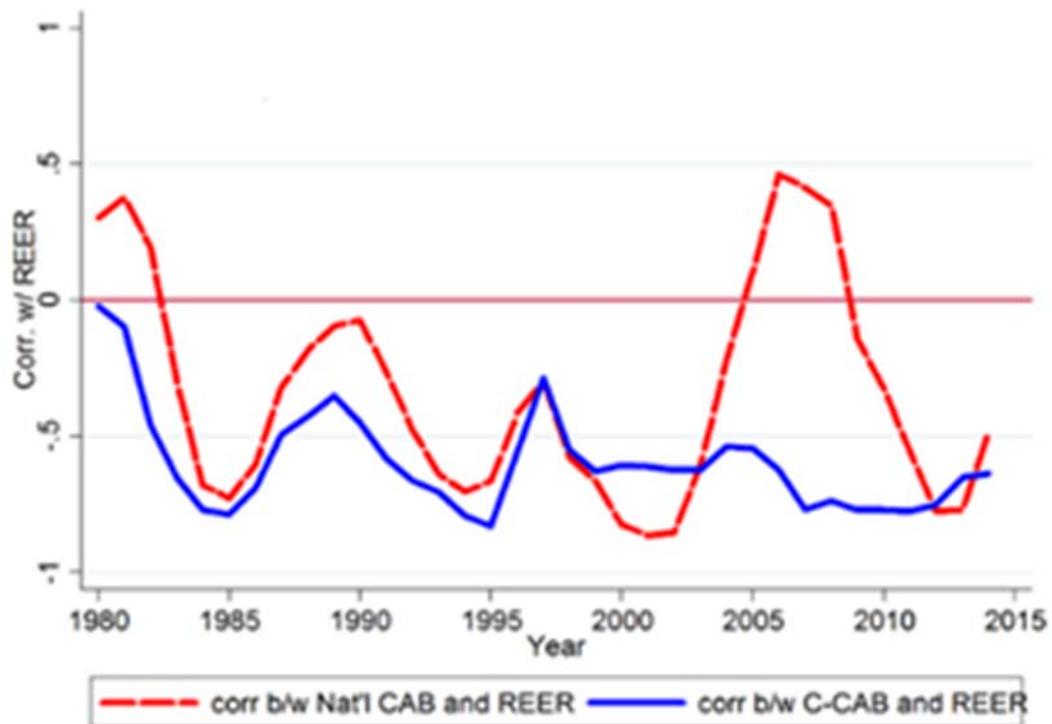
This section shows that the dollar's value is more consistently connected to the dollar zone current account than to the US current account. This is essentially the result of the zone's current account approaching balance in the mid-2000s, at a time when the dollar was relatively depreciated. Shifting from the US current account deficit to that of the dollar zone keeps the connection to the exchange rate.

The top panel of Graph 13 show the figures for the real effective exchange rate (REER) of the dollar and the U.S. current account and the current account of the dollar zone. The dollar zone current accounts are the same as those illustrated in Graphs 6 and 12. The REER is the Bank for International Settlement's "broad" index.

(a) Dollar zone and US current account balances in percent of world GDP



(b) Rolling 10-year correlation between current account balances and US dollar REER



Source: IMF and authors' calculations.

The bottom panel of Graph 13 displays the correlation between the REER and the (conventional or "nation-based") US current account in red and the one between the REER and the currency-zone current accounts with rolling ten year windows for the dollar and the euro in blue. The correlation between the REER and the currency-zone current accounts appears to be rather stable and persistently negative while the

correlation between the REER and the US (national) current account fluctuates. Although these correlations track each other into the 1990s, they part ways in the early 2000s. Indeed, the correlation between the dollar and the US current account becomes quite positive in the late 2000s.

The above observations imply that the dollar's exchange rate serves as an equilibrating mechanism for a larger economic area than the US economy. One could argue that the dollar zone deserves its own exchange rate index, but the conceptual and measurement issues that it entails are outside the scope of this paper. For now, we can show that the choice of the BIS REER is not decisive for our result.

Thus, we examine the bivariate correlation between various measures of the dollar's exchange rate and the US and dollar zone current accounts. Table 1 reports the correlation coefficients for the full sample and for the first and second halves of the sample (which breaks the sample at the Asian financial crisis). For the full sample, the correlation between the dollar zone current account and the dollar's exchange rate is not significant only for the BIS REER shown in Graph 13. The Federal Reserve Board's nominal effective exchange rate (NEER0, the BIS NEER and the Board's REER all show significantly negative correlations. Splitting the sample demonstrates that it is in the second subsample, when the dollar zone current account most differs from the US current account that the dollar zone correlation is larger in absolute value and extremely significant.

These results safely allow us to conclude that the dollar-zone current account is more connected than the US current account to the dollar's exchange rate. And this result does not depend on the choice of dollar index.

Correlation between US and dollar current accounts and dollar's exchange rate						Table 1
	Full sample: 1970-2015		1970-96		1997-2015	
	US CAB	Dollar-zone CAB	US CAB	Dollar-zone CAB	US CAB	Dollar-zone CAB
FRB's NEER	0.203 (0.191)	-0.538 (0.000)***	-0.155 (0.470)	-0.257 (0.225)	-0.199 (0.413)	-0.839 (0.000)***
BIS NEER	0.237 (0.112)	-0.447 (0.001)***	-0.064 (0.752)	-0.140 (0.488)	-0.197 (0.418)	-0.838 (0.000)***
FRB'S REER	-0.091 (0.563)	-0.431 (0.004)***	-0.126 (0.559)	-0.232 (0.276)	-0.164 (0.503)	-0.724 (0.001)***
BIS REER	0.169 (0.262)	-0.228 (0.128)	0.039 (0.847)	0.012 (0.951)	-0.080 (0.746)	-0.684 (0.001)***

Source: IMF; authors' calculations.

Note: CAB = current account balances. NEER = nominal effective exchange rate; REER = real effective exchange rate. Figures in parentheses are p-values.

6. China's adoption of basket management of the renminbi

Given the significant contribution of China's financing to the dollar-zone current accounts, the stabilisation of the renminbi against a trade-weighted basket could shrink the dollar zone and alter the current account balances of the dollar zone and other zones. This section analyses such a scenario.

Thus far, we have disaggregated our sample countries' current account balances into the four currency zones depending on the estimated weights on the four currencies for each currency. We have seen the important role China played in financing the U.S. current account deficit along with other emerging market economies. Thus far, the data have indicated that the renminbi belongs predominantly to the dollar zone.

The top panel of Graph 14 plots the average of the estimated currency weights for the renminbi for each of the three-year periods from 1993 through 2013. As the panel shows, the estimated share of the U.S. dollar in China's currency basket has been persistently high, ranging from 94% (in 2008-10) to 100%.¹⁶ In the context of currency-zone current account balances, these high dollar shares indicate that China has significantly contributed to helping to balance the dollar-zone current accounts.

However one interprets the data for 2005-15, on December 2015 the China Foreign Exchange Trade System (CFETS, which is run by the People's Bank of China) published its own index for the renminbi, based on 13 currencies traded on CFETS. This new index was published alongside the BIS NEER for the renminbi. At writing, market participants are divided in their interpretation of the role of a currency basket in the management of the renminbi. However, it is fair to say that most market participants now take seriously the notion that the Chinese authorities are managing the renminbi with reference to, if not strictly based on, a basket.

Thus, it is worthwhile to ask what if the Chinese currency were to respond to the movements among the major currencies as needed to stabilise its effective exchange rate. In particular, we investigate what would happen to the dollar-zone current account balance if the Chinese dollar weight were systematically reduced. For that, the weights which the BIS uses to construct the "broad" NEER index offer a way to compute the stabilising currency weights. The BIS weights thus allow us to see what would happen to the currency-zone current account balances if the renminbi had different, less dollar-centric, currency weights.

The BIS uses the data on the trade volume of 61 countries since 1993 to calculate the "broad" EER index series, and it revises the weights every three years.¹⁷ For China, the euro weight is currently 18.7%, the US dollar weight, 17.8%, the Japanese yen weight, 14.1% and the British pound, 2.9%, for a total of 53.5%. For the other 57 currencies with an aggregate weight of 46.5% in the renminbi NEER, including the largest, Korea, at 8.5%, we use the weights on the four currency-zones we have already estimated. For instance, most of Korea's 8.5% is added to the renminbi's weight on the dollar. We thus derive new currency weights for dollar, euro, yen and

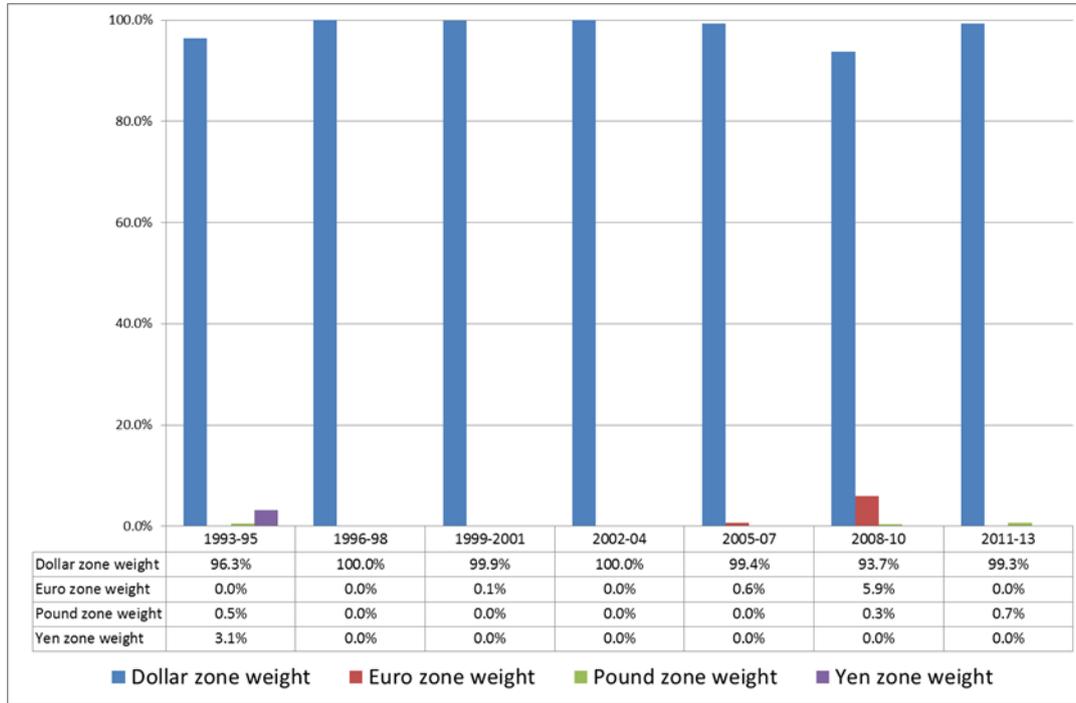
¹⁶ Such results accord with Frankel and Wei (2007). However, see Ma and McCauley (2011) and Ma et al (2012), who argue that the renminbi's management needs to be assessed at lower frequency, and that doing so allows the references to a basket management of the renminbi since 2005 to be taken seriously.

¹⁷ The most recent weights are for the 2011-13 period.

Estimated key currency weights and BIS weights for renminbi NEER

Graph 14

(a) Estimated currency weights



(b) BIS weights for renminbi NEER



Source: BIS; authors' calculations.

pound based on the BIS weights for China and the response of the loading of the 57 currencies on the four.¹⁸

The bottom panel of Graph 14 plots the resulting weights on the four key currencies that would have stabilised the renminbi effective exchange rate from 1993 through 2013. In the figure, we can see that the share of the dollar is much smaller than the currency weights we estimated previously. The graph shows that the dollar share hovered around 50-55% through the mid-2000s, and has since trended downward to only 41.4% in the 2001-13 period. In contrast, the euro share, starting around 20% in the 1990s, has risen gradually since the mid-2000s and peaked at 38.6% in 2011-13. The yen share has dwindled from 24.1% in 2002-04 to 14.4% in 2011-13.

Now we proceed to restate the currency-zone current accounts in the scenario in which the renminbi no longer sits squarely in the dollar zone in accord with our estimates. Instead, the renminbi's key currency weights are assumed to reflect the BIS NEER weights and partner currencies' key currency weights.

Panel (a) of Graph 15 shows how the dollar zone current account as a percentage of world GDP is reduced by the hypothesised basket management of the renminbi. The graph shows the current account balances for the dollar and the euro zones in 1993 through 2020. The currency-zone current accounts after 2014 assume that i) key currency weights for all 56 currencies other than the renminbi would take the values as of 2014, ii) the renminbi weights would be as described, and iii) individual countries' current accounts are as projected by the IMF.¹⁹

The dollar-zone current account as plotted in Graphs 6 and 12 above, shown as a red dotted line, lies above the hypothetical dollar zone current account with basket management of the renminbi is shown as a blue solid line. (For reference, the gray line shows the dollar-zone current account in the case where China's current account balances are not included, ie, the case where China left the dollar zone completely.) The contrast between the dotted red line and the solid blue line suggests that the dollar zone current account would be considerably wider, by something like a quarter of a percent of world GDP, were the renminbi's weight on the dollar to fall to about half. This would basically close the gap between the dollar zone and US current account deficit, shown as a yellow broken line. Conditional on the IMF projections of China's declining current account surpluses, the effect would decline over time.

The main corresponding increase in currency zone current accounts would be that of the euro zone. This is shown in the bottom panel of Graph 15, where again the red broken line shows the previously estimated euro zone current account surplus and the blue line shows the effect of a larger weight on the euro by the renminbi.

It should be noted that these results are partial in the sense that China's exchange rate management is assumed to change, while that of her important trading partners are assumed to continue as before. In reality, the management of the renminbi against China's trade-weighted exchange rate would tend to draw neighbouring currencies away from the dollar. This is the logic of Ito et al (2009).

¹⁸ The weight for currency zone h is $\sum_j w_{BISj} \cdot \widehat{\beta}_{jh}$ where w_{BISj} is the currency weight in the BIS basket of country j which is one of China's 60 trading partners in the BIS basket and $\widehat{\beta}_{jh}$ is the currency weight we previously estimated for country j and currency zone h .

¹⁹ We use the forecasts from the World Economic Outlook of October 2015. We omit presenting the comparable figures for the pound and yen zones because the currency-zone current accounts do not differ much from the UK or Japanese "national" current accounts, respectively.

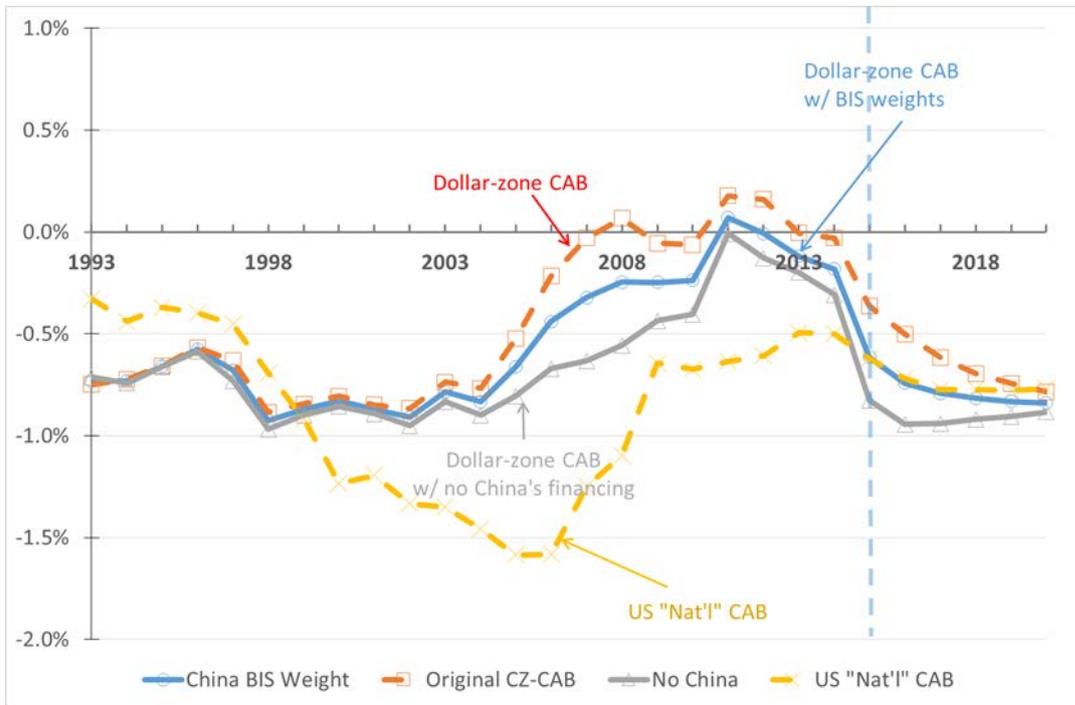
Current account balances for the dollar and euro zones, 1993 – 2014

What if the renminbi had currency weights in line with the renminbi's BIS NEER?

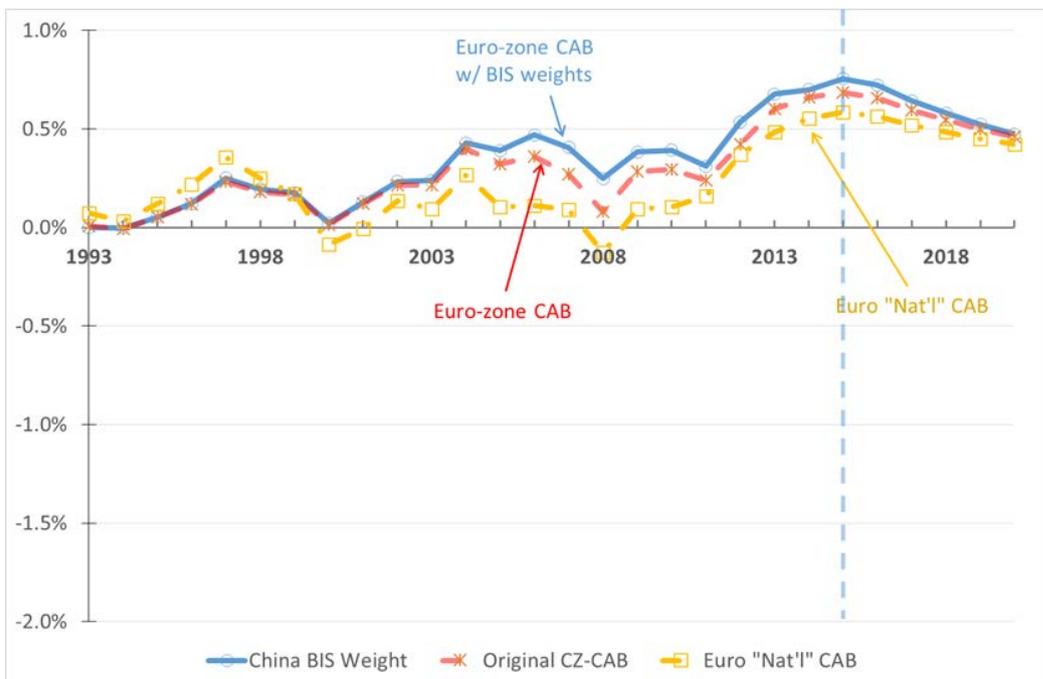
In Percent of World GDP

Graph 15

(a) Dollar zone



(b) Euro zone



Several observations can be made. First, China's financing within the dollar zone, which became large in the mid-2000s, contributed significantly to balancing the dollar zone current account. China's membership in the dollar zone boosted the dollar zone current account by as much as 0.5% of world GDP, which is not unsubstantial. Second, the contribution of China's financing in the dollar zone would halve if China lowers the renminbi's co-movement with the dollar in order to stabilize its NEER. Third, other current account surplus countries in the dollar zone, such as emerging Asia and oil exporters contributed much to balancing the dollar-zone current account balances in the period since the mid-2000s, improving the trend of the dollar-zone current account balances even without China's contribution. Finally, basket management by China would only enlarge the dollar zone deficit in the years ahead and deprive the United States of ready intra-zone financing of its projected wider deficit.

7. Conclusions

This paper tries to break free of the often unstated assumption that currencies and agents are confined to national economies. We have shown how different international finance looks when the key currencies are taken to be the unit of analysis rather than economies.

Contrary to the precarious look of the US current account deficit in the mid-2000s, we have shown that the dollar zone current account was near balance. Countries whose currencies co-moved with the dollar, whose investors therefore saw dollar investments as posing relatively low risk, were running current account surpluses that matched the US deficit.

Looking forward, IMF projections imply that the dollar zone will return to the sizeable deficits that were last seen in the mid-1980s. On these projections, the euro/dollar rate and its dynamics will prove more important in international finance than at any time during the euro's 17 years of existence.

If the renminbi is managed against its trade-weighted basket, the dollar zone deficit will be all the wider. The need for cross-zone financing will be equally larger. In this case, the smaller role of the dollar as an anchor for currencies could indeed make a difference.

Appendix 1: Country list (172 economies)

China	Oil Exporters	Croatia	Panama
Japan	Algeria	Djibouti	Papua New Guinea
United Kingdom	Angola	Dominica	Paraguay
United States	Bahrain	Dominican Republic	Peru
Euro Area countries	Brunei	Ecuador	Poland
Austria	Congo, Rep.	Egypt, Arab Rep.	Romania
Belgium	Gabon	El Salvador	Russian Federation
Cyprus (2008-)	Iran, Islamic Rep.	Equatorial Guinea	Rwanda
Estonia (2011-)	Iraq	Eritrea	Sao Tome and Principe
Finland	Libya	Ethiopia	Samoa
France	Nigeria	Fiji	Senegal
Germany	Norway	Gambia, The	Seychelles
Greece (2001-)	Oman	Georgia	Sierra Leone
Ireland	Qatar	Ghana	Solomon Islands
Italy	Saudi Arabia	Grenada	South Africa
Latvia (2014-)	Trinidad and Tobago	Guatemala	Sri Lanka
Lithuania (2015-)	Turkmenistan	Guinea	Sudan
Luxembourg	United Arab Emirates	Guinea-Bissau	Suriname
Malta (2008-)	Venezuela, RB	Guyana	Swaziland
Netherlands	Other Countries	Haiti	Syrian Arab Republic
Portugal	Afghanistan	Honduras	Tajikistan
San Marino	Albania	Hungary	Tanzania
Slovakia (2009-)	Antigua and Barbuda	Jamaica	Togo
Slovenia (2009-)	Argentina	Jordan	Tonga
Spain	Armenia	Kazakhstan	Tunisia
Other advanced economies	Aruba	Kenya	Turkey
Australia	Azerbaijan	Kiribati	Uganda
Canada	Bahamas, The	Kuwait	Ukraine
Denmark	Bangladesh	Kyrgyz Republic	Uruguay
Cyprus	Barbados	Lao PDR	Vanuatu
Estonia	Belarus	Lebanon	Yemen, Rep.
Greece	Belize	Lesotho	Zambia
Iceland	Benin	Liberia	Zimbabwe
Israel	Bhutan	Madagascar	
Latvia	Bolivia	Malawi	
Lithuania	Botswana	Maldives	
Malta	Brazil	Mali	
Slovakia	Bulgaria	Mauritiana	
Slovenia	Burkina Faso	Mauritius	
United Kingdom	Burundi	Mexico	
Emerging Asia	Cote d'Ivoire	Micronesia, Fed, States	
Hong Kong	Cambodia	Moldova	
Indonesia	Cameroon	Mongolia	
India	Cape Verde	Morocco	
Korea	Central African Republic	Mozambique	
Malaysia	Chad	Myanmar	
Philippines	Chile	Namibia	
Singapore	Colombia	Nepal	
Taiwan	Comoros	Nicaragua	
Thailand	Congo, Dem. Rep.	Niger	
Vietnam	Costa Rica	Pakistan	

Appendix 2: Data descriptions and sources

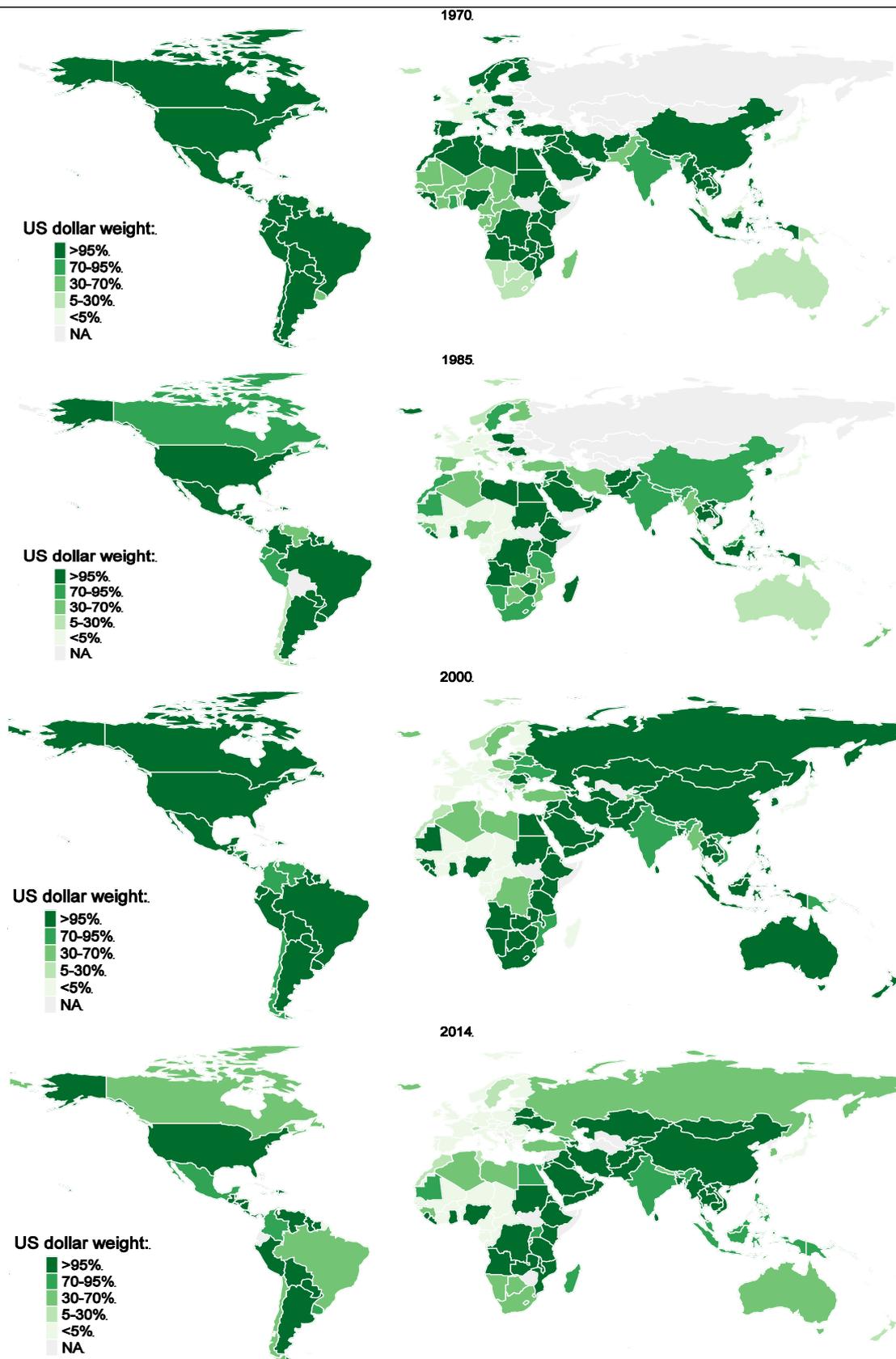
Current account balances – Data are extracted from the IMF's *World Economic Outlook*, *International Financial Statistics*, and the World Bank's *World Development Indicators*.

Nominal GDP – Data are extracted from the IMF's *World Economic Outlook* and the World Bank's *World Development Indicators*.

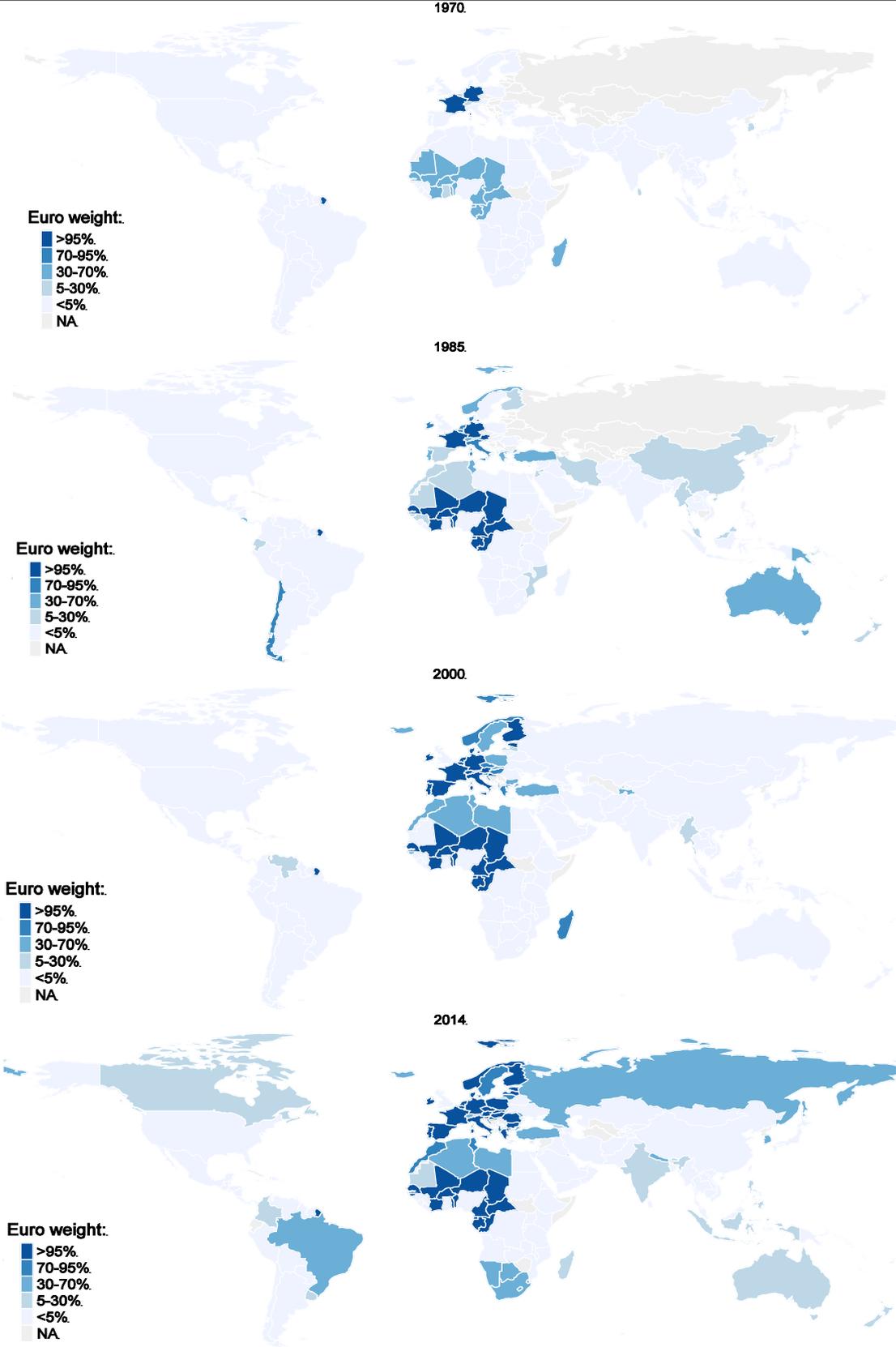
Currency weights – Estimated as explained in the text with moving 36-month rolling regressions, using monthly data from the IMF's *International Financial Statistics*. Outliers observed for the estimated $\hat{\beta}_{iht}$ due to financial or macroeconomic turbulences are deleted on a monthly basis. Any significantly negative $\hat{\beta}_{iht}$ is assumed to be a missing estimate and a statistically insignificant negative $\hat{\beta}_{iht}$ is replaced with a value of zero. Likewise, any $\hat{\beta}_{iht}$ that is significantly no greater from the value of one is replaced with the value of one, while $\hat{\beta}_{iht}$ significantly greater than one is replaced with a missing variable. Once outliers are removed and some estimates are replaced with other valued on a monthly basis, they are annually averaged to create annual data series.

Real effective exchange rates (REER), weights to construct the REER – Data are extracted from the Bank for International Settlement's website.

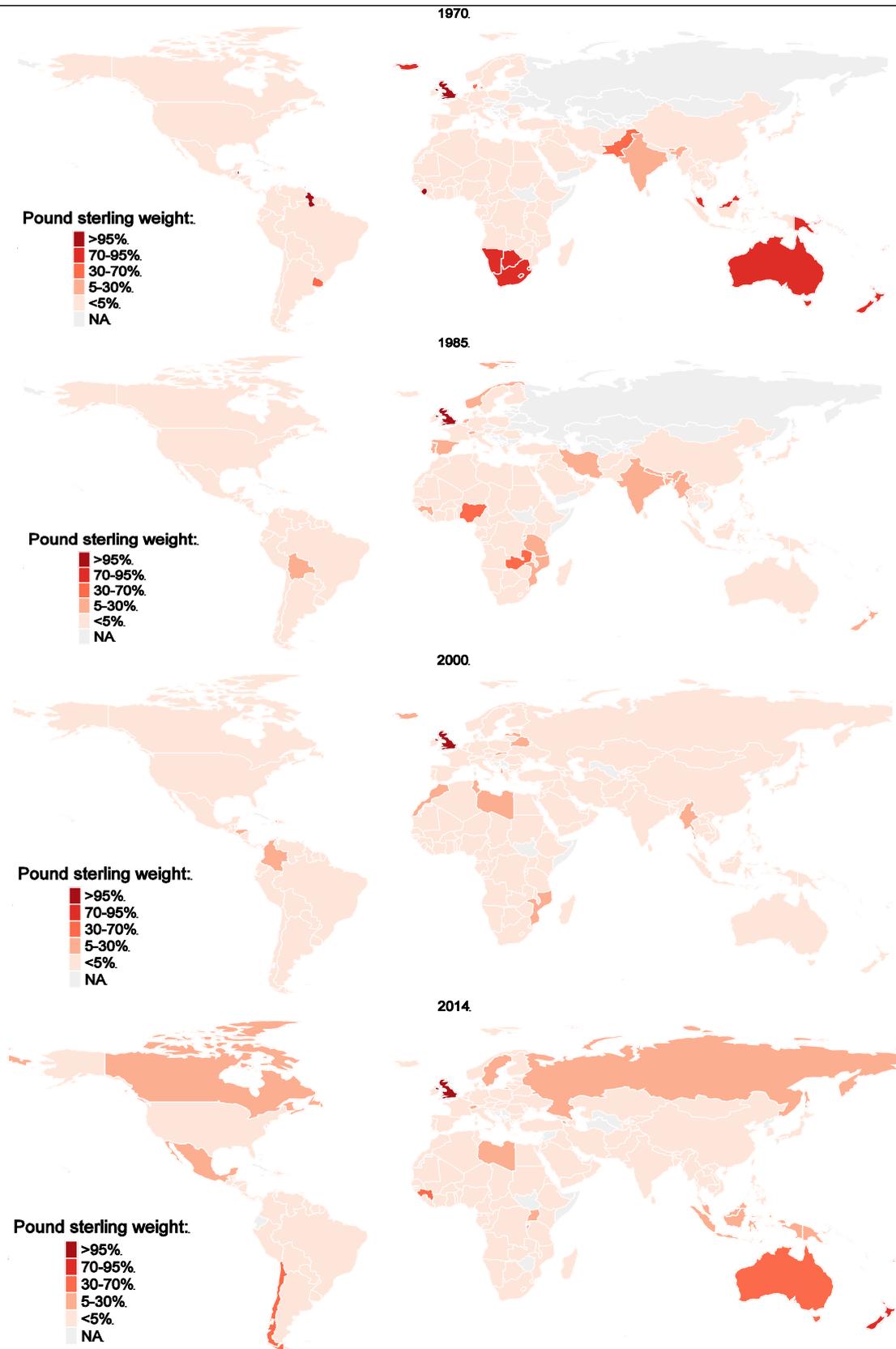
Appendix 3: Graph 5A-5D



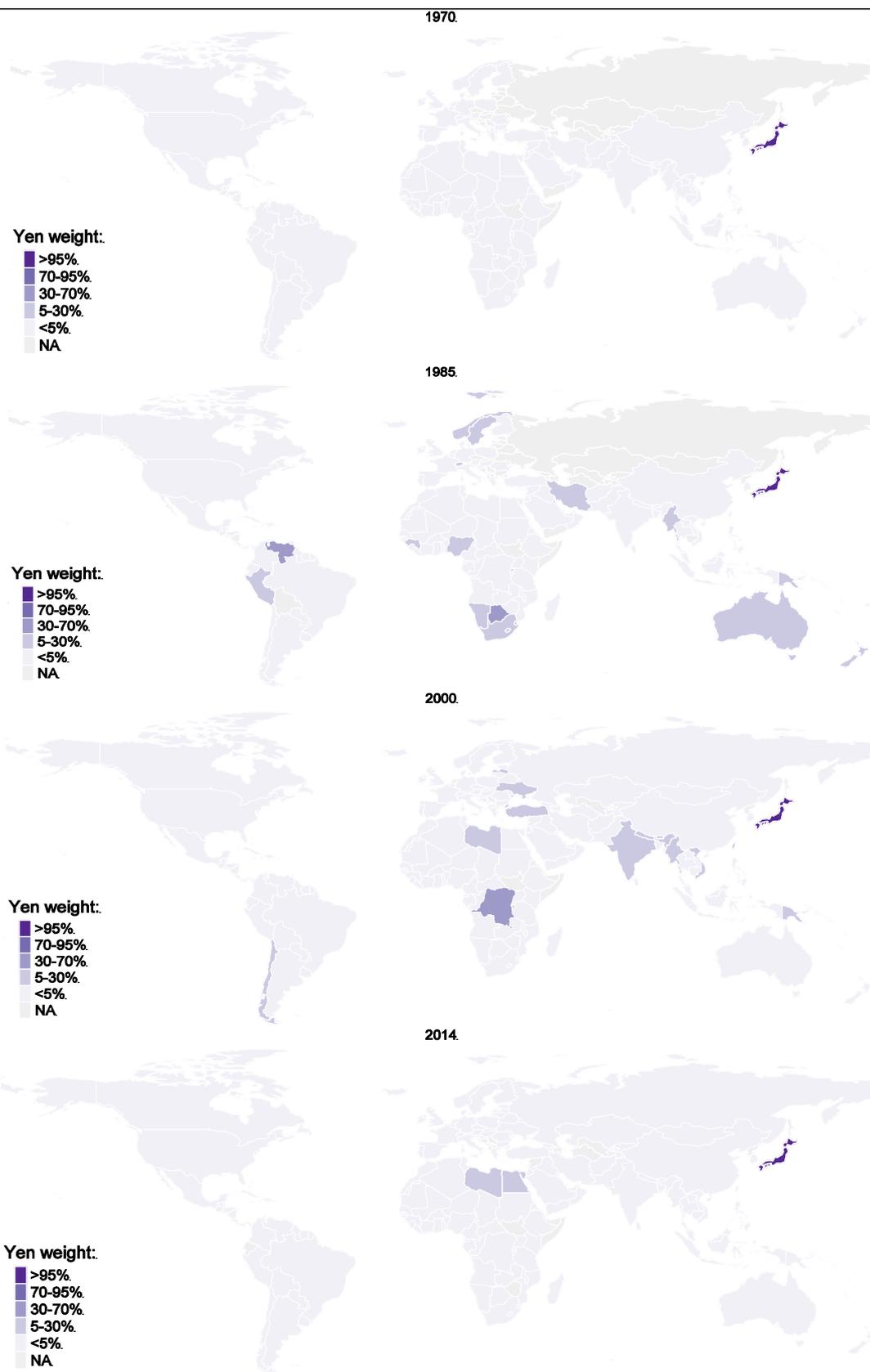
Source: IMF, *International Financial Statistics*; authors' calculations.



Sources: IMF, *International Financial Statistics*; authors' calculations.



Source: IMF, *International Financial Statistics*; authors' calculations.



Source: IMF, *International Financial Statistics*; authors' calculations.

Appendix 4: Gross investment positions

The global financial crisis inevitably made researchers refocus on the impact of global capital flows on the vulnerabilities of domestic financial markets as one of the main causes of the crisis (Borio and Disyatat (2011), Calderón and Kubota (2012), Catão and Milesi-Ferretti (2013), Rey (2013), Shin (2012), Bruno and Shin (2013)). The common denominator of these papers is that all these studies emphasised the impact of the volumes of gross capital flows on domestic financial vulnerabilities. Broner et al (2013) and Forbes and Warnock (2012) point out the importance of focusing on gross capital flows since gross capital inflows can be more volatile and procyclical than net inflows.

Panel (a) of Graph A shows that the total of the sum of external assets and liabilities peaks in 2007 at 360% as a percentage of world GDP, swelling more than 3.5 times compared to 1990 and seven times compared to 1980. In the aftermath of the financial crisis, it still remains about much over 300% of world GDP.

We disaggregate gross investment positions by the currency zone in a similar way to what we did with current accounts and net investment positions. Panels (b) and (c) present the gross investment positions of the same countries and country groups for the dollar and the euro zones, respectively. Panel (d) illustrates the gross investment positions of all the four currency zones.

Interestingly, the gross investment position of the dollar zone rises in three waves in the sample period: early 1980s, mid-1990s, and mid-2000s, each of which was followed by financial crises. While the increase in US gross position is noticeable in the mid-2000s, reaching about 35% of world GDP in 2007, China's gross position has been steadily increasing since the second half of the 2000s, from 4.4% to 14.3% as the share of world GDP.

The size of gross investment position of the euro zone is even greater than that of the dollar zone. The gross investment position of the euro zone rose rapidly in the late 1990s and the early 2000s, surpassing the counterpart of the dollar zone in 2003. As was in the case of the dollar zone's, it peaked in 2007, almost reaching 160% of world GDP (vs 130% for the dollar zone) and remaining around 150% in the aftermath of the global financial crisis (Panel (c)). The gross investment positions of these two currency zones are much larger than those of either the pound or yen zone (Panel (d)).

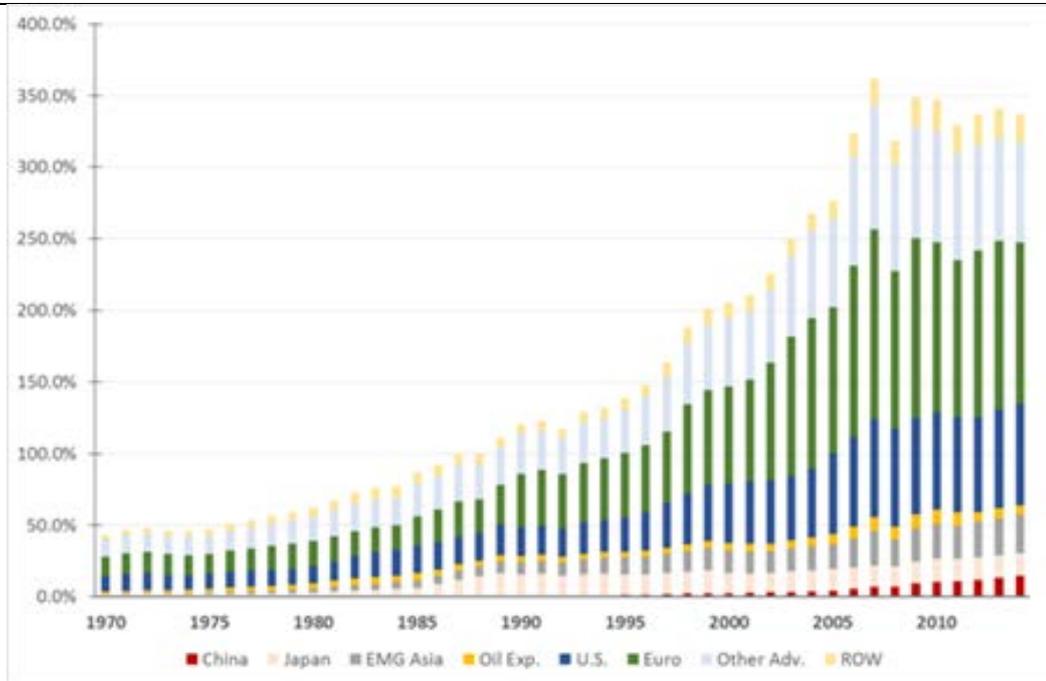
According to these observations, the euro zone seems to have been engaged in active financing both within the euro zone and with other currency zones in the 2000s. The active inter-currency-zone financing may have been one of the factors that led to the euro debt crisis. As for the dollar zone, despite active debates on global imbalances and the sustainability of US current account balances, the U.S. deficit was well-financed within the dollar zone by China, emerging Asia, and oil exporters, and the volume of financing of the dollar zones is not as high as that of the euro zone.

Gross investment position by country, 1970-2014

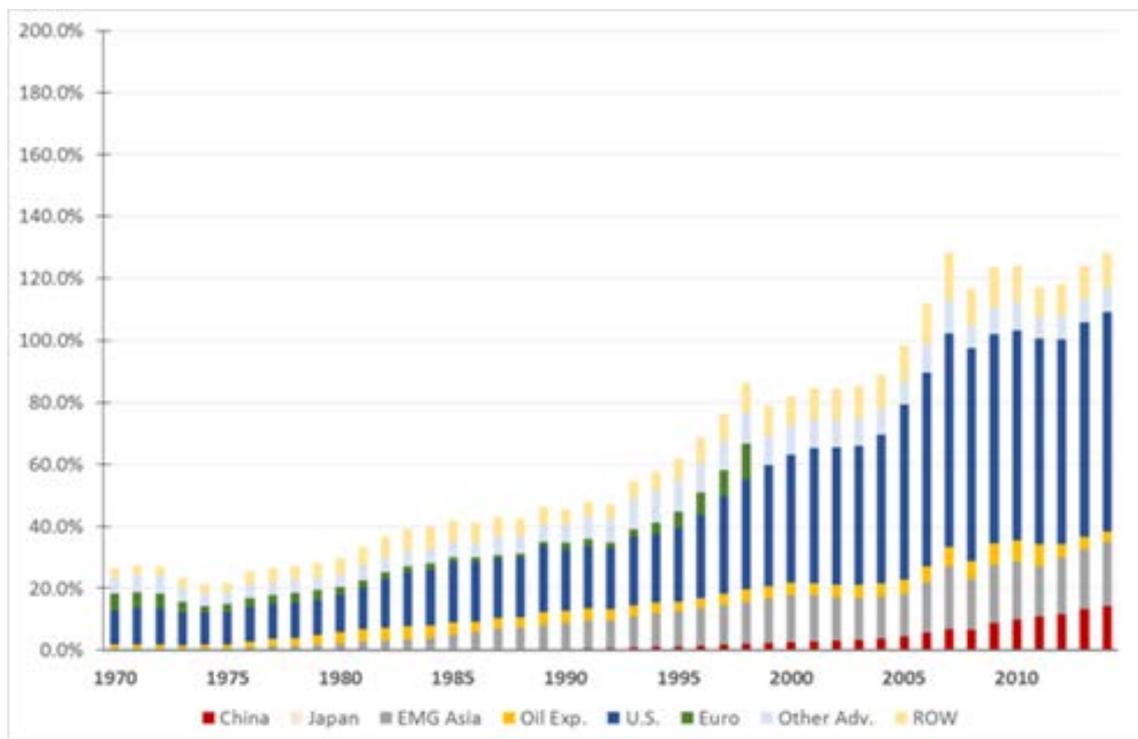
In Percent of World GDP

Graph A

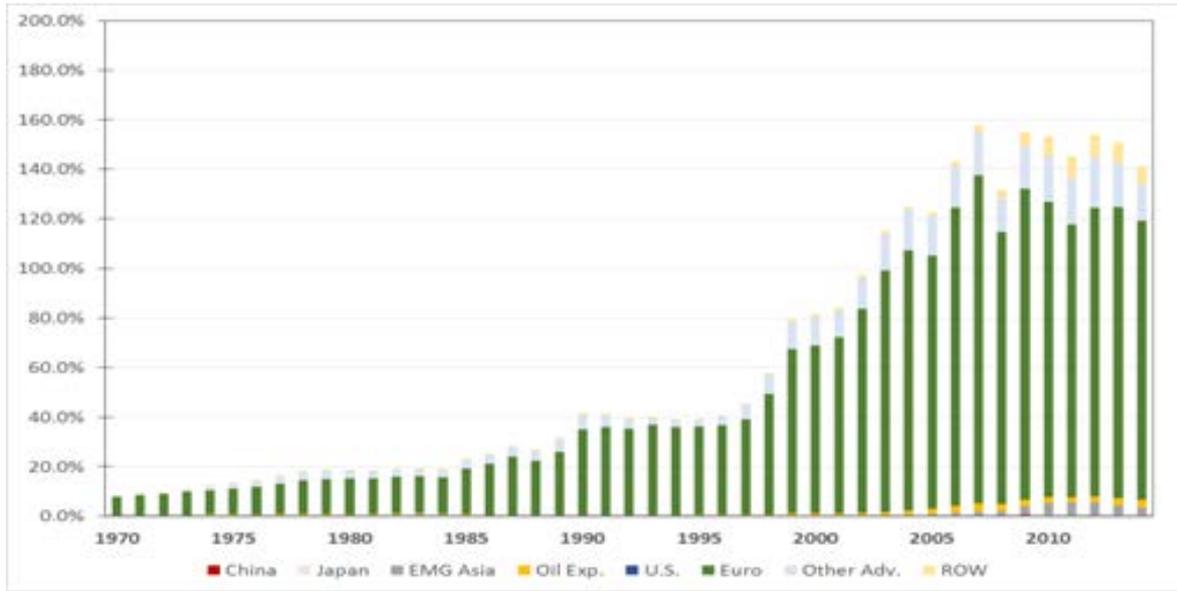
(a) "National" gross investment position



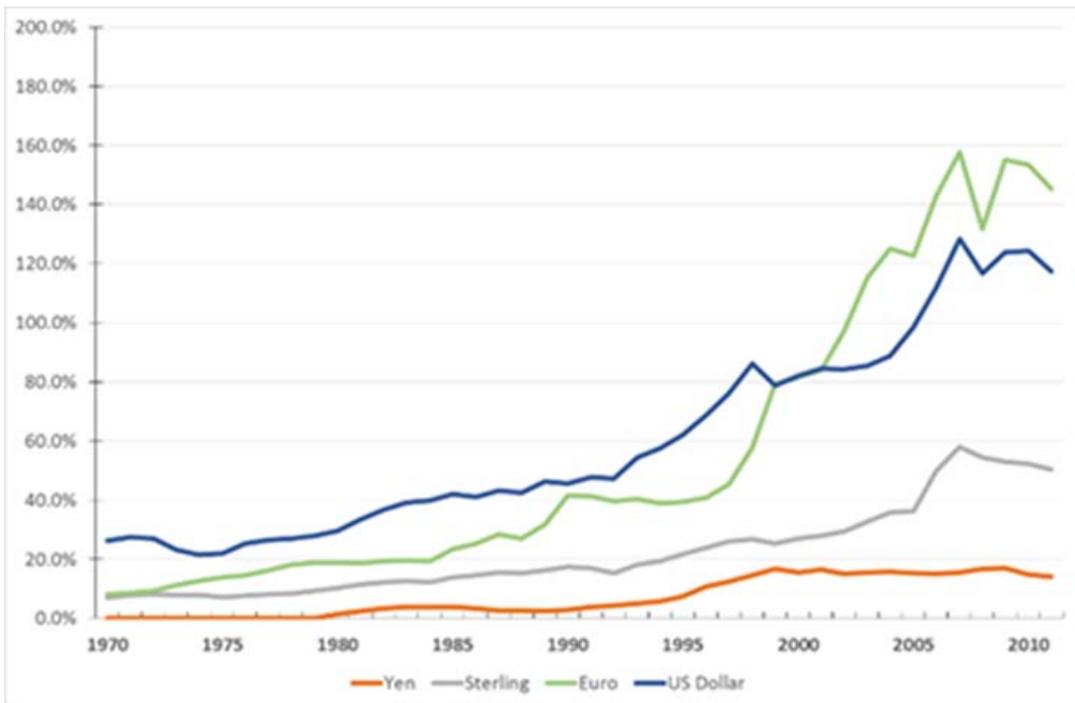
(b) Dollar zone



(c) Euro zone



(d) Currency-zone gross investment position



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