BU Global Development Policy Center

Global Economic Governance Initiative
GEGI STUDY | February 2021

THE HIERARCHY OF THE OFFSHORE US-DOLLAR SYSTEM

On Swap Lines, the FIMA Repo Facility and Special Drawing Rights

Steffen Murau, Fabian Pape and Tobias Pforr

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Abbreviations

BCEAO	Banque Central des États de l'Afrique de l'Ouest
BD	Bangladeshi
BIS	Bank for International Settlement
BoC	Bank of Canada
BoE	Bank of England
BoJ	Bank of Japan
C6	Swap network of six central banks
C14	Recipients of Federal Reserve Swap Lines
CBoB	Central Bank of Bangladesh
CBoR	Central Bank of Russia
CN	Chinese
COFER	Currency Composition of Official Foreign Exchange Reserves
DFG	Deutsche Forschungsgemeinschaft
EAEPE	European Association for Evolutionary Political Economy
ECB	European Central Bank
EME	Emerging Market Economies
ESF	Exchange Stabilization Fund
ESRC	Economic and Social Research Council
EUI	European University Institute
EUR	Euro
EZ	Eurozone
FDIC	Federal Deposit Insurance Corporation
Fed	Federal Reserve
FIMA	Foreign and International Monetary Authorities
FOMC	Federal Open Market Committee
FRBNY	Federal Reserve Bank of New York
F-RRP	Foreign Reverse Repo
FX	Foreign exchange
GBP	British pound
GDP	Global Development Policy
GFSN	Global Financial Safety Net
GRA	General Resource Account
IASS	Institute for Advanced Sustainability Studies
IMF	International Monetary Fund
IOER	Interest on Excess Reserves
IPE	International Political Economy
JPY	Japanese Yen
LDC	Low-Income Developing Countries
NCB	National Eurozone Central Bank
OBFAs	Off-balance-sheet fiscal agencies
OIS	Overnight Indexed Swap
PBoC	People's Bank of China
QE	Quantitative Easing
RFA	Regional Financing Arrangement
RMB	Chinese Renminbi
RRP	Reverse Repos
RU	Russian
SDR	Special Drawing Rights (as instruments)
SN	Senegalese
SNB	Swiss National Bank
SOMA	System Open Market Account
US	United States
USD	US-Dollar
VTA	Voluntary Trading Arrangementr

$	US-Dollar
€	Euro
¥	Japanese Yen
₹	Chinese Renminbi
₽	Russian ruble
৳	Bangladeshi taka
f	West African CFA franc
x	Special Drawing Rights (as unit of account)
¤	Other units of account

Executive Summary

The view that the international monetary system is hierarchical has become increasingly common in International Political Economy (IPE) scholarship. However, the nature, shape and origin of this hierarchy remain often vague. Is it a hierarchy of currencies, states, or monetary jurisdictions? What determines hierarchy empirically? And what are its causes?

This study conceptualizes international monetary hierarchy by focusing on different mechanisms to supply emergency US-Dollar (USD) liquidity from the Federal Reserve (Fed) to non-US central banks. To this end, it takes on board insights of critical macro-finance and develops a model of the global financial architecture as a web of interlocking balance sheets.

We perceive the international monetary system as a world-spanning payments system in which daily money flows are settled mainly through interactions of private financial institutions. In its current shape, we call it the 'Offshore USD System' as it is based on using and creating USD-denominated credit money instruments 'offshore', i.e. outside the US.

The centrality of the USD as global 'key currency' places the US monetary jurisdiction at the apex of the global payments system. It enables US institutions to provide the ultimate means of settlement and makes the Fed the system's hierarchically highest balance sheet. At the same time, it pushes all other monetary jurisdictions into a peripheral position.

While private credit money creation is the default mechanism in normal times, central banks become paramount when private credit money instruments are about to endogenously implode in a crisis. Private institutions have mechanisms to supply emergency USD liquidity to each other in smaller crises, but in a larger systemic crisis public credit money becomes essential for the provision of emergency USD liquidity.

The international hierarchy below the apex is determined by the mechanisms through which non-US central banks can access emergency USD liquidity from the Fed. Not only are they important when they are actually used in systemic crises but they also matter in normal times. Peripheral monetary jurisdictions which are higher up in the international hierarchy receive a more favorable implicit liquidity guarantee that grants a higher elasticity space to their banking systems.

Currently, there are three different mechanisms for non-US central banks to access the Fed's balance sheet to attain emergency USD liquidity. These create three peripheral layers in the Offshore USD System.

The first-layer periphery can receive emergency USD liquidity via the Fed's central bank swap lines. With this mechanism, set up during the 2007-9 Financial Crisis, the Fed stands ready to create new USD-denominated central bank deposits on demand, while accepting deposits of the partnering central banks as collateral, which are denominated in their respective unit of account and created on the spot.

The second-layer periphery can make use of the Fed's new repo facility for Foreign and International Monetary Authorities (FIMA) to access emergency USD liquidity. Set up in March 2020, the Fed creates new central bank deposits on the spot against US treasury bonds which non-US central banks have to accumulate beforehand and pledge as collateral.

The third-layer periphery can access emergency USD liquidity from the Fed only via the Special Drawing Rights (SDR) system, set up in 1969 and administered by the International Monetary Fund (IMF). Non-US central banks have to sell previously allocated SDR holdings and can interact with the Exchange Stabilization Fund (ESF), which acts as gatekeeper for the Fed. New central bank deposits are only created if the Fed buys SDR Certificates issued by the ESF.

This is the first study to integrate swap lines, the FIMA repo facility and the SDR system into a single framework of interlocking balance sheets. It clarifies the functional relationship between the Fed and the IMF in the Offshore USD System. While the Fed is the hierarchically highest balance sheet in the global payments system and ultimate source for emergency USD liqudity, we interpret the IMF as an off-balance-sheet fiscal agency in the US monetary jurisdiction.

Our analysis of the three mechanisms has the potential to contribute to future research in various strands of IPE. Insights into the nature, shape and causes of international hierarchy are of relevance to the literature on the Global Financial Safety Net (GFSN), studies on the changing role of the IMF, analyses of the international role of the USD, as well as theories on international monetary power.

Acknowledgments

This study is part of the research project 'Hierarchical and Hybrid Money on a Fractured Continent: Europe's Monetary Architecture after the Eurocrisis' (2019-21), funded by Deutsche Forschungsgemeinschaft (DFG) and carried out at the Global Development Policy (GDP) Center of Boston University. Adopting an institutionalist research paradigm by using the conceptual framework of interlocking balance sheets, the analytical interest of the project is to examine the international and European financial architecture as a genuine credit money system.

The study applies the methodology developed in the first piece of the series, titled 'A Macro-financial Model of the Eurozone Architecture Embedded in the Global Offshore US-Dollar System', to investigate how central bank swap lines, the FIMA repo facility and the Special Drawing Rights (SDR) system create a hierarchy among different monetary jurisdictions in the global financial architecture.

Our collaboration has greatly benefited from Steffen Murau's Research Fellowship at the Bank for International Settlement (BIS) and his role as an affiliate scholar at the Institute for Advanced Sustainability Studies (IASS) Potsdam as well as Fabian Pape's institutional visit to the GDP Center in March 2020, generously funded by the Economic and Social Research Council (ESRC).

We have presented an earlier version of this study at the 32nd Annual Conference of the European Association for Evolutionary Political Economy (EAEPE) in the special session 'International Financial Hierarchies in the Basel III World' in September 2020. We are grateful to all participants for their valuable feedback.

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All errors remain ours, and ours only.

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1

Introduction

A growing number of scholarship in International Political Economy (IPE) and neighboring fields has come to describe the international monetary system as hierarchical.

This theoretical position stands in contradiction to the traditional Mundell Fleming model (Mundell 1960; Fleming 1962), which implicitly assumes that the international monetary system is 'non-hierarchical' or 'flat'. In a nutshell, this traditional approach thinks of the international monetary system as being made up of hierarchically equal autonomous states as building blocks which issue their own money, co-exist next to each other and have 'monetary sovereignty' in a Westphalian sense (Murau and Van 't Klooster 2019).

Contrary to this notion, ideas of an international monetary hierarchy can be found in IPE classics such as Strange (1971), Cohen (1977; 1998) and Kindleberger (1970; 1974), post-Keynesian literature (e.g. Andrade and Prates 2013; Bonizzi, Kaltenbrunner, and Powell 2019; Fritz, de Paula, and Prates 2018; Kaltenbrunner 2015; Terzi 2006), scholarship in a Marxist tradition (Alami 2018; Koddenbrock 2019; Koddenbrock and Sylla 2019), the Money View (Mehrling 2012; 2013; 2015; Murau, Rini, and Haas 2020; Pozsar 2020a), legal scholarship on money (Pistor 2013; 2017), and publications of the Bank for International Settlements (BIS) (Aldasoro and Ehlers 2018a; 2018b; McCauley and Schenk 2020).

Hierarchy of the international monetary system is an increasingly common concept but its nature, shape and causes remain opaque and contested.

Despite their merits, these bodies of literature struggle to convincingly explain the exact nature, shape and causes of international monetary hierarchy.

First, the nature of the international monetary hierarchy is usually not well-defined. Is it a hierarchy of different *currencies* as suggested by Strange and Cohen who develop different classifications to rank currencies against each other and place the US-Dollar (USD) at the top of the hierarchy?[1] Or is it a hierarchy of *states*, e.g. with the US and formerly the British Empire as the hierarchically highest states, followed by some competitors among the 'developed' countries and surrounded by many subordinate 'developing' countries? Or is it a hierarchy of *monetary jurisdictions* (Avdjiev, McCauley, and Shin 2015)—an analytical category used in scholarship of financial globalization that stresses the decoupling of money and the nation state?

Second, determining the exact way in which the international monetary hierarchy takes shape empirically is not a straightforward endeavor. Beyond broad-brushed intuitions about the hegemonic position of the US or the USD as well as a North-South or center-periphery divide, we lack a more granular and analytically concise picture. How do we account for other currencies, states or monetary jurisdictions that occupy a middle ground? What are the determinants for a respective position in the hierarchy? How meaningful are empirical measures of hierarchy that resort to the composition of central banks' foreign exchange (FX) holdings (Eichengreen, Mehl, and Chiţu 2017) or global FX market turnover (Fritz, de Paula, and Prates 2018)?

Third, there are competing views on the causes of hierarchy in the international monetary system. Some see the international monetary hierarchy as the result of intergovernmental policy-making (Strange 1972), imperialism (De Cecco 1978; Koddenbrock 2019), or class relations (Alami 2018). Others perceive it as an endogenous result of demand-driven market processes (Cohen 1998; Kindleberger 1975) or attribute to credit money systems a natural tendency to form hierarchies, both nationally and internationally, because they need central nodes for clearing and settlement (Mehrling 2012, 2015).

1 Cohen (1998, 112-133) lists seven categories: top currency, patrician currency, elite currency, plebeian currency, permeated currency, quasi-currency and pseudo-currency. Strange (1971) presents four categories: top currencies, master currencies, passive or neutral currencies, and political or negotiated currencies.

Hierarchy in the Offshore USD System is created by different mechanisms to supply emergency USD liquidity from the balance sheet of the Fed to non-US central banks.

This study presents a first step toward addressing these shortcomings. Taking on board insights of the critical macro-finance framework (Dutta et al. 2020; Gabor 2020; Murau and Pforr 2020; Pape 2020), we showcase a novel way to conceptualize international monetary hierarchy in the global financial architecture by focusing on different mechanisms to supply emergency USD liquidity from the Federal Reserve (Fed) to non-US central banks.

As our analytical starting point, we assume that the international monetary system is a world-spanning payments system in which daily money flows are settled first and foremost through the interactions of private financial actors (Bernes et al. 2014; Mehrling 2015). In its current shape, we call it the "Offshore US-Dollar System" (Murau, Rini, and Haas 2020) as it is paradigmatically based on using and creating USD-denominated credit money instruments 'offshore', i.e. outside of the US (also see Kindleberger 1970).

Any credit money instrument in the Offshore USD System has to be denominated in exactly one particular unit of account such as the USD or the Euro (EUR). While each monetary jurisdiction has its own unit of account for domestic purposes, most wholesale instruments for international payments are denominated in USD as unit of account. This makes the USD the 'key currency' (Williams 1934).

The root cause of the hierarchy among monetary jurisdictions is that a national unit of account has the key currency status. The USD's role as key currency places the US monetary jurisdiction at the apex of the global payments system. It enables US institutions to provide the ultimate means of settlement and makes the Fed the system's hierarchically highest institution. At the same time, it pushes all other monetary jurisdictions into a peripheral position.

While private credit money creation of banks and shadow banks is the default mechanism in normal times, public institutions become paramount in a crisis—defined as the endogenous implosion of private credit money because the expansionary dynamics of the credit system flip towards contractionary dynamics. For smaller crises, private institutions have mechanisms to supply emergency USD liquidity to each other to stabilize the payments system. However, in a larger systemic crisis, public credit money becomes essential for the provision of emergency USD liquidity.

The international hierarchy below the apex is determined by the mechanisms through which non-US central banks can access emergency USD liquidity from the Fed. Not only are they important when they are actually used in systemic crises but they also matter in normal times. Peripheral monetary jurisdictions which are higher up in the international hierarchy receive a more favourable implicit liquidity guarantee that grants a higher elasticity space to their banking systems.

The Offshore USD System and its mechanisms for emergency USD liquidity provision via the Fed can be most accurately represented through a web of interlocking balance sheets.

To flesh out this argument, we use the methodology of Murau (2020) and depict the Offshore USD System as a web of hierarchical interlocking balance sheets (Minsky 1986). The result is Figure 1, around which this study is constructed. We may think of it as a synopsis of today's global financial architecture at a high level of abstraction. It depicts a fully self-referential credit money system in which every institution's asset (shown on the left-hand side of each balance sheet) is another institution's liability (shown on the right-hand side of each balance sheet). The approach is based on the conviction that an adequate representation of the international monetary system has to acknowledge that it is such a credit money system. Some liabilities issued by hierarchically higher institutions are used as 'money assets' by hierarchically lower institutions, but there is no absolute definition of money.

Importantly, our analysis distinguishes between 'actual assets and liabilities' in the upper row of each balance sheet and 'contingent assets and liabilities' in the lower row. Actual assets and liabilities can in principle be recorded on-balance-sheet at any point in time; the quantitative difference between both is the institution's 'equity capital'. However, an adequate analysis of the global financial architecture must pay similar attention to contingent assets and liabilities. Those are implicit or explicit guarantees— also called insurances or backstops—by higher-ranking balance sheets to provide emergency liquidity to lower-ranking balance sheets in a crisis. While crucial, those guarantees are not accounted on-balance-sheet.

The mechanisms for emergency USD liquidity provision from the Fed to non-US central banks all have important components as contingent assets and liabilities. Therefore, it is only within this methodological framework that we can appropriately express the nature, shape and causes of international hierarchy between monetary jurisdictions.

In our depiction, the Offshore USD System has an apex and a three-layered periphery. We represent the US monetary jurisdiction in the apex using five different balance sheets: the Fed and the US Treasury as the main public institutions, the private US banking system as a consolidated sectoral balance sheet, and two off-balance-sheet fiscal agencies (OBFAs), which are critical for the operation of the Offshore USD System: the International Monetary Fund (IMF) and the Exchange Stabilization Fund (ESF). For each peripheral layer, we use two monetary jurisdictions as examples: the Eurozone (EZ) and the Japanese (JP) monetary jurisdictions in the first, the Chinese (CN) and the Russian (RU) monetary jurisdictions in the second, and the Bangladeshi (BD) and the Senegalese (SN) in the third layer. The peripheral jurisdictions are shown via their central bank and their national banking systems, which form a domestic hierarchy towards each other.

The heart of the Offshore USD System is the Eurodollar market. Private banks create USD-denominated deposits outside of the US to fund and facilitate international payments.

As its defining feature, the Offshore USD System is based on privately created USD-denominated deposits in the non-US banking systems—the so-called **Eurodollar market** (note that 'Euro' here is an old word for 'offshore'). Figure 1 emphasizes how the peripheral monetary jurisdictions are integrated into the Eurodollar market. The non-US banking systems hold deposits not only in the local but also in the key currency. This allows other national institutions which are not depicted here (e.g. treasuries, firms and households) to interact with the global system. The banking systems' deposits are created against loans and bonds, which are also either denominated in the local or the key currency; in the latter case, they are 'Eurobonds' or 'Euroloans'. In normal times, international transactions do not require public balance sheets and occur only in the banking system.[2]

All deposits issued as liabilities by the banking systems are promises to pay higher-ranking money, either on demand or in the near future. For bank deposits issued in the domestic unit of account, this higher-ranking money is central bank money—notes and central bank deposits (or 'reserves'). For USD-denominated 'offshore' deposits issued by the non-US banking systems, however, these higher-ranking USD-denominated instruments are onshore deposits issued by the US banking system, which in turn are insured by the Fed. The non-US banking systems hold a limited amount of those USD instruments as quasi-reserves for their offshore USD deposits. In turn, the USD-denominated loans and bonds are promises to be paid such instruments in the future. The banks' business models depend on the ability to match the inflow and outflow of such payment commitments.

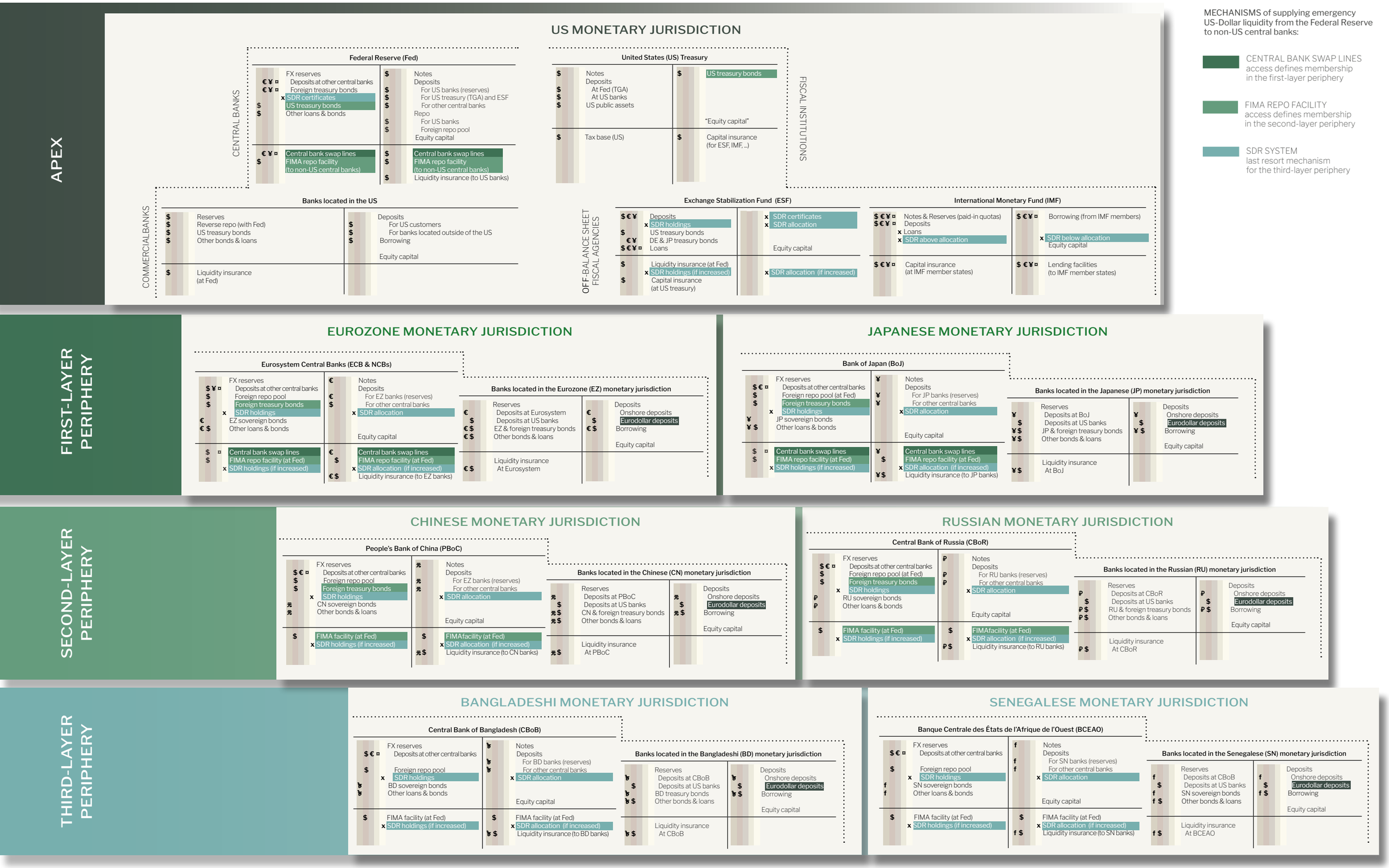
In a crisis, non-US banks may face a situation when some of their USD cash inflow commitments default and their customers insist on having their offshore USD deposits redeemed on demand. They could try to get emergency USD liquidity from US banks, which act as lenders of first resort. In some instances, however, this mechanism is insufficient—the non-US banks may find the borrowing conditions in private money markets too prohibitive or US banks may themselves be in crisis and unwilling to lend. Non-US banks then have to rely on liquidity support from their domestic central bank, which can act as a lender of last resort and lend money to the domestic banking system to alleviate the liquidity shortage.

In a systemic crisis, non-US banks are not able to receive sufficient emergency USD liquidity through private mechanisms and have to turn to their central banks as USD lenders of last resort.

For non-US central banks, it is of key difference if their domestic banks need instruments in domestic or the key currency. If the shortage is in domestic currency, non-US central banks can create unlimited emergency liquidity simply by expanding their balance sheets on both sides. If the shortage is in USD, however, they can only lend the liquid USD-denominated instruments accumulated as assets in their FX reserves beforehand or liquidate part of their FX reserve portfolio, e.g. with fire sales of US treasury bonds. In a large systemic crisis, the volume of those instruments will be lower than the USD-denominated claims outstanding and hence too low to inject enough liquidity to tame the crisis. Moreover, non-US central banks may prefer to keep some of their USD-denominated FX reserves for other purposes. Then they need to borrow USD-denominated instruments from other balance sheets.

2 We focus here exclusively on the traditional deposit-based banking system and abstract from shadow banking and non-bank financial institutions as they are not key to our argument on the origin of international hierarchy. Moreover, we adopt a locational approach, which measures international banking activity from a residents' perspective focusing on the location of the banking office (BIS 2015).

Figure 1 — The hierarchy of the global Offshore US-Dollar System



Monetary Jurisdictions: BD: Bangladeshi; CN: Chinese; EZ: Eurozone; JP: Japanese; RU: Russian; SN: Senegalese; US: United States. **Institutions:** BCEAO: Banque Centrale des États de l'Afrique de l'Ouest; BoJ: Bank of Japan; CBoB: Central Bank of Bangladesh; CBoR: Central Bank of Russia; ECB: European Central Bank; ESF: Exchange Stabilization Fund; Fed: Federal Reserve; IMF: International Monetary Fund; NCB: National Eurozone central banks; PBoC: People's Bank of China. **Instruments:** FIMA: Foreign and International Monetary Authorities ; F-RRP: Foreign Reverse Repo Facility; FX: foreign exchange; IR: interest rate; RRP: Reverse Repos; SDR: Special Drawing Rights (as instruments); TGA: Treasury General Account.. **Units of account: $**: US-Dollar; **€**: Euro; **¥**: Japanese Yen; **元**: Chinese yuan; **₽**: Russian ruble; **৳**: Bangladeshi taka; **f**: West African CFA franc; **x**: Special Drawing Rights (as unit of account); **¤**: other units of account.

The Fed is the ultimate source for emergency USD liquidity. It can create unlimited new USD-denominated central bank deposits out of thin air and supply them to non-US central banks. As hierarchically highest balance sheet, it is the last one to remain operational even if all private mechanisms fail in a systemic crisis.

In the current global financial architecture, there are three different mechanisms for non-US central banks to access the Fed's balance sheet and attain emergency USD liquidity. It is due to the different conditions attached to these three mechanisms that we see a clear hierarchical structure among peripheral monetary jurisdictions. The color scheme in Figure 1 highlights the various instruments related to each of these mechanisms in the web of interlocking balance sheets and links them to the three peripheral layers.

The **Fed's central bank swap lines** are the first mechanism. Access to them is the defining feature for monetary jurisdictions in the first-layer periphery. Swap lines are contingent instruments through which the Fed stands ready to create new USD-denominated central bank deposits on demand, while accepting instruments as collateral that are issued by partnering central banks, denominated in their respective unit of account. This mechanism dates back to the 2007-9 Financial Crisis and the run on the Eurodollar system when the Fed had set up emergency swap lines with 14 partnering central banks. The European Central Bank (ECB) and the Bank of Japan (BoJ) were the two largest recipients of emergency USD liquidity. In 2013, the Fed made five of these permanent and unlimited in volume. In March 2020, the Fed revamped those original 14 swap lines.

Monetary jurisdictions in the second-layer periphery can receive emergency USD liquidity via the **Fed's FIMA repo facility** — the most recent and least established mechanism considered here. It grew out of the Fed's long-standing Foreign Repo Pool. FIMA stands for 'Foreign and International Monetary Authorities'. Through this facility, non-US central banks holding US treasury bonds can interact with the Fed by pledging US treasury bonds as collateral while the Fed creates USD-denominated central bank deposits for them out of thin air on the spot. This is particularly relevant for monetary jurisdictions such as China or Russia whose political ties with the US are looser and which therefore have not received access to a swap line. Still, the Fed has integrated them in their management of the Offshore USD System. While swap lines are unlimited in volume, the FIMA repo facility is limited by the amount of available US treasury bonds as collateral.

Monetary jurisdictions in the third-layer periphery neither have access to the swap lines, nor have they accumulated enough US treasury bonds to use the FIMA repo facility. This applies to many Emerging Market Economies (EMEs) and most Low-Income Developing Countries (LDCs). For them, the last resort mechanism to receive emergency USD liquidity from the Fed is the **Special Drawing Rights** (SDR) system intermediated by the IMF. Developed as a political compromise in the 1960s, the SDR system is not only the oldest of the three mechanisms but also the most ambiguous one. While often mistakenly seen as an international currency in its own right, SDRs in today's global financial architecture are best interpreted as tokens for key currency. Hence, the SDR system allows channeling USD-denominated instruments across monetary jurisdictions in the Offshore USD System. In contrast to the other two mechanisms, the Fed does not interact directly with non-US central banks to create USDs on demand. Instead, the ESF acts as a gatekeeper. It can receive USD-denominated central bank deposits issued by the Fed in exchange for SDR Certificates and feed them into the SDR system. The main channel used in practice, however, is that central banks of the first or second-layer periphery swap SDRs for USD-denominated instruments held in their FX reserves to the third-layer periphery.

> Swap lines, foreign repo facilties and SDRs give non-US central banks access to the Fed's balance sheet to replenish their FX reserves with liquid USD-denominated instruments.

This analysis of the nature, shape and causes of international hierarchy in the Offshore USD System yields new insights into the global financial architecture on the level both of instruments and institutions. On one hand, this study is the first to integrate swap lines, the FIMA repo facility and the SDR system into a single unified framework of interlocking balance sheets to show how the actual and contingent instruments involved in those mechanism interlink. On the other hand, the study clarifies the functional relationship between the Fed and the IMF in the Offshore USD System. As a consequence of the key currency perspective, we interpret the Fed as the hierarchically highest balance sheet in the global financial architecture and attribute only a subordinate role to the IMF, which we conceptualize as an OBFA in the US monetary jurisdiction. This allows bridging the gap between so far disconnected strands of literature on the international monetary system that focus primarily on either one institution or the other.

At the same time, it is important to acknowledge that our analysis has some limitations. First, our

framing of the Offshore USD System is an ideal type insofar as it reduces the international wholesale money markets to the Eurodollar market. We abstract from cross-border transactions using shadow money, central bank notes, private money markets denominated in other units of account such as EUR or the Chinese Renminbi (RMB), and leave aside the FinTech or the crypto universe. Still, to the extent that we can measure the degree of dollarization in the international monetary system, this idealization addresses the stylized facts of our age (see Info Box).

Second, we only focus on public mechanisms of emergency USD provision and largely skip private lender of first resort mechanisms. For example, it is a lucrative business model for US banks to lend USD instruments to non-US central banks or non-US commercial banks in need for USDs. Moreover, the private FX swap market represents a key private refinancing channel in the Offshore USD System. Still, the mechanisms through which non-US central banks can connect with the Fed are key for understanding the nature, shape and origin of international hierarchy.

Third, while our analysis adopts a bird's eye view on the global financial architecture as a whole, it looks from the center to the periphery and remains Western-centric without necessarily doing justice to the specificities and idiosyncracies of monetary jurisdictions in the second and third-layer periphery. It will require future case-study-oriented work in the critical macro-finance framework to show in greater detail how the dynamics of the Offshore USD System overlap with non-Western monetary systems.

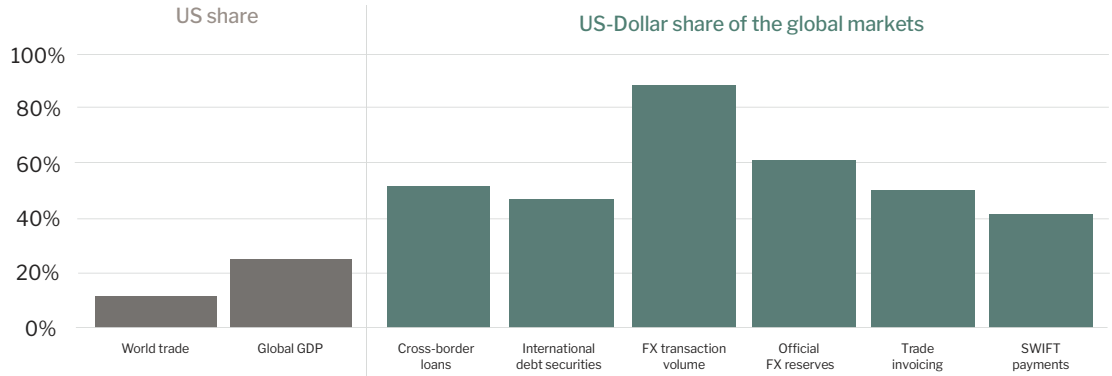
With these caveats in mind, our analysis of the three mechanisms has the potential to contribute to future research in various strands of IPE. Insights into the nature, shape and causes of international hierarchy are of relevance to the literature on the Global Financial Safety Net (GFSN), studies on the changing role of the IMF, analyses of the international role of the USD, as well as theories on international monetary power.

The remainder of this study will conceptualize, explain and compare the three mechanisms for providing international emergency USD liquidity in greater detail. Section 2 looks at the Fed's central bank swap lines which cater exclusively to the first-layer periphery. Section 3 studies the Fed's FIMA repo facility, which is the main source for emergency USD liquidity in the second-layer periphery. Section 4 explains the SDR system as a tool to supply emergency USD liquidity either via the ESF or central banks in the first and second-layer periphery to the third-layer periphery. Section 5 concludes.

Info Box: Measuring the degree of dollarization in non-US monetary jurisdictions

The USD dominates international finance as a funding, investment, and reserve currency. Usage of the USD is geographically dispersed, with a large share of activity occurring outside of the US borders (see Figure 2). While the US economy accounts for only one quarter of global GDP, around half of all cross-border loans and international debt securities are denominated in USD, and 40 percent of all international payments are made in USD. The dominance of the USD is particularly pronounced in FX markets, where 85 percent of all transactions occur against the USD. Finally, the USD retains the status of the world's primary reserve currency, accounting for 61 percent of official FX holdings. Holdings of official USD reserves have expanded rapidly following the 1997 East Asian crisis, with reserve holdings growing from $1.6 trillion in 1997 to $12 trillion by mid-2020. The growth in reserve accumulation was particularly pronounced in Asia and the Middle East, led by China, Japan, and Saudi Arabia. As a form of self-insurance, FX reserves signal that countries have liquid assets to meet a liquidity shock or sudden reversal of capital flows (BIS 2020).

Figure 2 — Assessing the international role of the US-Dollar in 2019-20



Source: Bank for International Settlements

2

The Fed's Central Bank Swap Lines

OUTLINE

The first-layer periphery of the Offshore USD System consists of monetary jurisdictions whose central banks are in an exclusive position to receive emergency USD liquidity from the Fed via central bank swap lines, which offer flexible access and low borrowing costs. They are able to pledge their own currency as collateral which they create ad hoc on their own balance sheets. This mechanism is only available to a select group of monetary jurisdictions which are relatively closely allied to the US. The more privileged monetary jurisdictions in the first-layer periphery are part of a network of permanent unlimited swap lines. This network comprises the US, the Eurozone, Japan, the United Kingdom, Switzerland, and Canada ('C6'). A second group of countries has non-permanent swap lines which the Fed has so far activated whenever it found necessary. This applies to Australia, Brazil, Denmark, Mexico, New Zealand, Norway, Singapore, South Korea, and Sweden ('C14').

HISTORICAL OVERVIEW

First used in 1962, swap lines were originally seen as a tool to stabilize exchange rates and prop up confidence in the USD-gold link under the Bretton Woods System (Coombs 1976). Early on, the Fed used a swap line to the BIS in order to offer USD-denominated deposits to banks operating in the Eurodollar market in an effort to stabilize interest rates in this market (McCauley and Schenk 2020). Swap lines continued to serve the purpose of exchange rate management throughout the 1970s but fell into disuse in the 1980s as central bankers increasingly came to consider discretionary exchange rate interventions at odds with rules-based monetary policy (Bordo, Humpage, and Schwartz 2015). In the 1980s and 1990s, swap lines were extended periodically by the Fed or the ESF to offer bridge loans to emerging market economies with balance of payment difficulties that were negotiating structural adjustment packages with the IMF.

As Figure 3 shows, the Fed's swap lines acquired their contemporary role in emergency USD liquidity assistance during the 2007-9 Financial Crisis. Over the course of the crisis, the Fed established a total of 14 swap lines to counter an acute USD funding shortage in the Eurodollar market. The swap lines were designed to channel emergency USD liquidity through foreign central banks to foreign banking institutions. The first swap lines were set up in December 2007 with the ECB and the Swiss National Bank (SNB) and were capped at $20bn and $4bn respectively (Goldberg, Kennedy, and Miu 2010). After the failure of Lehman Brothers, these swap lines were doubled in size, and new lines with the Bank of England (BoE), Bank of Canada (BoC) and Bank of Japan (BoJ) were added, bringing the total allotments to $247bn. As funding disruptions spread further, the Fed extended these lending agreements to a total of 14 swap lines with ever larger volumes (Broz 2015; Sahasrabuddhe 2019; McDowell 2012).

The scale of the crisis swap operations can hardly be overstated. Already on 13 October 2008, the swap lines to the BoE, the ECB and the SNB became unlimited in size to accommodate any quantity of USD funding demanded. In a single week in late October, the Fed lent a gross amount of $850bn through the swap lines. In December, the net sum of outstanding swaps reached a peak of $580bn, about 35% of the Fed's balance sheet at the time (Tooze 2018, 212). Primarily taken up by central banks in Europe, these swap lines provided emergency USD liquidity far in excess of existing FX reserves which had been estimated at a total of $294bn in mid-2007 for the Eurozone, Switzerland and the UK combined (McGuire and von Peter 2009, 20). Eventually, the Fed would provide about $10tn in gross USD liquidity through its crisis swap line operations (Tooze 2018).

The crisis swap lines were terminated in February 2010 but were resurrected only three months later in a modified form between the Fed and five major central banks—the ECB, the SNB, the BoE, the BoJ and the BoC. In 2011 and 2012, swap drawings continued especially by the ECB as European banks experienced further funding troubles amidst the intensifying Eurocrisis. In November 2011, the swap lines were converted into a standing network extending bilateral swap lines between each of them

(Bank of Japan 2011). In October 2013, this network—now dubbed 'C6 Swap Lines' (Mehrling 2015)—was announced to be made permanent and unlimited, putting in place an indefinite backstop.

In March 2020, during the COVID-19 crisis, the Fed reactivated the C14 swap lines as temporary and limited arrangements (Federal Reserve 2020b). Outstanding swap drawings peaked at $449bn in May and helped alleviate acute USD cash-flow problems in international funding markets. Unlike in 2007-09, however, the majority of drawings this time were not from the ECB, but from the BoJ, indicating a shifting pattern of emergency USD liquidity needs.

TECHNICAL DETAILS

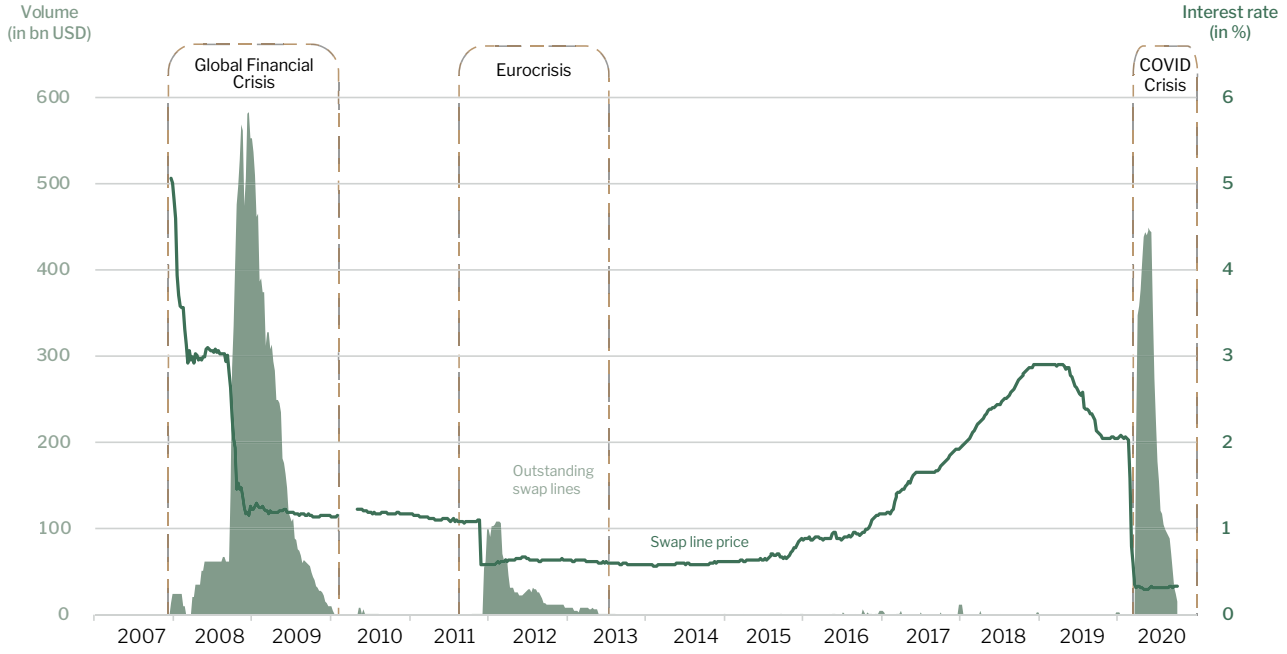
Swap lines are a relatively straightforward mechanism. The Fed's swap line agreements create a temporary commitment to exchange USD for a foreign currency and reverse the transaction at a later date. The terms of the exchange are specified beforehand. Typically, there is a pre-defined amount that can be exchanged and a set expiration date when the swap is to be reversed. The exchange happens at prevailing spot market rates with an additional small fee charged from the foreign central bank. The reversal of the swap occurs at the specified date by means of a forward transaction, usually the next day or as far ahead as three months, using the same exchange rate as the original swap to insulate both central banks from exchange risk (Federal Reserve 2017).

In legal terms, these arrangements are contracts, and they are exceptionally short. For example, the Fed's swap line contract with the ECB dated 10 May 2010 covers only seven pages (Federal Reserve Bank of New York 2010). Brevity distinguishes central bank swap line agreements from comparable private economic contracts. This discrepancy creates flexibility: whereas the details of private contracts have disciplining effects on economic agents, the relative vagueness of central bank swap line agreements creates the policy space necessary to do 'whatever it takes' to safeguard the financial system (Pistor 2013, 320).

The initial crisis swap lines were exclusively USD swap lines designed to supply USD to foreign central banks such as the ECB. The agreements stipulate that the ECB should pay interest on the proceeds of any swap transaction calculated at the rate of the applicable Overnight USD Indexed Swap (OIS) Rate plus a 100-basis-point spread. The Federal Reserve Bank of New York (FRBNY), by contrast, did not pay interest and did not invest but simply held the funds on its accounts (Fleming and Klagge 2010). A reciprocal swap line—allowing the drawing of either currency—was only established on November 30, 2011 between the Fed and its five counterparts.

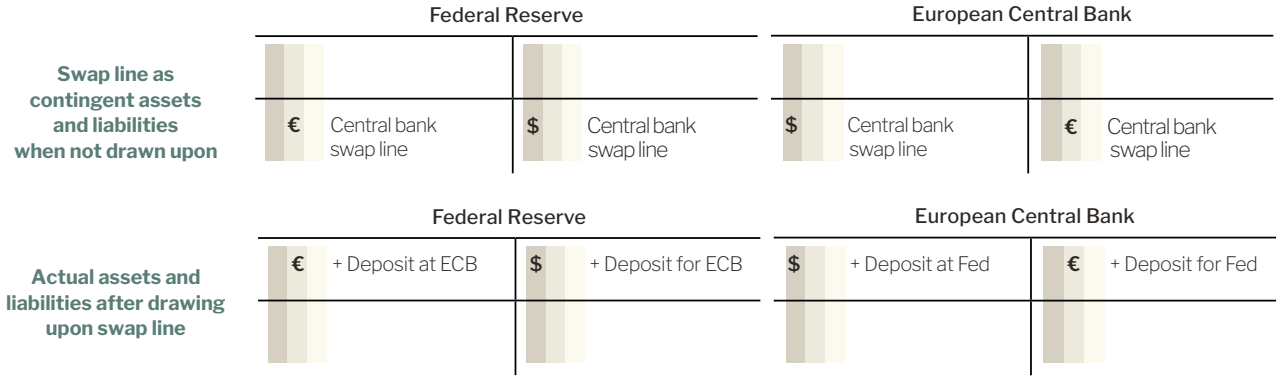
The terms of the swap contract have been amended several times. For instance, as the line in Figure 3 shows, the interest spread that the foreign central bank had to pay on its USD swap line was reduced from 100 to 50 basis points over OIS on

Figure 3 — Drawings on Fed swap lines, volume and price (2007-20)



Sources: Federal Reserve Bank of St. Louis, Bloomberg, authors' own calculations

Figure 4 — Balance sheet mechanism for central bank swap issuance



November 30, 2011; and on March 15, 2020, the spread was further lowered to 25 basis points over OIS.[3] Transcripts of Federal Open Market Committee (FOMC) meetings in 2011 indicate that the initial repricing was intended to encourage greater uptake of the swap line during the Eurocrisis and discourage foreign banks from drawing funds from the Fed directly. As the reduction made swap lines a slightly cheaper source of funding than the domestic Primary Credit Rate, it signaled that the Fed wanted European banks to borrow from the ECB rather than from the Fed directly (FOMC 2011). While FOMC transcripts are not available for 2020, it is likely that similar considerations to limit the use of the Fed's domestic facilities were at play during the COVID-19 crisis.

As Figure 4 indicates, the swap line agreement can be understood as a contingent instrument that does not depend on pre-existing currency reserves—using the methodology proposed in Murau (2020), contingent assets and liabilities are denoted as a mere 'potentiality' in the bottom part of a balance sheet. Once the swap line is activated, 'actual' assets and liabilities emerge that are denoted in the upper part of a balance sheet. The FRBNY creates a new balance sheet liability denominated in USD that it deposits into a special account for the ECB which holds it as asset; and vice versa the ECB creates a new liability credited to the FRBNY account. This process increases the amount of FX reserves on central bank balance sheets 'out of thin air' (Coombs 1976, 76). The establishment of unlimited swap lines between the C6 in 2013 thus effectively implies that the Fed stands ready to provide expansions of its balance sheet in indefinite quantities to meet the USD needs of these central banks.

The swap lines are legally constructed in a way that the Fed only interacts with foreign central banks and has no exposure to the credit risks of distributing USD-denominated instruments to private foreign banking institutions. This means that the Fed does not have to set up a distribution network and manage counterparty risks in the offshore USD markets.

SUMMARY

The Fed's swap lines represent a flexible mechanism of providing emergency USD liquidity at rapid speed. Access to this mechanism is strongly restricted as it applies only to five central banks in a permanent and unlimited form, and to another nine as temporary agreements. To the private banking system in those monetary jurisdictions, the standing swap lines provide an implicit backstop even when they are not used and increase their elasticity space (Murau 2020). Swap lines have emerged as the key tool for emergency USD liquidity provision in the 2007-9 Financial Crisis. While the Fed's swap lines are credited with restoring confidence in the USD and calming international markets (Allen and Moessner 2010; Goldberg, Kennedy, and Miu 2010; Tooze 2018), they are criticized for their selectiveness and opaqueness, giving power to technocratic central banks rather than multilateral political agreements (Broz 2015; Sahasrabuddhe 2019). Bilateral swap line schemes have proliferated between 2008 and 2015, over 80 agreements were signed involving over 50 countries around the world (McDowell 2019). The most prominent swap lines, however, remain those organized by the Fed as they provide access to emergency USD liquidity.

3 In Figure 3, swap pricing is based on three-month OIS data. However, swaps are offered in different maturities. The Fed uses matching OIS (e.g. one-week swap is priced off one-week OIS rate). Swap prices are thus variable, which is not reflected in the graph. Regarding past swap pricing, it is important to remember that—despite the existence of the standing C6 swap network—swap prices are implicit when not used as the Fed can unilaterally adjust the conditions for pricing, as has happened in November 2011 and March 2020. The interest rate curve is interrupted from February to May 2010 as swap lines were suspended during that period.

3

The Fed's FIMA Repo Facility

OUTLINE

The second-layer periphery in the Offshore USD System is made up of monetary jurisdictions whose central banks do not have access to the Fed's balance sheet via swap lines but who can interact with it via the Fed's foreign repo facilities. The prerequisite is that those non-US central banks hold a FIMA account at the Fed and have a sufficient amount of US treasury bonds in stock to pledge as collateral for borrowing emergency USD liquidity. While this mechanism is comparable in flexibility with swap lines, it is less attractive because central banks in the second-layer periphery are not able to pledge their own on-the-spot-created central bank deposits as collateral but have to resort to previously accumulated US treasury bonds. This creates a strict limit to the available borrowing capacity. The group of monetary jurisdictions that belongs to the second-layer periphery is more difficult to define than first-layer peripheral countries since the binding constraint is their holdings of US treasury bonds, which is not always known and fluctuates over time. We may contend that among those are monetary jurisdictions with a high degree of dollarization that have not received a swap line, arguably for political reasons, such as China and Russia.

HISTORICAL OVERVIEW

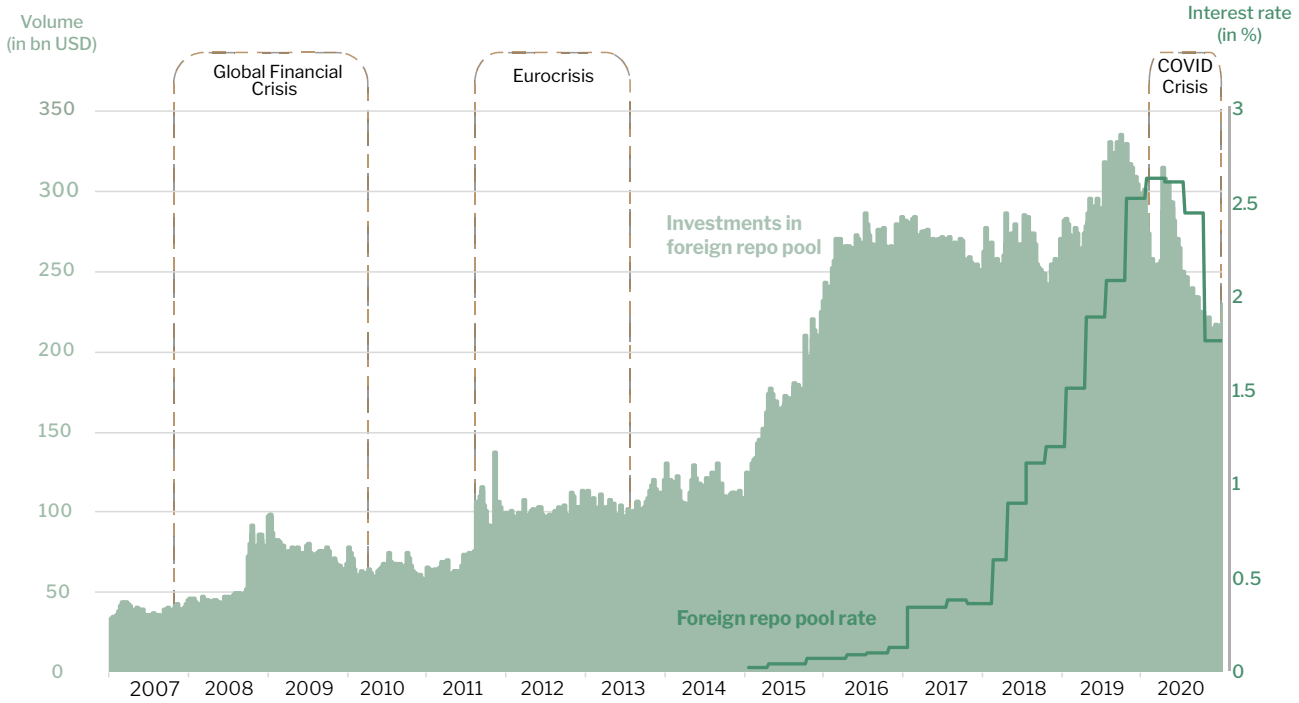
On March 31, 2020 the Fed announced the creation of a temporary repo facility for foreign and international monetary authorities (FIMA repo facility) to access emergency USD liquidity. Taking up operations on April 6, the new FIMA repo facility allows non-US central banks and other monetary authorities that have an account at the FRBNY to enter into repurchase transactions with the Fed and pledge US treasury bonds as collateral to receive USD-denominated central bank deposits which can then be made available to institutions in their respective monetary jurisdictions. The explicit goal of the facility is to smooth the functioning of key segments of both domestic and offshore USD markets, including the US treasury bond market (Federal Reserve 2020a).

One reason why the Fed decided to introduce a repo facility in 2020 was the scale of disruption in the US treasury bond market during the COVID-19 Crisis. The March 2020 market turmoil was a sudden 'dash for cash' by global investors that saw their usual income streams collapse. Driven by the unwinding of hedge funds' leveraged trading strategies, along with the liquidation of large treasury portfolios by foreign official reserve managers, the treasury bond market witnessed a sudden bout of unprecedented volatility (Schrimpf, Shin, and Sushko 2020). In this context, the new FIMA repo facility is a mechanism to allow non-US central banks to access emergency USD liquidity without having to sell into a falling market, potentially exacerbating instabilities.

The new FIMA repo facility expands the scope of interactions between the Fed and non-US central banks. Central banks usually maintain deposit and custody accounts between each other to facilitate cross-border payments as well as invest, settle and hold currency reserve balances. The FRBNY currently provides over 550 such accounts to more than 200 account holders, including central banks, treasuries, and foreign public reserve managers. Since the mid-1970s, the Fed has expanded these investment services to include a pooled foreign overnight reverse repurchase agreement, the so-called 'foreign repo pool' (Federal Reserve Bank of New York 2020), or 'foreign reverse repo facility' (F-RRP, cf. Pozsar 2016). This foreign repo pool can be considered a direct counterpart to the new FIMA repo facility.

Traditionally, the overall size of the foreign repo pool had been relatively small, averaging at around $30bn before the 2007-9 Financial Crisis. However, as Figure 5 indicates, the foreign repo pool has expanded considerably over the last decade, averaging at about $250bn since 2016. On one hand, this increase reflects foreign central banks' preference to maintain larger USD cash buffers since the crisis (Ihrig, Senyuz, and Weinbach 2020). On the other hand, the increase is indicative of the Fed's new large balance sheet, which emerged as the result of its emergency interventions during the 2007-9 Financial Crisis and the ensuing Quantitative Easing program. Before 2014, the Fed maintained tight

Figure 5 — Investment in the Fed's Foreign Repo Pool (2007-20)



Source: Federal Reserve

constraints on customers' ability to vary the size of their investments in the foreign repo pool, partially because the Fed itself had relatively few assets on its balance sheet that could be used as collateral in such repo transactions. From around 2015 onwards, it appears to have lifted constraints on the foreign repo pool (Potter 2016). While use of the facility appears to have declined after an initial peak at roughly $300bn in late 2019, the COVID-19 crisis in March and April 2020 saw a sudden build-up and subsequent unwinding of precautionary cash balances in the facility, as foreign monetary authorities sought to manage their USD liquidity needs.[4]

Although the Fed does not disclose who invests in the foreign repo pool, data from Japan's Ministry of Finance indicates that by 2016, it was the largest investor accounting for roughly half of the facility's use and most of its inflows in 2015 (Pozsar 2019). These investments occurred despite the Bank of Japan's access to a standing, unlimited swap line with the Fed. This shows that inflows into the foreign repo pool were not driven solely by the need to build up holdings of highly liquid foreign central bank deposits, but possibly also because the facility was competitively priced. Yet it also indicates that investments in the facility remain highly concentrated, and that most FX reserves continue to be invested in private markets, such as in the FX swap market or in US treasury bonds or other USD-denominated securities, leaving open the possibility of treasury bond market volatility amidst large-scale liquidations.

The introduction of the FIMA repo facility seeks to redress this situation (Setser 2020). By allowing non-US central banks to transform their holdings of official USD reserves outside of the private market mechanism, the facility effectively has expanded on the innovative use of the foreign repo pool in recent years. Importantly, the FIMA repo facility represents a decision by the Fed to continue to engage directly with its foreign counterparts, rather than going through the private banking system in the provisioning of USD balances.

4 The Fed only provides limited data on the foreign repo pool. While the total volume of investment is published, the composition of this investment is unknown. Similarly, the Fed only publishes averages of the foreign repo pool interest rate on a quarterly basis, starting in 2015. The crisis periodization here and in the remainder of the study is derived from the swap line usage plotted in Figure 3 with the Global Financial Crisis lasting from December 2007 to February 2010, the Eurocrisis from September 2011 to August 2013, and the COVID Crisis from March 2020 to the rest of the year.

TECHNICAL DETAILS

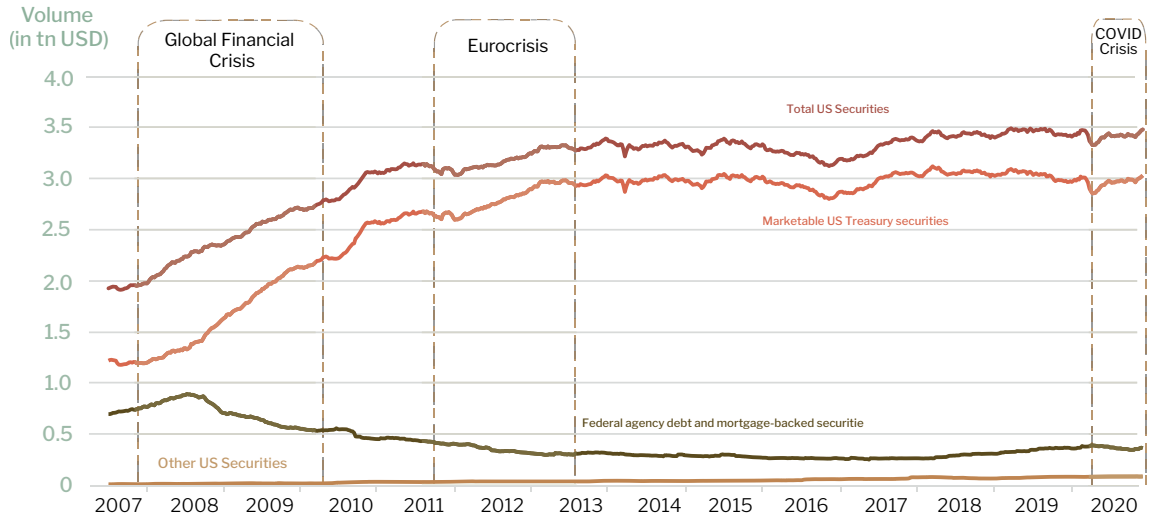
The stated purpose of the FIMA repo facility is to help ease strains in global USD funding markets (Federal Reserve Board 2020). This mirrors the official function of the Fed's swap lines. Yet unlike swap lines, it does not use foreign currencies as collateral but US treasury bonds. The difference matters: While foreign central banks can create their own currencies as a liability on the spot, access to the FIMA repo facility is limited by the amount of US treasury bonds accumulated beforehand. When a need for emergency USD liquidity arises, non-US central banks do not need to engage in fire sales of their US treasury bond holdings but can pledge them at the Fed as repo collateral. The Fed, just as in the case of swap lines, creates new USD-denominated central bank deposits out of thin air.

The idea that repo transactions backed by US treasury bonds is a 'second best' option next to swap lines finds expression in discussions by the FOMC as early as October 2008. In the 2007-9 Financial Crisis, just after Lehman Brothers had collapsed, FOMC members considered extending swap lines to EMEs. Keen to offset any repayment risks, the FOMC decided to grant swap lines to four EME countries—Mexico, Brazil, South Korea and Singapore—which all had large USD-denominated reserve holdings and also followed generally prudent policies in terms of low inflation as well as a roughly balanced current account and fiscal positions. Yet even amidst these favorable conditions, the FOMC took comfort in the broader 'set-off rights' of the FRBNY as these foreign central banks already held part of their USD-denominated FX reserves at accounts with the FRBNY. In case of non-repayment of an outstanding swap line, the Fed would be able to simply confiscate the assets already on its books (FOMC 2008, 19). Ultimately, the FOMC rejected the idea of lending officially to other central banks against US treasury collateral on the basis that this might be considered stigmatizing (McDowell 2017, 172).

With the introduction of the FIMA repo facility in March 2020, the Fed revived this idea by providing a mechanism for emergency USD liquidity provision to central banks with sufficient US treasury bond holdings, which we summarize as second-layer periphery. Who belongs to that group is less straightforward to determine than in the case of swap lines: On one hand, non-US central banks publish only the aggregate volume of their FX reserves without publicly specifying their exact US treasury bond holdings. On the other hand, even if we knew individual central banks' US treasury bond holdings, we would need to introduce a somewhat artificial benchmark to determine what volume would qualify for membership in the second-layer periphery. This could either depend on the absolute values of US treasury bond holdings or rather on the relative shares compared to the size of the Eurodollar market in that monetary jurisdiction.

Still, to provide a general picture, Figure 6 presents an overview over the holdings of US securities of non-US central banks. It shows a marked increase in holdings since the 2007-9 Financial Crisis. The tendency towards increased reserve accumulation is matched by IMF estimates regarding the overall growth of official reserve holdings, which have grown from $1.6 trillion in 1997 to $12 trillion by mid-2020. Within these holdings, the USD remains the dominant reserve currency, which accounts for about 60 percent of official FX reserves (BIS 2020).

Figure 6 — US securities holdings of non-US central banks (2007-20)



Sources: Federal Reserve Board (H. 4.1 Table 1A), Yardeni Research

Figure 7 — Balance sheet mechanism for foreign repo facilities

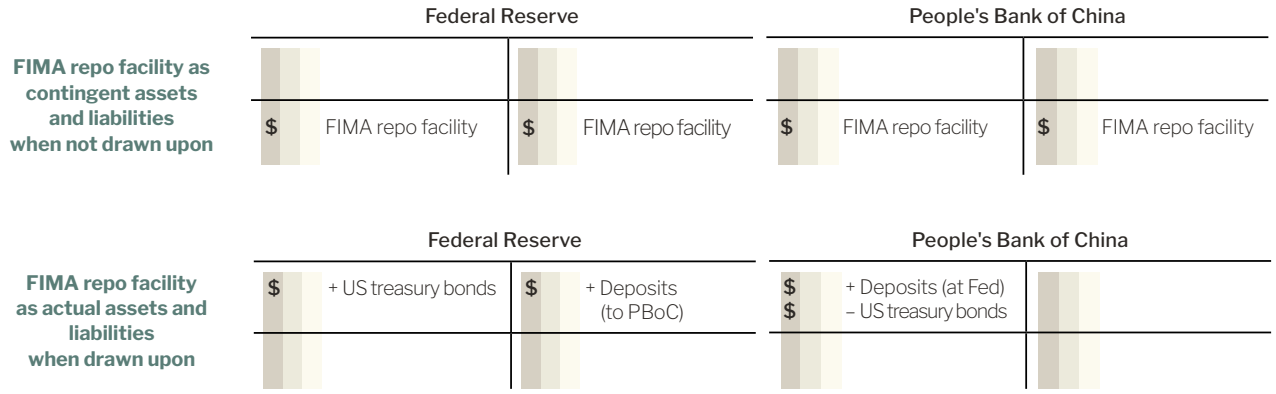


Figure 7 integrates the FIMA repo facility in our model of interlocking balance sheets. The first line shows the facility when not used as both contingent assets and liabilities on the Fed's balance sheet and that of the PBoC, which we take as an example of a counterparty. This way of putting it is constructed in analogy to the swap lines, the only difference being that the contingent asset for the Fed and the contingent liability for the PBoC is a USD instrument, not an RMB instrument. The second line indicates how the PBoC has been able to increase its holdings of USD deposits at the Fed via an asset swap whereas the Fed creates these deposits out of thin air.[5]

Since its introduction in March 2020, the FIMA repo facility has rarely been used. In October 2020, for example, it stood at $1 billion (Pozsar 2020b). However, this does not negate its impact on the Eurodollar markets in the second-layer periphery as it provides liquidity insurance that calms market sentiments. In a similar vain, the fact the FIMA repo facility is only a temporary mechanism and is due to expire at some point does not invalidate that it likely has a permanent influence on the global financial architecture because it raises the expectations to be an implicit guarantee that can be reactivated whenever it seems necessary.

At the moment, the FIMA repo facility is priced at interest on excess reserves (IOER) +25 basis points, similar to the swap lines that are priced at OIS +25 basis points. Since repos are offered overnight, they are priced above IOER; swap lines by contrast offer term USD rates. As current market repo rates are roughly at IOER or 10 basis points, the facility only acts as a backstop in times of market dislocation. The tight pricing above existing rates, however, suggests that the Fed stands ready to supply emergency USD liquidity at narrow spreads, leaving little room for the private banking system to profit from steeper offshore funding curves. By providing an outside spread on market transactions, the facility thus encourages the pricing of private repo rates within a narrow band.

SUMMARY

The FIMA repo facility is the latest innovation in the global financial architecture, introduced by the Fed in March 2020. It allows channeling emergency USD liquidity from the Fed's balance sheet to that of non-US central banks facing a shortage of liquid USD instruments in their FX reserves. The fact that it has hardly been used leaves us with little concrete information about which actual monetary jurisdictions are indeed part of the second-layer periphery but we can draw inferences on it from US treasury bond holdings of non-US central banks. As a 'second best' alternative to swap lines, the FIMA repo facility potentially serves those monetary jurisdictions that do not entertain close geopolitical ties with the United States—most notably, China, which holds a large reserve position in US treasury bonds, but also other monetary jurisdictions such as Taiwan, Hong Kong or India (Setser 2020). From our point of view, the FIMA repo facility provides an outside spread to the Eurodollar market in the potential recipient countries that will persist as an implicit guarantee even beyond its formal expiry date.

5 The term 'facility' is often used in different contexts without a clear consistent definition. In our framework, a facility represents a contingent mechanism that has to be depicted in the lower part of the balance sheets. Making use of a facility will lead to the creation of actual instruments that are then depicted in the upper part of the balance sheet and do not necessarily have to be visibly connected with that facility.

4

The Special Drawing Rights System

OUTLINE

The third-layer periphery in the Offshore USD System consists of monetary jurisdictions whose central banks neither have access to the Fed's swap lines nor do they have sufficient holdings of US treasury bonds to use the FIMA repo facility. The remaining of the three mechanisms available to them to receive emergency USD liquidity outside of private markets is the SDR system, which is administered by the IMF and available to all IMF member countries. This is especially important for many EMEs and most LDCs such as Bangladesh or Senegal (Koddenbrock and Sylla 2019).[6] Introduced in 1969, the SDR system is a relic of the Bretton Woods System. Based on a US-French compromise, it has an idiosyncratic accounting logic which makes SDRs neither asset money nor credit money. In our analytical view on the global financial architecture, SDRs are not international money themselves but tokens to attain USD-denominated instruments from hierarchically higher balance sheets. Accessing emergency USD liquidity via the SDR system is the most unattractive of the three mechanisms. Not only is it a comparatively tedious process but access to the Fed is also only indirectly possible, with the ESF functioning as a gatekeeper. In practice, however, most emergency USD liquidity in the SDR system is provided by central banks of the first and second-layer periphery.

HISTORICAL OVERVIEW

The SDR system was created in the later years of the crisis-ridden Bretton Woods System to supply additional international reserve assets besides gold and USD instruments. The goal was to fix some of the inherent shortcomings of the USD-gold standard.

Machlup (1962, 5) lists three different problems of the Bretton Woods System at the time: balance of payments difficulties of individual countries, inadequate growth of monetary reserves, and fragility of the gold-USD exchange rate. Machlup notes that a multitude of plans had been proposed as potential remedies to these problems, such as an extension of the gold exchange standard, mutual assistance among central banks, centralization of monetary reserves, increase in the price of gold, or the introduction of flexible exchange rates.

Belgian economist Robert Triffin was decisive in introducing the SDR system as a supposed solution to these problems. In his view, the root problem was that the USD had to function as a national currency and as a global reserve currency at the same time. According to what later became known as the 'Triffin Dilemma', the US had to run a persistent current account deficit to supply USD reserves to the rest of the world. This had happened during the 1950s when the central banks of Europe and Japan built up massive FX reserves in USD. In Triffin's view, this made it more difficult for the Fed to maintain the USD-gold parity once non-US central banks would decide to get their USD holdings redeemed for gold (Triffin 1960). Triffin's proposed solution was the creation of a new reserve asset that would neither depend on gold nor on USD but would expand the world's total liquidity.

The introduction of the SDR system was agreed upon in principle in 1967 but only initiated in 1969 after the US had passed the Special Drawing Rights Act of 1968 into law. However, the SDR system did not adhere to the core aims of Triffin's idea. Rather than designing SDRs as a free-standing reserve asset, the new SDR instruments were made convertible into USD at a one-to-one rate and, by implication, into gold at a rate of 0.8g (Williamson 2009).

6 Among the monetary jurisdictions in the third-layer periphery, we may distinguish between those who have access to Regional Financing Arrangements (RFAs) such as the Chiang-Mai Initiative or the Latin American Reserve Fund, and those who don't. In our analytical perspective, RFAs—which are seen as part of the Global Financial Safety Net—provide an additional layer of defense for central banks in the third-layer periphery to replenish their FX reserves with USD instruments in order to lend them on to their domestic banking system in crisis. However, as RFAs do not establish access to the Fed's balance sheet, we do not include them in our scheme of mechanisms for the provision of emergency USD liquidity.

Following that decision, the first round of SDR allocation took place in three steps from 1970 to 1972: SDR 3 bn in 1970, SDR 2.9 bn in 1971 and SDR 3.4 bn in 1972. The second round occurred in three similar installments on 1 January 1979, 1980 and 1981, amounting to SDR 12.1 bn (Clark and Polak 2002). After the third round, which comprised an allocation of SDR 161 bn on 28 August 2009 and SDR 21.5 bn on 9 September 2009, the total SDR allocation today amounts to SDR 204 bn (see Figure 8).

SDR instruments traded at par with the USD only until 1972. With the end of the Bretton Woods System, SDRs became an independent unit of account that was no longer identical to the USD. In 1974, the value of an SDR was defined as a currency basket that fluctuates against all other units of account, including the USD (Kindleberger 1975).

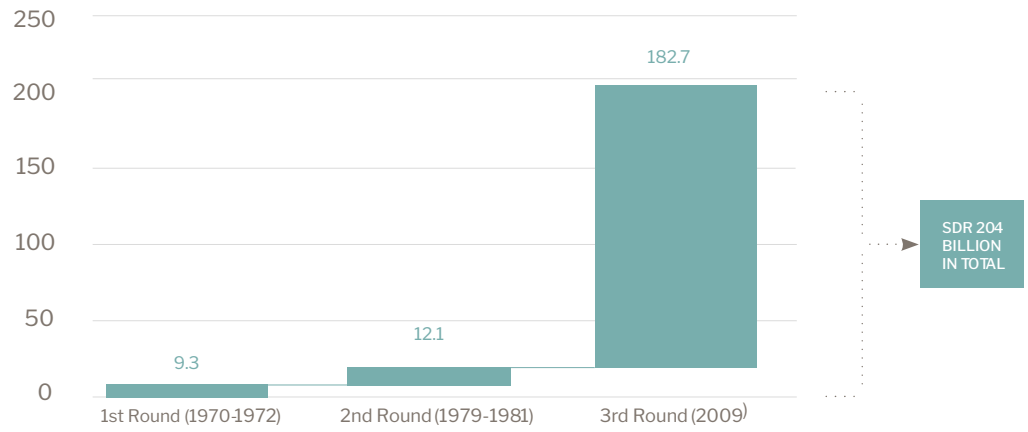
Despite its early equivalence with the USD, the SDR system was not meant to be a mechanism for emergency USD liquidity provision. By contrast, it was supposed to reduce the need for USD- denominated instruments. Designed in 1944 as a fund rather than a bank, the IMF depended on its members to pay in gold and domestic currency according to their quota, a periodic membership fee based on their importance in the world economy. The IMF then draws on the paid-in quotas to hand out loans to members with balance of payments problems. While the IMF holds currency of all IMF members, only a few currencies are designated 'usable currencies' for loans. The largest need was to borrow USD instruments that were in chronic under-supply. The introduction of the SDR system was supposed to help economize on the existing USD holdings. IMF members could now also provide some of their quota in SDRs. As SDRs had been established as USD equivalents, the SDR system would thereby increase the stock of usable currency for the IMF.

To manage the newly established SDR system, a new sub-balance sheet was added to the IMF—the SDR Department. Even though the IMF appears to be a single organization, it operates several distinct programs whose names and remits have changed over time. Its core is the General Department which is composed of the General Resource Account (GRA), the Special Disbursement Account, and the Investment Account.

The quota system, run via the GRA, allows the IMF to provide loans by using the liquidity generated from the previously agreed upon quota levels. Unlike commercial and central banks, the creation of a new loan does not increase the overall size of the IMF's balance sheet. Rather, IMF loans formally follow the logic of transferring resources made available by some members to other members. The IMF uses the resources of countries deemed to be in a strong financial position to pass funds onto those countries in need of IMF loans. The IMF subsequently collects interest payments from borrowing countries and credits them to the countries which made the loans available in the first place.

The SDR department uses this same logic for the SDR system, except that it allows countries to swap currencies against SDR instruments without the need to enter into a formal borrowing arrangement. Every member country is allowed to swap usable currency that it wishes to obtain for SDR instruments. The claim to obtain usable currencies is not made against the IMF itself. Rather, the IMF will wait for a member to voluntarily convert any claim of another member. Should no member step forward as a volunteer, the IMF has the power to force any member into making a conversion. As such, the IMF operates essentially as a pure swap agent (Kaminska 2015).

Figure 8 — Three historical rounds of SDR allocation, in SDR billion



Source: International Monetary Fund

TECHNICAL DETAILS

The SDR system has an idiosyncratic accounting logic that is the result of a French-US compromise. Both sides could not agree if the SDR was supposed to become a non-interest-bearing reserve asset or 'outside money' such as gold, or an interest-bearing credit instruments or 'inside money' such as drawings under IMF quotas. Today's SDR system provides a mix of both (Solomon 1996). It is only possible when considering its particular accounting logic to see how the SDR system, which was designed for the Bretton Woods System, can serve as a mechanism for supplying emergency USD liquidity to peripheral monetary jurisdictions in the Offshore USD System.

To integrate SDRs in our balance sheet model, we must distinguish two steps: allocation and drawing.

Figure 9 depicts an SDR allocation on-balance-sheet. Each IMF member country has to determine one balance sheet that participates in the SDR system, called 'participant'. In the US, this is the ESF (Henning 1999). In peripheral monetary jurisdictions, these are typically central banks (Ocampo 2017, 61) but can also be treasuries or OBFAs that have an FX reserve management regime with the central bank. In a new allocation, the participants' balance sheets expand symmetrically on both sides. The actual assets thus created are called *'SDR holdings'*, the actual liabilities *'SDR allocation'* (Galicia-Escotto 2005).

A new round of SDR allocation must be agreed upon in the IMF Executive Board, which also stipulates the amount of new SDR creation. In addition, a new allocation may require approval by the US Congress—a feature contributing to our view that the IMF is best seen as an OBFA in the US monetary jurisdiction. Once approved, the new SDR allocation is divided among the participants according to their relative quota shares. Hence, participants with a greater quota also will have a greater expansion of their balance sheet.

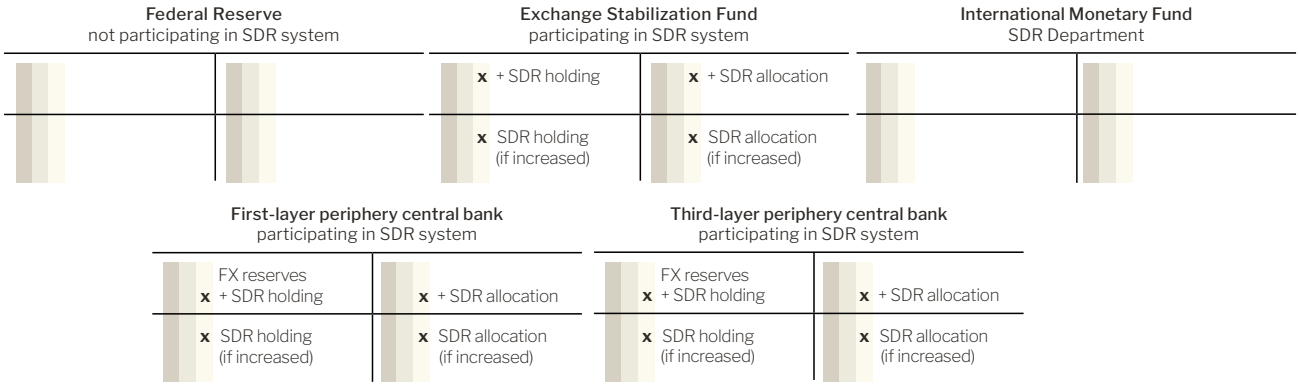
After an SDR allocation, the amount of SDR holdings and SDR allocation is fully inelastic in the SDR system. Unlike all other instruments that we depict as part of today's global financial architecture, they are not credit money instruments which are created and disappear depending on the circumstances. In the framing of Murau (2020), SDRs are only 'contingent instruments' on the participants' balance sheets in so far as a future SDR allocation can be expected.

Importantly, an SDR allocation directly affects neither the Fed nor any sub-balance sheet of the IMF. SDR instruments are only issued on the participants' balance sheets. The idea that the IMF would 'issue' SDRs as an international currency is misleading since SDR instruments are not liabilities of the IMF. The SDR Department only administrates the SDR system.

Each participant in the SDR system receives interest on its SDR holdings and has to pay interest on its SDR allocation. As both are compensated with the same interest rate, no interest is payable as long as the institution's SDR holdings are equivalent to its SDR allocation. The interest rate was initially set a fixed level of 1.5 percent but later changed into a market-based rate calculated weekly (IMF 2018b, 86).

Our balance sheet depiction of the SDR system explicitly distinguishes between SDR holdings and SDR allocation as *instruments* and SDR as *unit of account* (in the balance sheets called 'x') that the instruments are denominated in. The double meaning of 'SDR' as both instruments and a unit of account is a major source of confusion (cf. IMF 2018a for a similar clarification). The value of SDR instruments in other currencies depends on the exchange rate of the SDR as unit of account, which fluctuates against all other units of account. The SDR exchange rate is determined as the weighted exchange rates of the basket currencies. Since 2016, this basket is made up to 41.73 percent of USD, 30.93 percent of EUR, 10.92 percent of RMB, 8.33 percent of JPY and 8.09 percent of British pound (GBP) (IMF 2018b, 88).

Figure 9 — Balance sheet mechanism for SDR allocation



The logical second step to attain emergency USD liquidity in the SDR system is the 'drawing' of SDRs. If a participant finds itself in need for emergency USD liquidity, it may seek to sell its SDR holdings and convert them into USD-denominated instruments. This would typically happen to a central bank in the third-layer periphery ('borrower'). The counterparty which buys the SDR holdings must be one of the 31 'market-makers' with whom the IMF has a Voluntary Trading Arrangement (IMF 2018b, 103).

There are two ways in which the drawing of SDR holdings could play out. The third-layer central bank could either attain emergency USD liquidity from a peripheral institution in the first or second-layer or from the ESF and ultimately the Fed in the apex.

Figure 10 shows the balance sheet mechanism if the third-layer central bank receives emergency USD liquidity from a market-maker in the first-layer periphery. In this case, SDR drawing entails a mere asset swap in the FX reserves of both peripheral central banks. Their balance sheets do not expand, and also the balance sheets of the ESF and the Fed remain entirely unaffected. Therefore, no new USD-denominated instruments are created, only already existing USD instruments are shifted across the different layers of the global financial architecture.

Figure 11, by contrast, shows the balance sheet mechanics if the third-layer central bank receives emergency USD liquidity from the apex. As before, SDR drawing entails that the third-layer central bank and the ESF swap assets and exchange SDR holdings against USD-denominated deposits held at the Fed. In a next step, however, the ESF can issue so-called 'SDR Certificates' which the Fed buys and in the course of this creates new USD-denominated central bank deposits out of thin air (Department of the Treasury 2019, 72–73). If this happens, the Fed expands its balance sheet on both sides and creates new emergency USD liquidity that it channels into the SDR system. The third-layer central bank was able to access the Fed's balance sheet—albeit only mediated by the ESF, which has a gatekeeper function.

In both cases, the balance sheet of the IMF's SDR Department mirrors the transaction of the third-layer central bank and its counterparty. The fact that the borrower now holds fewer SDRs than allocated emerges as an asset on the SDR Department's balance sheet ('SDR allocation in excess of holding'). Vice versa, the counterparty's position becomes a liability of the IMF ('SDR holding in excess of allocation'). This allows the SDR Department to regulate interest payments between the participants that have sold and bought SDR holdings. The third-layer central bank that has sold SDR holdings now has to pay interest on the difference between its remaining SDR holdings and its original SDR allocation, while its counterparty receives interest payment on the excess of its SDR holdings over the original SDR allocation. The costs of borrowing involve not only the nominal SDR interest rate but also fees on top of that (IMF 2018b, 89-95).

Figure 10 — Balance sheet mechanism for SDR drawing via first layer

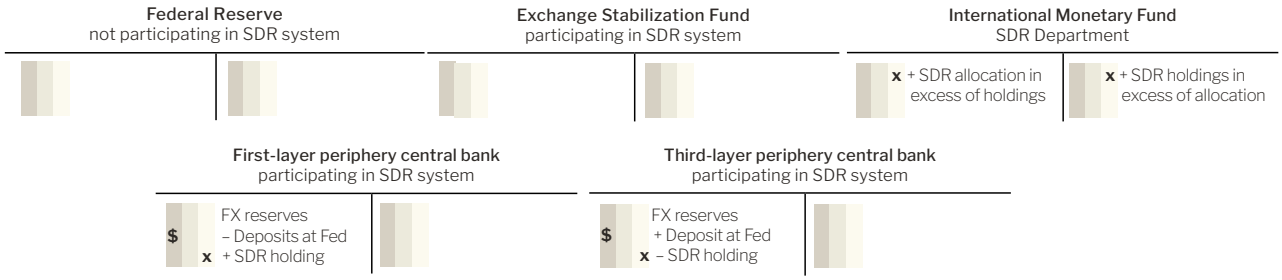


Figure 11 — Balance sheet mechanism for SDR drawing via apex

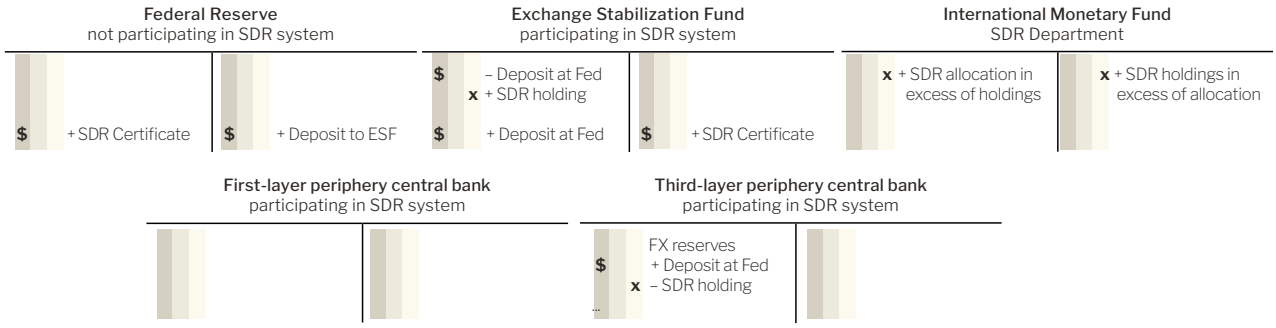
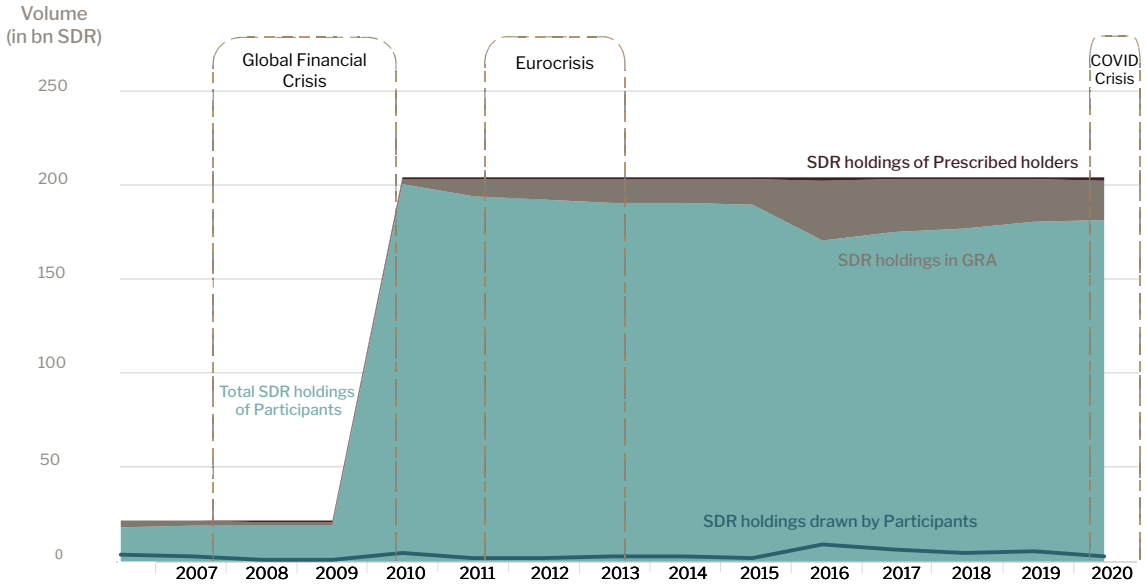


Figure 12 — SDR drawings in relation to total SDR holdings (2007-20)



Source: International Monetary Fund

The SDR system thus offers a mechanism for third-layer central banks to receive emergency USD liquidity. Albeit not originally intended for this purpose (Clark and Polak 2002), the SDR system parallels central bank swap lines in some respects (Ruhlmann and Holmberg 2017, 6)—in particular if the drawing were to happen via the ESF and entail a new creation of USD-denominated central bank deposits by the Fed. Determining the extent to which this mechanism is deployed in practice, however, is not straightforward and complicated by a lack of data.

First, not all transactions in the SDR system are used to attain *liquidity*. Drawing SDR holdings against usable currency is not the only use of the SDR system. Participants can carry out two additional categories of transactions. These involve institutions that do not receive an SDR allocation in the first place but are still part of the SDR system and can buy and sell SDR holdings. On one hand, participants can interact with the GRA of the IMF's General Department, for example to pay their quotas and fees in SDR holdings. On the other hand, participants can transact with a total of sixteen international financial institutions called 'prescribed holders'—among them the ECB, the BIS, the World Bank and regional development banks—for example to pay contributions or grant loans in SDR holdings (IMF 2020, 58).

Leaving those alternative uses aside, Figure 12 shows the annual volume in which participants have drawn on their SDR holdings and sold them for usable currency. In the period from 2007 to 2020, annual SDR drawings peaked between May 2015 and April 2016 at SDR 8.41 bn and had their low point between May 2008 and April 2009 with SDR 0.63 bn. In the fiscal year ending in April 2020, participants drew SDR holdings of SDR 2.5bn. These numbers are small compared to the total volume of SDR holdings. Distributed among participants, prescribed holders and the GRA, the vast majority of SDR holdings are held by participants with the largest quote shares that are least in need of borrowing usable currency via the SDR system. Still, drawings of SDR holdings for usable currency are considerable if we look at individual balance sheets in the third-layer periphery. The gross position of holdings below allocation lay at SDR 30.06bn in April 2020 (IMF 2020, 59-62).[7]

Second, not all SDR holdings drawn were used to attain *USD* liquidity. Participants can choose to replenish their FX reserves with any of the SDR's basket currencies. While, there is no public data on the currencies that participants actually attain when they draw SDR holdings, it stands to reason to believe that the largest part of it is the USD, given its key currency status.

7 Figure 12 is based on the IMF's annual reports 2007 to 2020 which present the total volume of transactions among participants, prescribed holders and the GRA in various categories during a fiscal year lasting from 1 May to 30 April, as well as the distribution of SDR holdings between them at the end of each fiscal year. Therefore, the third round of SDR allocations is presented as a gradual increase instead of two discrete changes in August and September 2009. SDR drawings are based on participants' sales (or uses) of SDR holdings in Transactions by Agreement.

Third, USD-denominated instruments attained via the SDR system do not necessarily have to be used as *emergency* USD liquidity. Neither the IMF nor market-makers can require a specific use for the usable currency attained, and individual motivations of participants for SDR drawings are both difficult to assess and generalize. In fact, the SDR mechanism is ill-suited to provide emergency liquidity. As Figure 13 indicates, the administrative process for SDR drawing can take up to eleven workdays from the expression of interest to draw SDR holdings until the actual asset swap (IMF 2018b, 104). Still, it is by definition the only mechanism available to the third-layer periphery outside of private money markets.

Finally, not all emergency USD liquidity provided via the SDR system is *newly created* by the Fed. When participants draw on their SDR holdings, the lending channel via the first and second-layer periphery is much more widely used than the channel via the apex (Ocampo 2017, 63-64). Hence, the SDR system seems to mainly redistribute existing USD-denominated instruments rather than leading to the creation of new ones. Still, the ESF is a net supplier of USD-denominated instruments via the SDR system as its SDR holdings of SDR 36.7 bn ($50bn equivalent) in September 2019 exceeded its SDR allocation of SDR 35.3 bn ($48.1 bn USD equivalent). The volume of SDR Certificates issued lay at $5.2 bn (Department of the Treasury 2019, 2). As the maximum level of SDR Certificate issuance amounts to the volume of SDR allocation (Special Drawing Rights Act of 1968, Sec. 4a), the Fed's provision of USD-denominated central bank deposits to the SDR system amounts to 11 percent of its total capacity. Arguably, we see a dynamic at play where the Fed is the potential lender of last resort within the SDR system whereas the other market-maker central banks are lenders of first resort.

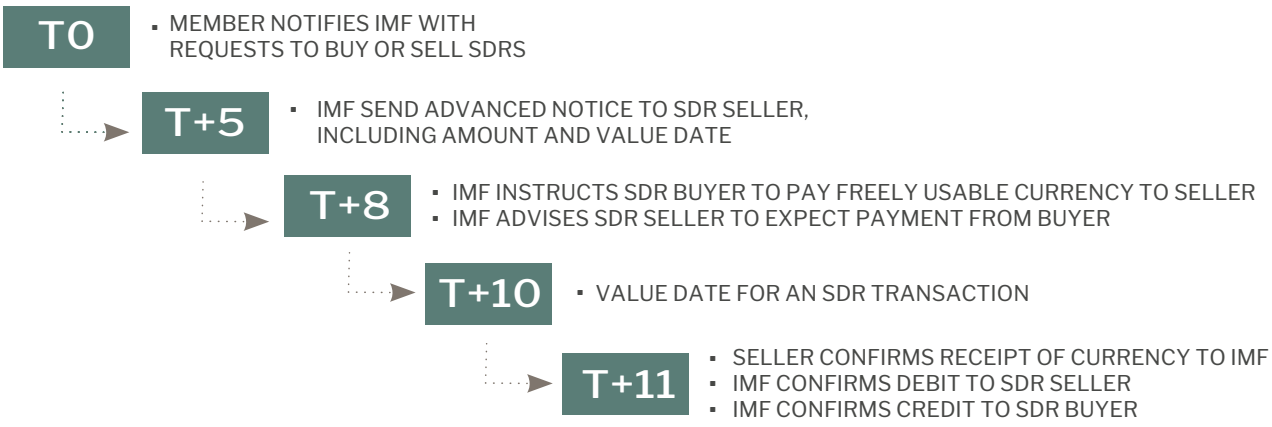
SUMMARY

The SDR system was created in 1969 in an attempt to ease reliance on the USD in the Bretton Woods System and to provide SDR holdings as alternative reserve assets to non-US central banks. Hopes that the SDR system would be the first step towards a world money were soon disappointed (Wilkie 2011). Hirsch (1973, 1) assessed that SDRs proved inadequate to the wider task of providing a secure and controlled base for world monetary reserves. One particular reason for this is the idiosyncratic accounting mechanism of the SDR system. McCauley and Schenk (2015, 190) find that "[i]n setting up the SDR, ambiguity triumphed over clarity of purpose."

Our analysis suggests that in today's global financial architecture, SDR holdings represent tokens to attain key currency and in that sense are promises to pay USD-denominated deposits. Hence, they are integrated into a hierarchy of claims on Fed liabilities, and exist in an enclosed, politically negotiated and administered payment system for public institutions. Transactions in the SDR system do not primarily occur to accumulate SDR holdings as reserve assets as suggested by Triffin but to attain USD-denominated instruments by selling SDR holdings.

The SDR system provides a last resort mechanism to central banks for accessing emergency USD liquidity. To use this mechanism, participants must have an SDR allocation and remaining SDR holdings in their FX reserves. As the mechanism is less preferential than swap lines or the FIMA repo facility, it is mainly used by central banks in the third-layer periphery whose domestic banking systems thus enjoy worse implicit USD liquidity guarantees than those of hierarchically higher monetary jurisdictions in the first and second layer periphery.

Figure 13 — Administrative process for SDR drawing (in working days)



Source: International Monetary Fund

5

Conclusion

This study has presented a novel approach of conceptualizing the nature, shape and causes of hierarchy in the international monetary system by focusing on different ways of supplying emergency USD liquidity from the Fed to non-US central banks.

Our analysis suggests that the root cause for international hierarchy is the structural setup of the global financial architecture in which the USD is the 'key currency'. As it is used for the majority of international transactions, the international monetary system is paradigmatically based on creating USD instruments by private banks offshore. Such offshore USD deposits are promises to pay onshore USD deposits, which in turn are promises to pay notes or reserves issued by the Fed. This makes the Fed the world's hierarchically highest balance sheet—the ultimate source of emergency USD liquidity—and positions the US monetary jurisdiction in the apex of the global system.

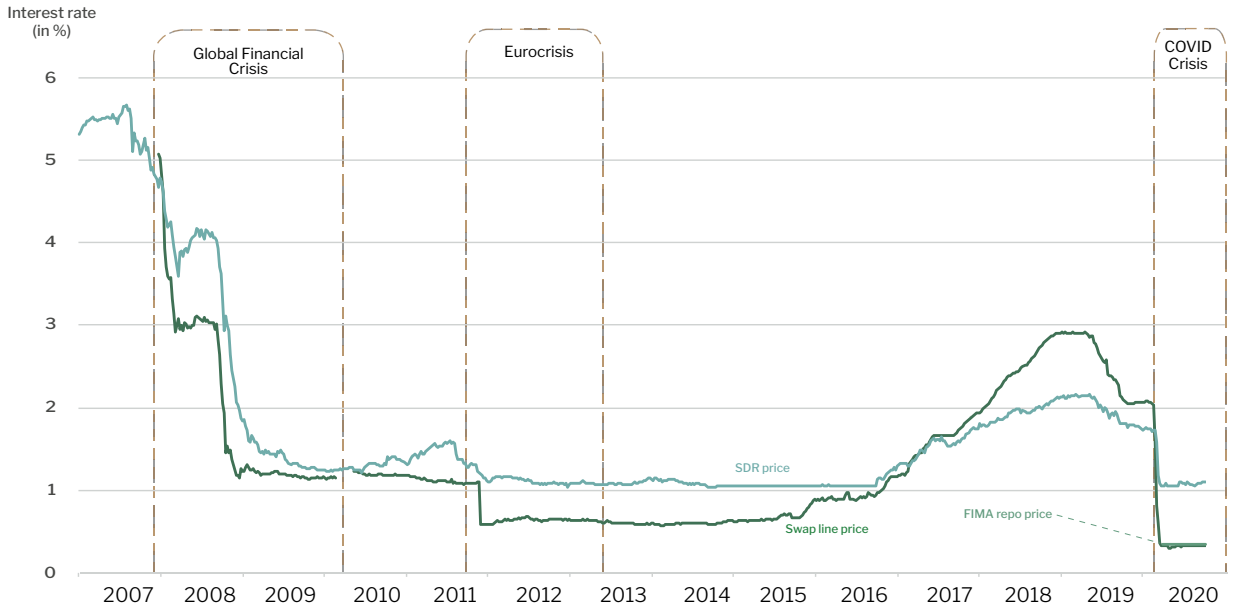
Beneath the apex, there is a hierarchy among all non-US monetary jurisdictions, which from our stance does not primarily depend on the international usage of their respective currencies but on the mechanisms available to their central banks to access the Fed's balance sheet and receive emergency USD liquidity. In case of a credit crunch in the Eurodollar market, non-US banks have to turn to their domestic central bank for lender of last resort support in USD. As these are unable to create USD-denominated liabilities themselves, they can only lend out USD-denominated assets accumulated in advance. Once they run out of USD-denominated FX reserves, they need access to the Fed's balance sheet and borrow new ones. Swap lines, the FIMA repo facility and the SDR system are the available public mechanisms to that end.

Table 1 compares these three mechanisms with regard to quantitative limits, acceptable collateral, flexibility of access, and the costs of borrowing. While the maximum volume of swap lines can be freely adjusted by the Fed, the FIMA repo facility is limited by the available holdings of US treasury bonds and the SDR mechanism by the general SDR allocation and the remaining SDR holdings. Swap lines offer the unbeatable advantage that non-US central banks can post their domestic central bank deposits as collateral which they can create on the spot. Swap lines and the FIMA repo facility allow non-US central banks to directly interact with the Fed immediately, whereas the SDR system is slower and offers only indirect access to the Fed, if at all. While the mechanisms' effective interest rates on emergency USD liquidity depend on three different benchmarks, the price for swap lines—whenever used in a crisis—has been below the one charged in the SDR system. Albeit the FIMA repo facility is priced at a similar nominal level as swap

Table 1 — Comparison of the three mechanisms

	Swap lines	FIMA repo facility	SDR system
Quantitative limits	Unlimited in volume for C6, limited for C14 depending on Fed regulations	Limited by US treasury bond holdings of non-US central banks	General SDR allocation and remaining SDR holdings
Acceptable collateral	Reserves in domestic unit of account, created on the spot on balance sheet of non-US central bank	US treasury bonds, must be accumulated prior to borrowing	SDRs holdings
Flexibility of access	Immediately available, using Fed as counterparty	Immediately available, using Fed as counterparty	Takes around 11 workdays, requires market-makers as intermediaries
Costs of borrowing	OIS + 25 bps	IOER+ 25 bps	SDR interest rate plus rate of adjustment

Figure 14 — Borrowing costs via swap lines, the FIMA repo facility and SDRs



Source: Federal Reserve, International Monetary Fund, Bloomberg, authors' own calculation

lines, it is effectively more expensive as it only offers overnight funding while swap lines give term-funding (see Figure 14).[8]

This comparison leaves no doubt that access to swap lines is preferable to using the FIMA repo facility, which in turn is preferable to using the SDR system. Commercial banks in hierarchically higher peripheral monetary jurisdictions can thus receive emergency USD liquidity at more favourable conditions and face a lower outside spread for borrowing in the Eurodollar market (Mehrling 2015). This creates a greater elasticity space (Murau 2020) on the balance sheets of banks in hierarchically higher monetary jurisdictions compared to banks in hierarchically lower monetary jurisdictions, and provides them with a competitive advantage.

The model presented in this study chimes in with different connected strands of literature and can be the starting point for ample follow-up research.

First, our way of integrating the SDR system in a balance sheet model of the Offshore USD System speaks to ongoing research on the IMF (Abdelal 2007; Broome 2010; Clift 2018; Ocampo 2017; Woods 2006) and SDRs (Gallagher, Ocampo, and Volz 2020; Kenen 2010; McCauley and Schenk 2015; Wilkie 2011; Williamson 2009). Our framing depicts the IMF as an off-balance-sheet fiscal agency in the US monetary jurisdiction and puts it in a sub-ordinate position to the Fed and the US Treasury. This contrasts the dominant view on the IMF as an autonomous international organization or potentially even a world central bank.

Second, our analysis complements the literature on the Global Financial Safety Net (GFSN)—a concept used both by academics (Gallagher et al. 2020; Henning 2015; Volz 2016) and financial institutions (Denbee, Jung, and Paternò 2016; IMF 2016). The GFSN looks at states' access to emergency lending in the form of domestic FX reserves, central bank swaps, regional financing arrangements (RFAs), and IMF lending channels. In comparison, we focus more narrowly on USD-denominated instruments and place emphasis on non-US central banks that act as lenders of last resort to banks in the Eurodollar market rather than treasuries. Moreover, we prioritize mechanisms that involve a channel for new USD creation on the Fed's balance sheet, which leads us to disregard RFAs but brings the FIMA repo facility into the picture.

Finally, our analysis of international hierarchy lays the groundwork for future research to generate new insights into the longstanding debate of IPE scholars on the nature, shape and causes of monetary power (Andrews 2006; Cohen 2015; Gallagher 2015; Hardie and Maxfield 2016; Hardie and Thompson 2020; Kirshner 1995; Krampf 2019; McNamara 2008; Schwartz 2019; Vermeiren 2014).

8 The SDR price in Figure 14 is the effective adjusted rate of charge payable by IMF members to use SDRs. It is calculated weekly by taking the SDR interest rate and adding the basic rate of charge and adding or subtracting adjustments for deferred charges as well as charges arising from the burden sharing mechanism from Special Contingency Accounts. For swap line pricing see Footnote 3.

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