

IV. The 'exorbitant privilege' of an international-currency status: theory and evidence

By Eric Meyermans

Abstract: A strong international-currency status may provide the issuing country an 'exorbitant privilege'. This privilege can take several forms, ranging from an 'excess return' on the country's gross external assets over liabilities, to an almost unlimited capacity to issue internationally accepted liabilities to purchase its imports and service its foreign debt. At the same time, this 'exorbitant privilege' can also entail an 'exorbitant duty'. This is because in times of global stress the issuing country is expected to supply its international currency in large amounts, and the exchange rate of its currency may appreciate as capital flows to safe havens. This section compares, for a selected group of countries and areas, including the euro area and the US, their possible 'excess return' on foreign assets over liabilities, as well as changes in global demand for their liquid assets in times of global stress. After a brief literature review, the empirical part highlights that the 'excess return' has been modest for the euro area so far, as well as for most other countries in the sample. The section then illustrates econometrically that periods of global stress have induced significant increases in the demand for liquid assets issued by the US. Finally, it shows notable differences in the performances of euro-area Member States in terms of excess return⁽⁸⁷⁾.

IV.1. Introduction

Since the second world war, the widespread use of US financial assets across the globe has facilitated the invoicing and settling of international trade⁽⁸⁸⁾, conducting of international financial transactions⁽⁸⁹⁾ and storing of wealth.

This unique position of the US in the international monetary system came about with the creation of the Bretton Woods system⁽⁹⁰⁾. However, by the early 1960s it was already argued that this unique

position also entailed an 'exorbitant privilege' for the US⁽⁹¹⁾. This claim has often been repeated since then, albeit with a broader understanding of the nature of this privilege over time.

Under the Bretton-Woods system⁽⁹²⁾, when international financial flows were primarily linked to international transactions of goods and services, the 'exorbitant privilege' referred mainly to the low interest rate on US government securities and the (almost unconstrained) ability of the US to finance its external deficits with liabilities denominated in its own currency - thus shielding itself from balance of payments crises⁽⁹³⁾.

After the Bretton Woods system ended in 1971⁽⁹⁴⁾ and global financial markets became more integrated, this 'extraordinary privilege' broadened as these developments created more opportunities for non-governmental US residents to issue internationally traded financial assets such as debt

⁽⁸⁷⁾ The author wishes to thank an anonymous reviewer and colleagues for useful comments. This section represents the author's views and not necessarily those of the European Commission.

⁽⁸⁸⁾ Including its use as 'vehicle currencies' by two trading partners that do not have the international currency as their home currency - because of lower transaction costs. See, for instance, Goldberg, L. and C. Tille (2005), 'Vehicle Currency Use in International Trade', *Federal Reserve Bank of New York Staff Report* No 200 and Devereux, M. and S. Shi (2013), 'Vehicle currency', *International Economic Review*, Vol. 54, No. 1, pp. 97-133.

⁽⁸⁹⁾ Canzoneria, M., Cumby, R., Diba, B. and D. López-Salido (2013), 'Key currency status: An exorbitant privilege and an extraordinary risk', *Journal of International Money and Finance*, Vol. 37, pp. 371-393. For instance for the private sector the international currency may serve as collateral in many financial markets or as liquidity buffers. For the public sector, international currencies may serve as strategic reserves to withstand severe shocks to the balance of payments. These strategic reserves were greatly strengthened by emerging-market economies in the wake of the Asian Financial Crisis of 1997

⁽⁹⁰⁾ Eichengreen, B. (2010), *Exorbitant Privilege. The Rise and Fall of the Dollar and the Future of the International Monetary System*, Oxford University Press, argues that the first steps were made with: (i) the founding of the Federal Reserve System, which reduced financial volatility in the US; and (ii) the first world war which forced European countries off the gold standard. After the second world war, a strong international-currency status became unavoidable with the creation of the Bretton Woods system and economic reconstruction assistance from the Marshall Aid programme.

⁽⁹¹⁾ A term coined by former French finance minister Valéry Giscard d'Estaing in 1965.

⁽⁹²⁾ During the Bretton Woods System the exchange rate of national currencies was fixed vis-à-vis the US dollar (but adjustable within a 1 percent band), while foreign central banks could convert US dollars into gold at fixed prices.

⁽⁹³⁾ See, for instance, Portes, R., Rey, H., De Grauwe P. and S. Honkapohja (1998), 'The Emergence of the Euro as an International Currency', *Economic Policy*, Vol. 13, No. 26, pp. 305-343.

⁽⁹⁴⁾ I.e. the international monetary system switched from a gold exchange standard to the dollar exchange standard. See for instance De Grauwe, P (1989), *International Money. Post-War Trends and Theories*, Clarendon Press.

by financial institutions and equity by enterprises as well as inward foreign direct investment ⁽⁹⁵⁾.

Outline of this section

Since the end of the Bretton Woods system, ongoing structural changes in the global financial and trade order have created room for other currencies to also exploit their potential as an international currency ⁽⁹⁶⁾.

Against this background, this section assesses for a selected group of countries their international-currency status by: (i) comparing their returns on gross external assets over liabilities; and (ii) assessing shifts in the demand for internationally traded liquid assets issued by these countries in times of global stress.

The second subsection (IV.2) provides a brief literature review of the channels, such as liquidity and safety premiums, that may give rise to the exorbitant privilege, and the macro-economic implications of exorbitant privilege for the issuing country. It also highlights that the literature argues that a strong international-currency status may entail an ‘exorbitant privilege’ ⁽⁹⁷⁾ such as acting as an international lender of last resort in times of global stress.

The third subsection (IV.3) compares the return on gross external assets over liabilities for the euro area, US, UK, Switzerland and Japan. This analysis shows that this return has been modest for the euro area so far – but also for most other countries.

The fourth subsection (IV.4) examines the impact of macroeconomic factors on the demand for the

international liquid assets of the above-mentioned countries ⁽⁹⁸⁾. This analysis shows how the share of liquid assets issued by the US in recent decades increased significantly in times of global stress.

The fifth subsection (IV.5) explores the capacity of euro-area Member States to benefit from the euro’s international-currency status so far. The last section draws some conclusions.

IV.2. Exorbitant privileges and possible drawbacks: a brief literature review

Strong international currencies are key to the good functioning of the international monetary system ⁽⁹⁹⁾. However, if only a few strong international currencies are available, then this may give the countries that supply those currencies the opportunity to use their monopoly currency-issuing power to their own benefit, giving rise to an ‘exorbitant privilege’.

‘Exorbitant’ privileges ...

The recent economic literature identifies several channels via which this market power may give rise to ‘exorbitant privileges’ in an open world economy. These channels refer mainly to the safety and liquidity premiums and to seigniorage on cash held by foreigners. These channels may in turn have significant macroeconomic feedbacks for the issuing country.

Firstly, the issuing country supplies an asset for which there is strong worldwide demand because it is perceived to be a safe asset. As long as this demand remains strong, the interest rate on these assets will remain low as a compensation for the safety it provides (compared to assets with an

⁽⁹⁵⁾ See, for instance, Gourinchas, P. and H. Rey (2014), ‘External Adjustment, Global Imbalances, Valuation Effects’, Chapter 10 in Gopinath G., Helpman E. and K. Rogoff (Ed.), *Handbook of International Economics*, Vol. 4, pp. 585–645; and Rogoff, Kenneth and T. Takeshi (2015), ‘Japan’s exorbitant privilege’, *Journal of the Japanese and International Economies*, Vol. 35, pp. 43–46

⁽⁹⁶⁾ See, for instance, Juncker (2018), ‘State of the Union 2018: the Hour of European Sovereignty’, in which President Juncker stated that ‘... we must do more to allow our single currency to play its full role on the international scene. ... The euro must become the face and the instrument of a new, more sovereign Europe. For this, we must first put our own house in order by strengthening our economic and monetary union, as we have already started to do. Without this, we will lack the means to strengthen the international role of the euro. We must complete our economic and monetary union to make Europe and the euro stronger.’

⁽⁹⁷⁾ As argued by Gourinchas, P., H. Rey and N. Govillot (2010), ‘Exorbitant privilege and exorbitant duty’, Bank of Japan, *IMES Discussion Paper 2010-E-20*.

⁽⁹⁸⁾ I.e., the third subsection (IV.3) focuses on all external assets and liabilities which include liquid assets and liabilities as well as (illiquid) inward and outward foreign direct investment. The fourth subsection (IV.4) focuses only on the countries’ liquid external liabilities covering portfolio investment, financial derivatives and other investments, such as trade credits and loans. See also Box IV.1.

⁽⁹⁹⁾ Albeit with different shades ranging from an international currency mainly used in a limited domain (such as foreign exchange reserve by foreign central banks), to a major international currency used for accounting, transactions and a store of value by the private and public sectors far beyond the borders of the issuing country. Cohen, B (2013), ‘Currency and State Power’, Chapter 8 in Finnemore, M. and J. Goldstein (eds.), *Back to Basics. State Power in a Contemporary World*, Oxford University Press.

average rating). This phenomenon is known as the safety-premium channel ⁽¹⁰⁰⁾.

In addition, large and homogeneous financial markets, such as the US Treasury market, may create network effects ⁽¹⁰¹⁾ and lower transaction costs ⁽¹⁰²⁾, thus strengthening demand for the international currency and putting downward pressure on the interest rate. This phenomenon is known as the liquidity-premium channel. Moreover, in times of severe global crisis, when the international demand for liquidity may increase strongly, there may be an additional flight to these liquid markets (Engel (2020) ⁽¹⁰³⁾).

The foreign holdings of international currencies also provides seigniorage to the issuing country ⁽¹⁰⁴⁾. Bernanke (2015) ⁽¹⁰⁵⁾ estimates that about two thirds of US currency in circulation (about 1.4 trillion US dollar in 2015) is held abroad.

Domestic firms may also benefit because they do not have to pay currency-conversion fees in their international trade, use a currency that is relatively immune to exchange-rate risks, and are able to borrow from foreigners without issuing foreign-currency bonds (Maggiore et al. (2018) ⁽¹⁰⁶⁾).

... carrying beneficial macroeconomic effects ...

A lower interest rate triggered by a currency’s international status may generate significant macroeconomic benefits for the issuing country.

Firstly, lower interest rates may induce domestic firms to invest more and households to consume more. In the short-to-medium term, this may deteriorate the reserve country’s current account, but external financing constraints are less binding because the issuing country can use its currency to purchase its imports and service its foreign debt ⁽¹⁰⁷⁾.

In the long run, a major benefit for the issuing country is that it will have the opportunity to develop a more capital intensive (and productive) economy because interest rates are lower. At the same time, the trade deficit stemming from increased investment and consumption, may partly be financed by the ‘excess return’ on its net asset position. Nevertheless, as discussed below, holding higher yielding, but riskier foreign assets may also induce severe wealth losses for the reserve country in times of global stress (Maggiore (2017) ⁽¹⁰⁸⁾).

... but also macroeconomic costs via the exchange rate channel ...

The macro-economic costs of a strong international-currency status are mainly transmitted via the exchange-rate channel. Firstly, strong demand for the international currency may appreciate its exchange rate ⁽¹⁰⁹⁾, especially in times of global stress as capital flows to safe havens (Adler et al. (2013) ⁽¹¹⁰⁾). In turn, this will make the exports of the country issuing the international currency less competitive thus adversely affecting the output of domestic exporting firms (Eichengreen (2011) ⁽¹¹¹⁾).

Moreover, when the issuing country’s international trade is mainly invoiced and settled in the international currency, then the intensity at which

⁽¹⁰⁰⁾ As the issuing country has a comparative advantage in risk taking, this premium can also be interpreted as an ‘insurance fee’ for guaranteeing the safety of its assets in times of a severe crisis. See, for instance, Maggiore, M. (2017), ‘Financial Intermediation, International Risk Sharing, and Reserve Currencies’, *American Economic Review*, Vol. 107, No. 10, pp. 3038, Gourinchas, P. and H. Rey (2022), ‘Exorbitant Privilege and Exorbitant Duty’, *CEPR Discussion Paper Series DP 16944*, or Farhi, E. and M. Maggiore (2018), ‘A Model of the International Monetary System’, *The Quarterly Journal of Economics*, Vol. 133, No. 1, pp. 295–355.

⁽¹⁰¹⁾ ‘Money is like language’, the more people speak the same language, the easier it becomes to communicate – without a rise in the cost for those people already speaking the language.

⁽¹⁰²⁾ I.e., lower transaction costs for larger volumes.

⁽¹⁰³⁾ Engel Ch. (2020), ‘Safe US Assets and US Capital Flows’, *Journal of International Money and Finance*, Vol. 102, pp.1-13

⁽¹⁰⁴⁾ I.e. a monopoly rent via the creation of fiat money (at negligible cost) in exchange for real resources; and also giving rise to a rent generated by an inflation tax on foreigners

⁽¹⁰⁵⁾ Bernanke, B. (2015), ‘Federal Reserve Policy in an International Context’, paper presented at the *Mundell-Fleming lecture*, International Monetary Fund, Washington DC, November 5, 2015

⁽¹⁰⁶⁾ Maggiore, M., B. Neiman and J. Schreger (2018), ‘International currencies and capital allocation’, *NBER Working Paper 24673*

⁽¹⁰⁷⁾ At least as long as confidence in the currency does not wane. Also giving rise to the so-called “net position” puzzle, in which the net international investment position of the US shows a negative position, while its net foreign income is positive (e.g. Obstfeld, M. (2012), ‘Does the current account still matter?’, *American Economic Review*, Vol. 102, No. 3, pp. 1–23).

⁽¹⁰⁸⁾ Maggiore (2017), *op.cit.*

⁽¹⁰⁹⁾ An appreciation despite a low interest rate, i.e. the paradox of the reserve currency. See, for instance, Caballero, R., Farhi, E. and P. Gourinchas (2015), ‘Global imbalances and currency wars at the ZLB’, *NBER Working Paper* No. 21670.

⁽¹¹⁰⁾ See, for instance, Adler, G. and D. Garcia-Macia (2018), ‘The stabilising role of net foreign asset returns’, *IMF Working Paper* No. 18/79.

⁽¹¹¹⁾ Eichengreen, B. (2011), *Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System*, Oxford University Press.

changes in the exchange rate are transmitted to import prices and final consumer prices may weaken considerably (Goldberg and Tille (2006) ⁽¹¹²⁾). As a result of this, more of the external adjustment may need to be borne by domestic aggregate demand ⁽¹¹³⁾. However, with a stronger international-currency status, the issuing country's monetary autonomy may benefit from a stronger insulation from foreign spill-overs ⁽¹¹⁴⁾ in setting interest rates (Cœuré (2019) ⁽¹¹⁵⁾).

Last but certainly not least, when the exchange rate of the issuing country appreciates in times of global stress, its foreign assets denominated in foreign currency lose value, while its liabilities issued in its own currency stay stable. This may then trigger important wealth transfer to the rest of the world (Gourinchas and Rey (2022) ⁽¹¹⁶⁾).

... and the interest rate channel ...

When global demand for safe assets increases, the issuing country may experience a stronger risk that interest rates hit the effective lower bound at which monetary policy becomes ineffective (e.g. Eichengreen (2019) ⁽¹¹⁷⁾). Moreover, once the interest rate hits the effective lower bound and is unable to decline further, the exchange rate may appreciate thereby exerting downward pressure on economic activity.

In turn, a lower yield may create stronger incentives for the domestic financial sector to 'search for yield', taking on riskier investments.

Moreover, lower yields raise the market value of financial assets, thus relaxing banks' balance-sheet constraints and this may lead to banks making more risky loans (Engel (2020) ⁽¹¹⁸⁾).

... as well as an 'exorbitant duty' ...

A strong international-currency status also entails an 'exorbitant duty'. This is because in times of global stress, the issuing country is expected to supply its international currency as international lender of last resort ⁽¹¹⁹⁾, while at the same time addressing moral hazard risks. More specifically, the presence of an international lender of last resort may reduce the incentives of other countries to implement reforms that strengthen their economies' resilience or reduce their need to hold international reserves ⁽¹²⁰⁾.

... and 'exorbitant risk'.

Finally, the supply of – and demand for – international currencies is characterised by a delicate balance between liquidity and confidence. An excessive supply of international currencies may undermine confidence in their long-run viability, while an insufficient supply of the currency may hinder the full realisation of the economies of scale and network externalities that underpin its liquidity.

This means that an international-currency status also entails an 'exorbitant risk' as a sudden sell-off of assets denominated in the international currency – triggered by a loss of confidence in the currency – could have severe economic consequences (Canzoneri et al. (2013) ⁽¹²¹⁾).

Gourinchas and Rey (2007) ⁽¹²²⁾ as well as Farhi and Maggiori (2017) ⁽¹²³⁾ warn that this risk of a

⁽¹¹²⁾ Goldberg and Tille (2006), *op. cit.*

⁽¹¹³⁾ See for instance Smets, F., and R. Wouters (2002), 'Openness, imperfect exchange rate pass-through and monetary policy', *Journal of Monetary Economics*, Vol. 49, No. 5, pp. 947–981.

⁽¹¹⁴⁾ See, for instance, Burlon, L., Notarpietro, A. and M. Pisani (2018), 'Exchange rate pass-through into euro area inflation. An estimated structural model', *Banca D'Italia Working Paper* No. 1192. In this article the authors use quarterly data covering the period from the first quarter of 1999 until the second quarter of 2017. The authors estimate that, every quarter, only 3.8% of exchange-rate fluctuations are passed-through into retail prices of euro-area non-oil imports from the rest of the world. All in all, the pass-through depends on several factors, such as the cost of adjusting prices, expectations as to the duration of the depreciation, and pricing behaviour of the exporter whereby exporters may set their prices in the currency of the importing country (local currency pricing) or in their own currency (producer currency pricing).

⁽¹¹⁵⁾ Cœuré, B. (2019b), 'Should the ECB care about the euro's global role?', *VoxEU*.

⁽¹¹⁶⁾ See Gourinchas and Rey (2022), *op. cit.* They estimate that such wealth transfers from the US to the rest of the world amounted to about 20% of US GDP at the height of the global financial crisis.

⁽¹¹⁷⁾ Eichengreen B. (2019), 'Two Views of the International Monetary System', *Interconomics*, Vol. 54, No. 4, pp. 233–236.

⁽¹¹⁸⁾ Engel (2020), *op. cit.*

⁽¹¹⁹⁾ For instance, the US Federal Reserve has swap lines with other central banks which allow other central banks to borrow dollars in exchange for the equivalent amount in their own currencies. See, for instance, Bordo, M. and R. McCauley (2019), 'Triffin: Dilemma or myth?', *IMF Economic Review*, Vol. 67, pp. 824–851.

⁽¹²⁰⁾ However, in the absence of a lender of last reserve counter-parties could be inclined to insure themselves by holding excessive reserves – which in turn may raise the demand for euro safe assets thereby putting downward pressure on the euro interest rate and appreciate the euro exchange rate. See, for instance, Bordo, M., Humpage, O. and A. Schwartz (2015), 'The Evolution of the Federal Reserve Swap Lines since 1962', *IMF Economic Review*, Vol. 63, No. 2.

⁽¹²¹⁾ Canzoneri et al. (2013), *op. cit.*

⁽¹²²⁾ Gourinchas, P. and H. Rey (2005), 'From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege', *NBER Working Paper* No. 11563.

sudden sell-off may intensify when there is an alternative reserve asset to which capital may flow, i.e. the new Triffin dilemma. However, Eichengreen (2011) ⁽¹²⁴⁾ emphasises that the emergence of additional strong reserve currencies may bring about diversification benefits and a stronger capacity to meet the growing demand for safe assets, which in turn will bring more stability to the international monetary system.

IV.3. Return differences

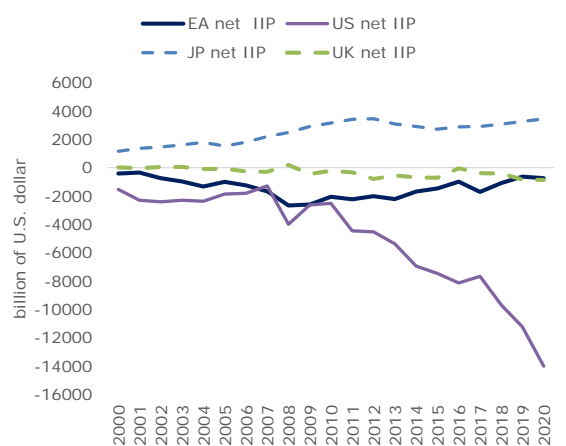
This subsection highlights some notable variation in return differences ⁽¹²⁵⁾ between the external assets and liabilities ⁽¹²⁶⁾ of the euro area, US, UK, Switzerland and Japan ⁽¹²⁷⁾. These returns are not directly observable and have to be estimated. (See Box IV.1)

Level

Graph IV.1 shows the net international investment position of a selected group of countries in US dollar ⁽¹²⁸⁾. The sharply deteriorating position of the US since the early 2010s is striking ⁽¹²⁹⁾. In discussions on sustainability in the economic

literature ⁽¹³⁰⁾, this position is often attributed to the US dollar’s strong currency status entailing a strong demand for US financial assets by the rest of the world. This means that the US receives a higher return on its external assets than it pays on its external liabilities within the same asset class (i.e. the return effect ⁽¹³¹⁾). In addition, the external supply of US liabilities with a low return, such as Treasuries, is usually transformed into claims on the rest of the world with a higher return, such as outward foreign direct investment (i.e. the composition effect ⁽¹³²⁾) ⁽¹³³⁾. See also the discussion and Graph IV.4 in the next subsection (IV.4).

Graph IV.1: Net international investment position



(1) Net international investment position measures the difference between a nation’s stock of external assets and a external liabilities

Source: IMF databases

Composition

A key feature of the balance sheet of countries issuing an international currency is that their liability side shows a higher share of liquid assets than their asset side ⁽¹³⁴⁾. Graph IV.2 illustrates this phenomenon for both the euro area and the US.

⁽¹²³⁾ Farhi, E. and M. Maggiori (2017), ‘The new Triffin Dilemma: The concerning fiscal and external trajectories of the US’, VoxEU. In this article the authors discuss the example of international monetary instability during the 1920s when investors were constantly shifting their holdings between the pound and the dollar.

⁽¹²⁴⁾ Eichengreen (2011), *op. cit.*

⁽¹²⁵⁾ Total return is equal to yield plus capital gains, as described in more detail below.

⁽¹²⁶⁾ Which include – on both sides of the balance sheet – liquid asset classes, such as equities, and non-liquid asset classes. The non-liquid assets are the asset-classes that enable a resident entity in one economy to obtain a lasting interest in an enterprise resident in another economy.

⁽¹²⁷⁾ I.e. the so-called broad definition of the ‘exorbitant privilege’ that takes into account returns across all asset classes. The narrow definition only focusses on the uncovered interest-rate parity, whereby the difference in interest rates on government bonds between two countries is equal to the change in their foreign exchange rates over the same period. Rogoff, K. and T. Takeshi (2015), *op. cit.*

⁽¹²⁸⁾ I.e. not as percentage of GDP, to get a better impression of the relative size of the countries net international investment positions in absolute terms.

⁽¹²⁹⁾ A similar pattern can be seen when looking at developments in terms of percentage of GDP. The negative net international investment position (NIIP) of the US as a percentage of its GDP weakened further by about 50 pps between 2010 and 2020 to reach about 68% of GDP in 2020. Over the same period, the euro area, which had almost the same NIIP position as a percentage of GDP as the US in 2010 improved its negative NIIP position by about 10 pps to about 6% of GDP in 2020. Over the same period, Japan improved its positive position by about 15 pps reaching 68% of GDP in 2020, while the very strong position of Switzerland decreased by 25 pps, but still came out at almost 100% of GDP in 2020.

⁽¹³⁰⁾ See for instance Gourinchas and Rey (2005) and (2020), *op.cit.*

⁽¹³¹⁾ I.e. the first right-hand side term in equation (2.A) in Box IV.1, $\sum_i w_i (R_i^A - R_i^L)$.

⁽¹³²⁾ I.e. the second right-hand side term in equation (2.A) in Box IV.1 $\sum_i (w_i^A - w_i^L) R_i$.

⁽¹³³⁾ IMF (2021), *2021 Article IV Consultation*, Staff Report, projects the NIIP to remain broadly unchanged through the medium term as the current account balance reverts to its pre-COVID average.

⁽¹³⁴⁾ The liquid external asset class covers portfolio investment, financial derivatives and other investments that includes trade credits and loans; as well as reserve assets on the asset side but not on the liability side. Non-liquid assets such as direct

Box IV.1: The excess return on assets over liabilities

This box describes how the returns on external assets and liabilities for various asset classes have been estimated ⁽¹⁾, making use of the IMF Balance of Payments and International Investment Position database.

A. Accounting identities

The total return of a particular asset or liability comprises its yield (such as its interest, dividend and FDI earnings) and capital gains (such as changes in asset prices and exchange rates) ⁽²⁾. The return (R) on external assets (A_i) and liabilities (L_i) of asset class i is computed as:

$$(1.a) R_{it}^A = \frac{A_{it} - A_{it-1} - FL_{it}^A}{A_{it-1}} + \frac{INC_{it}^A}{A_{it-1}} \quad \text{and} \quad (1.b) R_{it}^L = \frac{L_{it} - L_{it-1} - FL_{it}^L}{L_{it-1}} + \frac{INC_{it}^L}{L_{it-1}}$$

A_{it} (or L_{it}) is the stock of external assets (or liabilities) of class i at the end of year t , FL_{it}^A (or FL_{it}^L) is flows to (or from) the rest of the world during the year t , while INC_{it}^A (or INC_{it}^L) is income (including interest, dividend and FDI earnings) during the year t . The capital gain is captured by the first term on the right-hand side of the equations, while the yield is captured by the second term. The return differential per asset class is measured as $R_{it}^A - R_{it}^L$.

The total return differential of the portfolio comprising all asset classes is not only affected by differences in return on the external assets and liabilities across the asset classes (i.e. the return effect), but also by differences in the composition of assets and liabilities across these classes (i.e. the composition effect). More formally speaking:

$$(2.a) R^A - R^L = \sum_i w_i (R_i^A - R_i^L) + \sum_i (w_i^A - w_i^L) R_i$$

with the average share (w) of the asset class i in the portfolio and the average return per asset class i as:

$$(2.b) w_i = \frac{w_i^A + w_i^L}{2} \quad \text{and} \quad (2.c) R_i = \frac{R_i^A + R_i^L}{2}$$

In equation (2.a) the first term on the right-hand side refers to the excess return per asset class, while the second term refers to the difference in weight between assets and liabilities for each asset class ⁽³⁾.

B. Asset classes

A distinction is made between direct investment, portfolio investment and other investments ⁽⁴⁾. Direct investment reflects the objective of a resident entity to obtain a lasting interest in an enterprise resident in another economy. Direct-investment capital transactions cover mainly equity capital and various intercompany debt transactions for a longer period.

Portfolio investment aims primarily to receive a return and collect an appreciation in value ⁽⁵⁾. This means that portfolio investors may often shift their capital. Portfolio investment comprises equity securities and debt securities ⁽⁶⁾ which are traded (or tradable) in financial markets.

Financial derivatives other than reserves consist of cross-border transactions arising from financial contracts that are linked to underlying financial instruments, commodities, or indicators ⁽⁷⁾. No primary income accrues on financial derivatives; they involve risk transfer rather than supply of funds.

⁽¹⁾ As proposed elsewhere in the literature, such as Gourinchas, P. and H. Rey (2005), 'From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege', *NBER Working Paper* No. 11563; Habib, M. (2010), 'Excess Returns on Net Foreign Assets. The Exorbitant Privilege from a Global Perspective', *ECB Working Paper Series* No 1158.

⁽²⁾ By construction it may include data revisions, new measurement techniques and reclassifications. Gourinchas and Rey (2022), *op. cit.*

⁽³⁾ The return effect will be equal to zero if returns in the asset class are equal, while the composition effect will be equal to zero if the weights of the different asset classes are equal. See Gourinchas and Rey (2005), *op. cit.* for more details.

⁽⁴⁾ For more details see IMF (2013), *Balance of Payments Manual*, Sixth edition.

⁽⁵⁾ Excluded are the instruments included in the categories of direct investment and reserve assets.

⁽⁶⁾ Debt securities are subdivided into bonds and notes, money market instruments, and financial derivatives.

(Continued on the next page)

Box (continued)

Other investments comprise trade credits ⁽⁸⁾, loans ⁽⁹⁾, currency and deposits, and other assets and liabilities such as miscellaneous accounts receivable and payable.

Reserve assets, such as foreign exchange and monetary gold, are foreign financial assets available to the monetary authorities for financing or regulating payments imbalances.

In the following subsections, the liquid external asset class covers portfolio investment, financial derivatives, other investments (these other investments include trade credits and loans) and reserve assets on the asset side but not on the liability side.

- (7) See for instance ECB (2016), European Union Balance of Payments and International Investment Position statistical sources and methods
- (8) Trade credits consist of claims and liabilities arising from the direct extension of credit by suppliers and buyers for transactions in goods and services and advance payments for work in progress (or to be undertaken) that is associated with such transactions.
- (9) Loans comprise those financial assets created through the direct lending of funds by a creditor (lender) to a debtor (borrower) through an arrangement in which the lender either receives no security evidencing the transaction or receives a non-negotiable document or instrument. It includes the use of IMF credit and loans from the IMF.

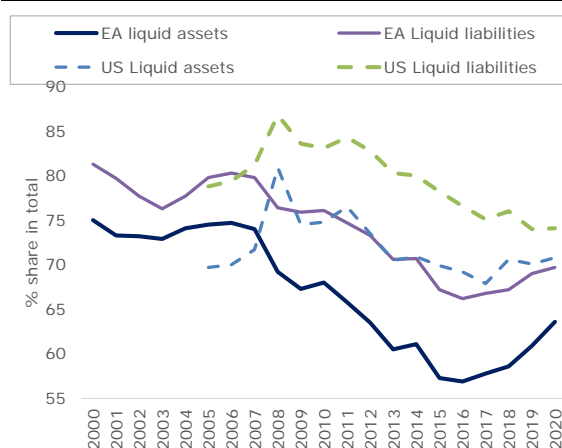
As expected, for both currency areas the share of liquid liabilities is larger than the share of liquid assets. However, the shares of external liquid assets and liabilities of the US have been persistently higher than in the euro area. While the share of liquid assets and liabilities has been rising somewhat in recent years in the euro area, it has been falling in the US.

Yields and capital gains

The upper pane of Graph IV.3 shows yield differences between external total assets and liabilities. While the US and Japan show a persistent positive differential, in Japan this differential followed a more stable pattern. The yield differential was less strong for the euro area and the UK, even turning negative in the early 2000s and at the height of the global financial crisis. For Switzerland, the yield differential shows a notable fall at the start of the global financial crisis.

The lower pane of Graph IV.3 shows the differences in capital gains in external assets and liabilities. One of the most notable aspects of this lower pane is the strong capital gains in the run-up to the global financial crisis in the US and the sharp capital losses in 2008. These capital gains reflect a variety of changes, including the change in exchange rates and stock-market prices.

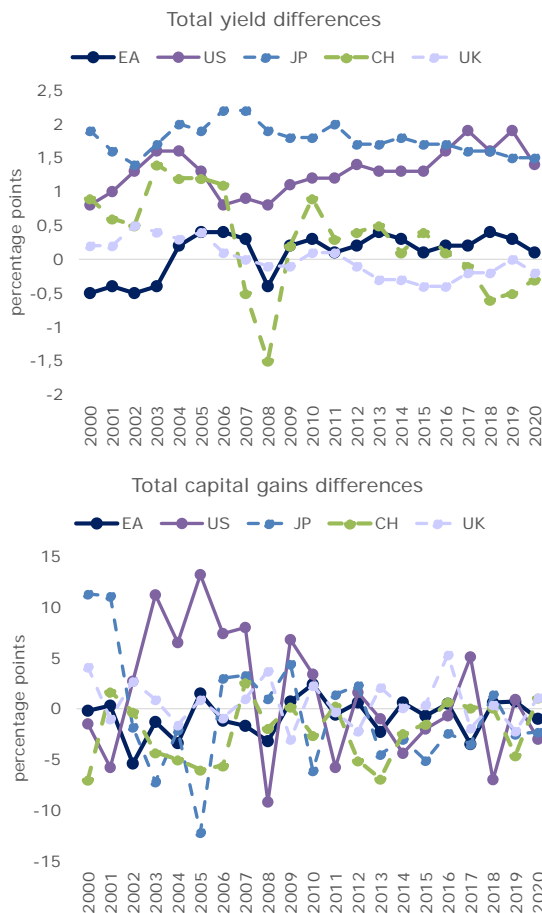
Graph IV.2: Share of liquid assets and liabilities in total assets and liabilities



(1) Liquid assets/liquid liabilities cover portfolio investment (equity and debt), other investment, financial derivatives and reserves. See part 2 of Box IV.2 for more details

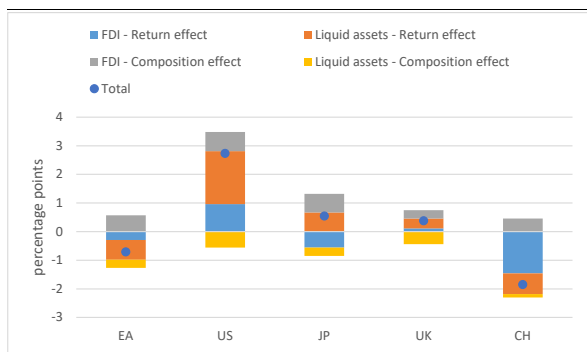
Source: Authors' calculations based on IMF data.

Graph IV.3: Return differences between total assets and total liabilities
(scales differ)



(1) See Box IV.2 for methodology.
Source: Authors' calculations based on IMF data.

Graph IV.4: Breakdown return differential 2001-2020



(1) See Box IV.2 for technical details.
Source: Authors' estimates.

Breakdown into return effect and composition effect

Making a distinction between liquid and illiquid assets for the 2001-2020 period, Graph IV.4 shows

a breakdown of the total return differential into a return effect and a composition effect for a selected group of countries (see Box IV.1).

The return on illiquid foreign direct investment (FDI) (blue bar) shows that the net contribution of the difference between outward and inward FDI is only notably positive in the US. The FDI composition effect (grey bar) shows that the difference in the share of outward and inward FDI made a positive contribution on average to return differences in all countries.

The difference between the returns on liquid assets and liabilities (orange bar) was by far the strongest and most positive in the US⁽¹³⁵⁾, followed by the UK and Japan. However, this difference was negative in the euro area and Switzerland. The difference in the composition of the liquid assets (yellow bar) was negative in all areas, indicating a stronger share of liquid assets on the liability side than on the asset side.

All in all, this breakdown suggests that the euro area recorded a rather weak performance in terms of its returns on liquid assets between 2001 and 2020.

IV.4.Substitutability between liquid assets

This subsection investigates – for the euro area, the US, Switzerland and the UK⁽¹³⁶⁾ – how their share in the global demand for international liquid assets⁽¹³⁷⁾ was affected during times of severe global stress over the period from the first quarter of 2006 until the fourth quarter of 2020⁽¹³⁸⁾ ⁽¹³⁹⁾.

In normal times, a diversified portfolio of international liquid assets is used to facilitate international trade and finance or to store wealth. However, in times of severe global stress, the holding of international liquid assets is expected to shift sharply towards the asset with the strongest international-currency status (typically the US).

⁽¹³⁵⁾ This graph shows net outcomes. However, compared with – for instance – the euro area, the external liquid liabilities of the US provided on average a lower return than those of the euro area (with the notable exception of returns in 2008). At the same time, US external liquid assets provided on average a higher return than the euro area external liquid assets.

⁽¹³⁶⁾ For Japan the quarterly data series is too limited.

⁽¹³⁷⁾ I.e. liquid liabilities from the perspective of the issuing countries.

⁽¹³⁸⁾ I.e. the available sample size.

⁽¹³⁹⁾ In other words, it does not examine the factors affecting global demand for liquid assets as a whole, only the distribution of this demand.

Box IV.2: The allocation of external liquid liabilities

This box examines whether there has been a significant shift towards the liquid assets issued by the US in recent times of global stress. For this purpose, a vector error correction mechanism is estimated for the demand for external liquid liabilities ⁽¹⁾ issued by the euro area, the US, the UK and Switzerland – making use of quarterly data ⁽²⁾.

Specification

The representative economic agent who wants to hold liquid assets faces a multi-stage decision process. First, they have to decide the total amount of liquid assets they want to hold. Next, they have to decide how to allocate this amount over the various liquid assets available. This box focuses on the latter decision and assumes that rigidities prevent an immediate adjustment of the portfolio and that short-term dynamics follow a vector error-correction scheme, i.e.

$$(1) \Delta S_{it} = \alpha_i + \rho_i SCALE_t + \sum_{j=1}^n \beta_{ij} \Delta R_{jt} + \sum_{k=1}^m \gamma_{ik} \Delta X_{kt} + \sum_{l=1}^n \theta_{il} ECT_{it-1} + u_{it}$$

whereby S_i is the share of asset i in the portfolio, $SCALE_t$ is the total demand for assets, R_{jt} is the return on asset j , X_k are other relevant macro-economic variables, ECT is the error correction term and u_i is a stochastic component. The subscript i indicates the country, while the subscript t indicates the quarter.

In other words, equation (1) regresses for the euro area, the US, the UK and Switzerland the change in their share in total liquid assets (S) ⁽³⁾ upon a set of common explanatory variables that include: (i) the change in total demand for liquid assets (SCALE); (ii) the returns on these assets (R); (iii) some other macroeconomic variables (X) discussed in more detail in the data section below; and (iv) lagged error-correction terms (ECT).

The parameters satisfy the adding-up conditions ⁽⁴⁾, i.e.

$$(2) \sum_{i=1}^n \alpha_i = 0, \sum_{i=1}^n \beta_{ij} = 0, \sum_{i=1}^n \gamma_{ik} = 0 \text{ and } \sum_{i=1}^n \theta_{il} = 0,$$

while the variables meet the adding-up conditions, i.e.

$$(3) \sum_{i=1}^n S_i = 1, \sum_{i=1}^n \Delta S_i = 0, \sum_{i=1}^n u_{it} = 0 \text{ and } \sum_{l=1}^n ECT_{it} = 0. \text{ (5)}$$

Data

The data are retrieved from the IMF Balance of Payments and International Investment Position database, and the IMF World Economic Outlook. Liquid assets held by the representative agent cover, on the debit side of the issuing country, equity and debt, as well as financial derivatives and other investments as described in Box IV.1. The return (R) on the asset issued by country i is computed as described in Box IV.1 ⁽⁶⁾.

Additional explanatory variables, obtained from the IMF World Economic Outlook (WEO) database, are the state of overall economic activity (measured by the G7 output gap ⁽⁷⁾), world inflation (measured as a percentage of world-wide average consumer prices) and world trade volume ⁽⁸⁾. Stress in financial markets is

⁽¹⁾ I.e. liquid 'assets' from the perspective of the non-residents who hold them.

⁽²⁾ Japan not included because its quarterly data series are too limited.

⁽³⁾ Total liquid assets is the sum of the external liquid assets of the euro area, the US., the UK and Switzerland – which is a nominal variable measured in dollars.

⁽⁴⁾ In the economic literature the adding-up conditions implies that the economic agent allocates his/her whole budget over the available goods and services.

⁽⁵⁾ The latter condition implies perfect multicollinearity if all ECT terms are included in the regression equation. This requires then the additional restriction that $\sum_{k=1}^n \theta_{ik} = 0$

⁽⁶⁾ These are ex post total returns; and not the ex ante expected returns that cannot be observed. Assuming rational expectations, one could argue that the ex post returns are equal to: (i) the ex ante returns; plus (ii) returns created by new developments (with 'new developments' being a random variable). To remove this random variable in the subsequent regression analysis, the fitted values, obtained after regressing the observed returns on lagged returns, have been used as explanatory variables.

⁽⁷⁾ The G7 is the largest entity for which an output gap is available in the WEO database.

⁽⁸⁾ These data with annual frequency have been interpolated to quarterly frequency.

(Continued on the next page)

Box (continued)

measured by the VIX index. The SCALE variables is the sum of liquid assets issued by the euro area, the US, the UK and Switzerland divided by world nominal GDP (IMF WEO database). The error-correction terms are estimated by regressing the share levels on the levels of the explanatory variables. The sample covers the period ranging from the first quarter of 2006 up to the fourth quarter of 2020.

Estimation results and hypothesis testing

Table 1 summarises the estimation results of the short-term dynamics. The first four columns show point estimates and their level of significance for the factors affecting the change in the share of liquid assets for each of the four countries. The last four columns elaborate further on the sensitivity of the share of the euro area to global inflation (as discussed below.) While the main text provides more discussion of these results, the following technical issues may be worth taking into account when interpreting the point estimates.

Firstly, the point estimates have to add up to zero across the equations for each variable ⁽⁹⁾, even though they have been estimated separately with ordinary least squares ⁽¹⁰⁾. The point estimates of the total-return variables add up to zero in each equation, indicating that it is relative returns (and not absolute returns) that matter for the allocation between the different assets. Secondly, the error-correction terms of each country share appears in each equation. The point estimates of the lagged own-error-correction term (with an expected value between 0 and -1) measures how much of the disequilibrium in the previous quarter is carried over to the present quarter ⁽¹¹⁾. In an allocation system, past disequilibria in a specific component will also spill over to the other components of the allocation system, hence their inclusion in the other equations. This point estimate is expected to be between -1 and +1.

Looking at the point estimates in Table 1, it can be concluded that: (i) the null-hypothesis that the point estimates of the output gap and the VIX indicator (i.e. the proxies for global stress) are equal to zero can be rejected at a fairly high confidence level (i.e. first panel of Table 1); and that (ii) the level and significance of the short-run sensitivity of the share of the euro area to inflation is fairly robust to the choice of other explanatory variables such as the output gap, international trade and the VIX indicator (i.e. second panel of Table 1).

Table 1: Changes in the share of external liquid assets and its drivers

Dependent variable: change in share of external liquid liabilities	All countries				EA inflation sensitivity conditional on deleted variables			
	EA	US	UK	CH	Base model	Output gap	Trade	VIX
Scale	-0.00	-0.02	0.05 ***	-0.03 ***	-0.00	-0.00	-0.00	-0.02
EA total return	0.07 ***	-0.04 **	-0.02	-0.02 ***	0.07 ***	0.07 ***	0.07 ***	0.10 ***
US total return	-0.04 **	0.09 ***	-0.05 ***	0.00	-0.04 **	-0.04 **	-0.04 *	-0.07 ***
UK total return	-0.03 **	-0.05 ***	0.07 ***	0.01	-0.03 **	-0.03 **	-0.03 **	-0.04 **
CH total return	0.00	-0.01	-0.01	0.01 ***	0.00	0.00	0.00	0.01
Output gap G7 economies	-0.00	-0.07 ***	0.08 ***	-0.00	-0.00	0.00	0.01	-0.02
World trade growth	-0.02	0.00	0.01	-0.00	-0.02	-0.02		-0.02
VIX (first differences)	-0.05 ***	0.03 ***	0.02 *	-0.00	-0.05 ***	-0.05 ***	-0.05 ***	
World inflation (first differences)	0.41 **	-0.23	-0.19	0.01	0.41 **	0.41 **	0.29 *	0.46 **
EA_ECT (-1)	-0.29 **	0.03	0.23 **	0.03	-0.29 **	-0.29 **	-0.28 **	-0.30 **
US_ECT (-1)	0.00	-0.15	0.07	0.07 ***	0.00	0.01	0.03	0.00
UK_ECT (-1)	0.08	-0.04	-0.11	0.07 **	0.08	0.08	0.06	0.09
CH_ECT (-1)	0.20	0.16	-0.19	-0.17 **	0.20	0.20	0.19	0.21
Adjusted R-squared	0.63	0.59	0.62	0.65	0.63	0.64	0.62	0.50
Durbin Watson	1.58	2.02	1.70	1.93	1.58	1.58	1.60	1.38
Total number of observations	59	59	59	59	59	59	59	59
Total number of explanatory variables	11	11	11	11	11	10	10	10

Note: Sample 2006Q3-2020Q4; estimated with OLS with adding-up and homogeneity constraints;
 Note: Point estimates with their significance level: * for p<0.05 and ** for p<0.01.

⁽⁹⁾ See for instance Theil, H. (1971), Principles of Econometrics, John Wiley and Sons, Inc.

⁽¹⁰⁾ The values of the point estimates should not be affected if they would have been estimated as a system that takes explicitly into account that the stochastic components are correlated across equations, as in the case of – for instance – the SURE (seemingly unrelated regression equations) estimator. In that case, the standard errors and t-values are affected. However, for the exercise in this box, no qualitative changes in terms of significance level (i.e. number of * in Table 1) are made applying the SURE estimator. Here, it should also be noted that the covariance matrix of the stochastic components is singular because these elements meet the adding-up constraint. This implies then, that one equation of the system has to be deleted when estimating the equations as a system, but the estimation results should not depend on the equation deleted if properly specified.

⁽¹¹⁾ The higher this value (in absolute terms) the faster any past disequilibrium will be absorbed.

To assess demand for liquid assets, each currency’s share in total demand for international liquid assets is regressed on a set of common macroeconomic indicators. These indicators refer to: (i) total demand for international liquid assets; (ii) the returns on the various international liquid assets; (iii) international trade growth; (iv) the output gap of the G7 countries (as a proxy for overall pressures in the real economy); and (v) the VIX indicator (as a proxy for tensions in financial markets). The overall specification is a vector error-correction mechanism with lagged own-error and cross-error correction terms reflecting that a disequilibrium in the demand for liquid assets of one country or currency area trickles down to the demand for liquid assets of the other countries or currency areas (See Box IV.2 for more details).

Econometric results

The econometric results presented in Box IV.2 suggest that, whenever there has been a global economic cyclical downturn (measured by the IMF’s output gap of the G7 economies) and rising stress in financial markets (measured by the VIX indicator), there has been a significant shift towards liquid assets issued by the US ⁽¹⁴⁰⁾.

The other point estimates also provide interesting insights. Firstly, the point estimates of the own return have the expected positive sign and are significant for the four assets in the sample. In addition, euro-area assets as a share of total liquid assets is also significantly affected by changes in US and UK returns (with increases in these returns inducing a drop in the share of the euro area), while the share of the US is also significantly affected by the return on assets of the euro area and the UK. UK liquid assets as a share of total liquid assets is mainly sensitive to changes to its own and to US returns, while the share of Swiss assets is significantly affected by its own return and the return on euro-area liquid assets.

Secondly, higher worldwide inflation induces a significant increase in the share of liquid assets issued by the euro area. The stability of this point estimate for the euro area has been tested by re-estimating the equation after deleting other explanatory variables, suggesting that this point

⁽¹⁴⁰⁾ I.e. the point estimates of the output gap and the VIX indicator are negative and positive respectively, suggesting that a negative output gap and a rise in the VIX indicator induce an increase in the share of liquid assets issued by the US.

estimate is fairly stable (See the right-hand pane in Table 1 in Box IV.2).

Thirdly, changes in global trade do not seem to have a significant impact on the geographical allocation of liquid assets. Finally, in the absence of other disturbances, the share of liquid assets tend to be reallocated towards UK liquid assets when the total demand for liquid assets ⁽¹⁴¹⁾ increases ⁽¹⁴²⁾.

Two episodes of global stress: illustrative simulations

Graph IV.5 provides a breakdown of how liquid assets were reallocated at the height of the global financial crisis and the COVID-19 crisis; making use of the point estimates in Table 1 of Box IV.2.

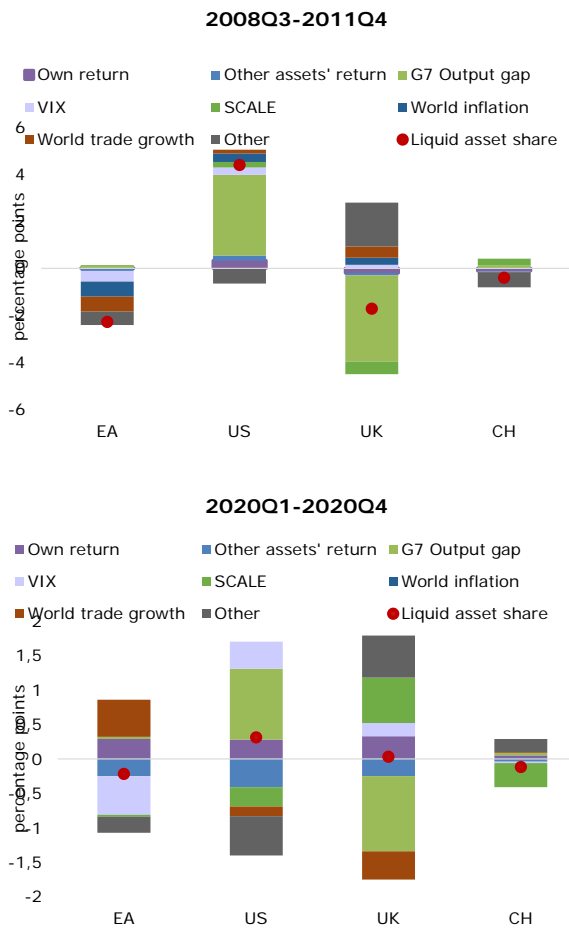
Between the fourth quarter of 2008 and the fourth quarter of 2011 (i.e. the top panel of Graph 5), the US share of liquid assets increased notably (up by 4.4 pps), while the share of external liquid assets issued by the euro area, Japan and Switzerland fell (down by 2.3 pps for the euro area). The overall global downturn in economic activity (measured by the output gap of the G7 countries) induced a notable rise in the share of US liquid assets (3.4 pps), mainly compensated for by a decrease in the share of UK liquid assets (down 3.7 pps). Rising stress in financial markets led to a rise in the share of US liquid assets (by 0.3 pps) and to a lesser extent in the share of UK assets (0.1 pps), mainly compensated by a decrease in the share of euro-area assets (0.5 pps). The global deflationary pressures generated an additional fall in the share of euro-area assets (0.6 pps.) The changes in relative returns had only a minor impact ⁽¹⁴³⁾.

⁽¹⁴¹⁾ As measured by the scale variable in equation (1) of Box IV.2 that measures the total external liquid assets. The scale variable is assumed to be predetermined in this analysis.

⁽¹⁴²⁾ As a corollary to this, the share of liquid assets tends to be reallocated away from UK liquid assets when the total demand for liquid assets decreases. Similarly, in consumption theory, when income increases ‘luxury’ goods experience increases greater than income. And when income decreases, ‘luxury’ good experience decreases by more than income.

⁽¹⁴³⁾ Interpreting the data in Graph IV.5, note that in equation (1) in Box IV.1 the return part $\sum_{j=1}^n \beta_{ij} \Delta R_{jt}$ can be re-written for currency i as $\beta_{ii} \Delta R_{it} + \sum_{j=1, j \neq i}^n \beta_{ij} \Delta R_{jt}$, where the first term is labelled “own return” and second term “other assets’ return”.

Graph IV.5: The liquid asset shares and their drivers: a breakdown of change



(1) Variables measured in quarter-on-quarter growth rates; simulations based on point estimates in Table A of Box IV.2.
 (2) Other assets' return: return on all assets except the return on the asset issued by the country; VIX: measure of stress in the stock market; SCALE: sum of liquid assets issued by the euro area, the United States, the United Kingdom and Switzerland divided by world nominal GDP. For more details see Box IV.2.
Source: Authors' estimates.

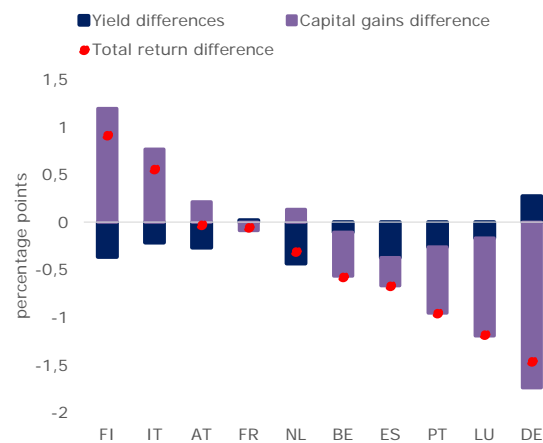
A similar pattern can be found for the period from the first to the fourth quarter of 2020 (i.e. bottom panel of Graph IV.5) (albeit with a lower intensity with the US share of liquid assets rising by 0.3 pps). Again, the overall slowdown in economic activity induced a 1 pp. increase in demand for liquid assets issued by the US, while rising stress in financial markets induced a 0,4 pp increase in the demand for US liquid assets. Changes in returns of these assets had only a limited impact on demand. On balance, the declines in the share of liquid assets issued by the other currency areas during this period remained fairly subdued (down by 0.2 pps for the euro area).

IV.5.Heterogeneity across euro-area Member States: some illustrative evidence

While it would be beyond the scope of this section to provide a full assessment of differences in the capacity of euro-area Member States to issue external liabilities with a strong currency status, the available evidence seems to suggest some notable differences between the Member States.

For instance, Graph IV.6 shows the average return differences on liquid assets for the Member States that were members of the euro area in 1999 (except Ireland) for the period from 2006 to 2020.

Graph IV.6: Return differences – euro area 2006-2020 average



(1) Euro-area Member States since 1999 (except IE).

(2) For each of the Member States intra-euro area claims are included.

Source: Authors' estimates

Germany is the only country that recorded, on average, a positive yield difference on its external liquid assets in this period. However, it is also the country recording the strongest negative difference in capital gains, indicating that non-residents earned a much stronger capital gain on their German liquid assets than German residents earned on their foreign liquid assets. This loss was especially strong at the start of the global financial crisis (2008), during the euro crisis (2010-2011) and the early stage of the COVID-19 pandemic (2020) ⁽¹⁴⁴⁾.

⁽¹⁴⁴⁾ This finding is in line with the hypothesis discussed in subsection IV.2 that a reserve country may experience a strong wealth transfers to the rest of the world in times of severe stress. See also Gourinchas and Rey (2022), *op. cit.*

All in all, these large differences in return reflect strong cross-country differences in the structural characteristics that underpin a country's international-currency status⁽¹⁴⁵⁾, and some country-specific developments. In this respect, one could test hypotheses related to the impact of specific developments such as for instance the decline of prominent companies in the mobile device industry in Finland, elevated Target2 balances of Germany⁽¹⁴⁶⁾, or some attractive features of the tax system in Luxembourg and the Netherlands. However, testing these hypotheses would be beyond the scope of this section.

IV.6. Conclusions

A strong international currency status can provide the issuing country with significant benefits. However, this section presented some evidence which indicates that the euro area is not yet fully making the most of its potential as an international currency. More particularly, the findings suggest that: (i) the excess return that can be attributed to a strong international-currency status has been moderate for the euro in the last two decades; (ii) in times of global stress, it is mainly liquid assets supplied by the U.S. that increased their share in total liquid assets, and (iii) there is still a significant

divergence in the capacity of Member States to supply assets with a strong international-currency status, partly reflecting differences in Member States' structural characteristics as well as country-specific features.

Strengthening the euro's international-currency status and spreading the benefits and costs of a strong international-currency status in a balanced way across the euro area will require further reforms at national and euro-area level.

More particularly, this task calls for the completion of the architecture of the Economic and Monetary Union, and a full convergence towards resilient economic structures across the euro area Member States.

In addition, these reforms will also have to recognise that a stronger international role for the euro will: (i) affect some specific transmission channels that have a direct impact on the euro area's capacity to withstand shocks such as an appreciation of the euro and (ii) lead to calls for the euro area to act as international lender of last resort in times of global stress.

⁽¹⁴⁵⁾ Several economic factors affect the strength of a currency's international status, including: (i) the issuing country's economic size and openness to trade; (ii) the depth and liquidity of the issuing country's financial markets; (iii) whether the issuing country has low and stable inflation; (iv) fiscal and external debt sustainability of the issuing country; and (v) habit persistence among investors. See, for instance, Chinn, M. and Frankel, J. (2008), 'Why the euro will rival the dollar', *International Finance*, Vol. 11, No. 1, pp. 49-73; Eichengreen, B., Mehl, A. and Chițu, L. (2017), *How Global Currencies Work: Past, Present and Future*, Princeton University Press.

⁽¹⁴⁶⁾ Target2 balances are part of an euro area Member State net foreign asset position, booked under "other investments". They may provide a low return.