
IASS DISCUSSION PAPER

Institute for Advanced Sustainability Studies (IASS)

Potsdam, June 2018

Offshore Dollar Creation and the Emergence of the post-2008 International Monetary System

Steffen Murau

**IASS Potsdam, in collaboration with Weatherhead
Center for International Affairs, Harvard University**



Summary

This paper studies the transformation of the International Monetary System (IMS) in the run up to and after the 2007-9 Financial Crisis. Adopting a Money View perspective, it argues that the IMS, in contrast to wide-spread skepticism, does have a system-like quality. This paper understands the IMS as a US-centered hierarchical payments system within which short-term debt instruments are issued as credit money by various public and private financial institutions, in particular central, commercial and shadow banks. With the Fed located at the apex of the IMS, credit money forms denominated in US dollars are located highest up in the hierarchy and trade at par with each other, whilst they typically have fluctuating exchange rates to credit money forms denominated in the units of account of other monetary jurisdictions. From this, the paper argues that the key component of today's IMS is the 'realm' of offshore US dollar creation, which is situated in between US dollar-denominated credit money issued in the US ('onshore dollars') and non-US dollar-denominated credit money issued outside the US. In this 'offshore dollar realm', non-US financial institutions are able to create international liquidity via US dollar-denominated private credit money outside the US. The paper systematically carves out the post-2008 setup of the offshore dollar realm with a focus on Eurodollar deposits, offshore money market fund shares, foreign exchange swaps and central bank swaps. With the institutional innovations materializing during the 2007-9 Financial Crisis, the IMS is now a public-private hybrid that fully mirrors the onshore US monetary system in the offshore dollar realm.

Keywords: International Monetary System; Money View; credit money; offshore; shadow money; shadow banking; Federal Reserve; central bank swap lines; Eurodollars; foreign exchange swaps; 2007-9 Financial Crisis; transformation; functionalism.

Acknowledgments

This discussion paper is the first in a series of two complementary publications on the past, present and possible futures of the International Monetary System. It lays the foundation for the paper 'The Future of Offshore Dollar Creation: Four Scenarios for the International Monetary System by 2040'.

I worked on this project between February 2017 and May 2018 at the Institute for Advanced Sustainability Studies in Potsdam and the Weatherhead Center for International Affairs at Harvard University in Cambridge, Massachusetts. The research on the International Monetary System has been part of the Integrated Project DOLFINS ('Distributed Global Financial Systems for Society'). I gratefully acknowledge funding by the European Union's Horizon 2020 research and innovation program [grant agreement number: 640772—DOLFINS—H2020-FETPROACT-2014] as well as a postdoctoral fellowship of the German Academic Exchange Service (DAAD).

This paper would not have seen the light of day without the help of a great number of people. At IASS Potsdam, I wish to thank Armin Haas and Joe Rini with whom I have worked on the DOLFINS project as well as the research group Systemic Risks led by Pia-Johanna Schweizer and Ortwin Renn. At the Weatherhead Center for International Affairs, Kathleen Molony has supported my research in a multitude of ways. For the invaluable feedback I have received throughout the last one and a half years in various forms and at multiple occasions, I am deeply indebted to Stefano Battiston, Michael Beggs, Andrea Binder, Benjamin Braun, Ben Clift, Christine Desan, Lorenza Belinda Fontana, Daniela Gabor, Jean Grosdidier, Andrei Guter-Sandu, Jacob Feygin, Jeffrey Frieden, Eckehard Häberle, Iain Hardie, Torben Iversen, Carlo Jäger, Casey Kearney, Jens van 't Klooster, Arie Krampf, Elizaveta Kuznetsova, Sylvia Maxfield, Perry Mehrling, Manfred Nitsch, Stefano Pagliari, Tobias Pforr, Zoltan Pozsar, Pia Raffler, Aditi Sahasrabudde, Maria Schweinberger, Stefano Sgambati, Alexis Stenfors, Harald Stieber, Céline Tchong, Matthias Thiemann, Geoffrey Underhill, Leanne Ussher and Fabian Winkler. Moreover, the paper is based on a series of background talks with central bankers and financial market practitioners who have to remain anonymous.

I have no potential conflict of interest to report. All remaining errors are naturally my own.

Steffen Murau,
Cambridge, MA

Contents

| | |
|--|----|
| 1. Introduction | 5 |
| 2. The Money View as Conceptual Lens | 8 |
| 2.1 Money Creation as a Swap of IOUs..... | 8 |
| 2.2 Public-Private Money Hybridity | 11 |
| 2.3 Hierarchy of Money..... | 13 |
| 2.4 Onshore-Offshore Dualism of Credit Money Creation..... | 16 |
| 3. Mapping the Offshore Dollar System..... | 18 |
| 3.1 Offshore Bank Deposits in the Eurodollar Market | 18 |
| 3.2 Offshore Shadow Money in the Shadow Banking System | 22 |
| 3.3 Offshore Central Bank Money in the C6 Swap Network | 29 |
| 4. Conclusion: The post-2008 International Monetary System | 34 |
| Literature..... | 37 |
| About the Author..... | 46 |

1. Introduction

It is a common perspective in international economics and International Political Economy (IPE) that since the collapse of the Bretton Woods System in 1973, the International Monetary System (IMS) has no system-like qualities or only obscure ones. The traditional rationale in the literature is that under Bretton Woods, there was a politically agreed upon exchange rate arrangement between the participating states that was enforced by specifically mandated international organizations, first and foremost the International Monetary Fund (IMF), and held up by the cooperation of central banks and treasury departments. At the same time, the US dollar (USD) was explicitly singled out to be the international reserve currency that was tied to gold at a pre-determined rate. This system was in place for roughly three decades, and when it was unilaterally suspended by the Nixon Administration, it was not replaced by anything even remotely similar. Instead, the era of ‘Generalized Floating’ set in. It is characterized by new forms of monetary collaboration on a regional level, most notably European monetary integration as well as widespread attempts to peg small currencies to stronger ones, in particular to the USD (Eichengreen 2008). On a global level, however, there is absence of any kind of centralized political monetary planning. In the eyes of a number of scholars, this makes the IMS essentially a “non-system” (cf. Cohen 2008; Eichengreen 2007; Farhi, Gourinchas and Rey 2011; Gallarotti 1995; Gilpin 1987; Haldane 2014; Mateos y Lago et al. 2009; Mundell 2000; Ocampo 2015, 2017; Wyplosz 2010), “not really a system” (Rajan 2016) or an “international monetary non-order” (Bibow 2008).

This paper sets out to challenge this very idea that the IMS is a non-system.¹ Instead, it argues that the IMS does in fact have system-like properties, which have developed around one particular legal feature: offshore dollar creation. However, in order to see the systemic logic, we need to adjust our analytical entry point when thinking about money and acknowledge aspects of monetary theory that may seem counter-intuitive to conventional wisdom: First, modern money predominantly is, and has been since the English financial revolution, credit (Desan 2014). It is not a commodity and does not need a commodity base. Its physical shape is much less relevant than typically suggested. Today’s IMS is a credit money system, and actually was already one under Bretton Woods and even under the Gold Standard (Mehrling 2016). Second, money creation occurs predominantly through private institutions, not the state. In fact, the contemporary IMS has been crucially shaped by private credit money creation with the USD as the unit of account (cf. Kindleberger 1970). As will be demonstrated, this happens to a large extent outside the US’s monetary jurisdiction in what this paper calls the ‘offshore dollar realm’. Thus, the key argument presented in this paper is that we do have an international monetary *system* which has gradually developed over the last few decades and relies on *private* USD-denominated offshore credit money creation but since the 2007-9 Financial Crisis also has a *public* side to it in the form of a network of international central bank swap lines with the Federal Reserve at the center.

There is currently a small, but growing literature dealing with a credit money approach to matters of international monetary affairs. It takes into account two themes that are mostly treated separately but sometimes viewed as overlapping. On the one hand, a number of authors have addressed private offshore dollar creation, primarily via the Eurodollar market (Avdijev et al. 2015; Awrey 2017; Bernes et al. 2016; Mehrling 2016; Mehrling and Tooze 2016; Ricks 2016) but also via foreign exchange swaps (Borio 2017; Borio et al. 2017; Gabor 2017; Pozsar 2017a, 2017b, 2017c). On the other hand, scholars (e.g. Braun and Krampf 2017; Broz 2015; Denbee et al. 2016; Duran 2015a, 2015b; Henning 2015; McDowell 2016; Mehrling 2015; Scheubel and Stracca 2016) have studied the emerging Global Financial Safety Net (GFSN), a patchwork of various instruments that—among others—comprises the

¹ Attempts to carve out the systemic nature of the post-Bretton Woods world have been made before. Regarding the systemic setup, some of the authors stress continuity (cf. e.g. the *Bretton Woods II* hypothesis by Dooley, Folkerts-Landau and Garber 2003) or change (cf. the *Bretton Woods, reversed* argument by Rose 2007).

network of central swap lines (IMF 2016b). Based on these works, this paper sets out to connect both themes and sketch a systematic picture of the way in which the IMS is set up today with private offshore dollars and the GFSN. This requires adopting a conceptual lens allowing us to frame the activities of institutions both involved in offshore markets and the GFSN in terms of money creation that can be thought of together and synthesized into an innovative understanding of the international monetary ‘system’.² Therefore, drawing on the works of Perry Mehrling and Zoltan Pozsar, this paper chimes in with the Money View perspective (Mehrling 2011, 2017; Pozsar 2014; Murau 2017b).

In this vein, different forms of credit money can be created by various public or private financial institutions by swapping debt certificates of different maturities. They denominate the credit money in the unit of account of any monetary jurisdiction (e.g. the US dollar, the euro or the renminbi). This can either occur onshore, i.e. within that monetary jurisdiction and subject to its regulation, supervision and a crisis protection scheme, or offshore, i.e. outside that monetary jurisdiction without its regulation, supervision and crisis protection. If the USD is used as the unit of account to issue credit money offshore, credit money creation occurs by definition in the ‘offshore dollar realm’. The paper provides an institutionalist analysis of how from the 1950s the offshore dollar realm has developed into its current shape and thus how the IMS has transformed in conjunction with the rise of financial globalization. It adopts a functionalist perspective which assumes that the system’s institutional evolution is driven by private initiative in times of financial stability whilst public authorities respond and shape it in moments of financial crises (Murau 2017a, 2017b).

Historically, the first step was the emergence of the ‘Eurodollar market’ or—more accurately—the market for offshore USD deposits. This market translated the onshore credit money creation in the form of USD deposits by US commercial banks into the offshore dollar realm, located first and foremost in the City of London, where it was built on pre-existing structures of the Victorian bills market. In the 1960s, large New York banks discovered the Eurodollar market as a means to circumvent the strict domestic banking regulations established at the end of the Great Depression. The Eurodollar market, which then was no longer limited only to London but extended to many other financial centers worldwide, became a complement to the domestic US money market (He and McCauley 2012). In the 1970s, with the rise of what today is called shadow banking system, financial institutions developed new forms of private credit money as substitutes for bank deposits (Pozsar et al. 2012, Pozsar 2014). With its transnational structure, shadow banking does not adhere to state boundaries in monetary affairs. Major shares of the associated creation of ‘shadow money’—most notably money market fund (MMF) shares and asset-backed commercial papers (ABCPs)—are located offshore. Moreover, foreign exchange (FX) swaps are an instrument that may be considered, analogously to repurchase agreements, to be a means for creating credit money substitutes specifically in the offshore dollar realm and thus also represent a form of offshore shadow money.

In the 2007-9 Financial Crisis, a global bank run emerged during which holders of USD-denominated shadow money forms and offshore deposits tried to convert their credit money balances into onshore USD deposits, which were under the protection of the Federal Reserve and the US deposit insurance. To tame the run, authorities intervened in a multitude of ways (Murau 2017a). One of them was to establish emergency swap lines with non-US central banks in whose jurisdictions offshore dollar creation took place. Effectively, the Fed put those central banks in the position to autonomously create USD-denominated public credit money on their balance sheets and lend it on to domestic banks engaged in offshore dollar creation. Some of these temporary swap lines were made permanent after the crisis and are still in place, effectively allowing non-US central banks to create USD deposits on their balance sheets upon their own discretion to an extent that is not limited ex ante (Mehrling 2015b).

² Renn et al. (2018) provide a discussion of what ‘systemness’ can mean in the context of international money and finance. This may provide the starting point for developing a better understanding of the systemic risks inherent in the IMS. Also see Murau, Rini and Haas (2018) as well as Haas, Murau and Rini (2018).

Therefore, since the 2007-9 Financial Crisis, through gradual institutional evolution, the offshore dollar realm has come to fully mirror the domestic US credit money system, with USD-denominated credit money created offshore by central, commercial and shadow banks. Step by step, the offshore dollar realm has been 'filled' with innovative credit money instruments because relocating financial activity—understood as money creation from a Money View perspective—offered pragmatic solutions for various actors to problems they faced at the respective time. Thus, the paper argues that the emergence of the offshore dollar realm's central role in the IMS was a non-linear process which materialized primarily upon the initiative of private profit-oriented financial institutions that shifted the activities of credit money creation offshore. Public authorities facilitated the process but were not its main drivers. The primacy of the political came about only at the moment of a systemic crisis when emergency interventions pre-determined the further institutional evolution of the system. This analysis is based on academic literature, publications of financial institutions as well as fourteen interviews conducted with both academics and practitioners.

The remainder of this paper is organized as follows. Section 2 presents the key insights of the Money View that recognizes the offshore dollar realm as the relevant area for research to understand how international credit money is created. As a conceptual lens, it is represented along the notions of money creation as a swap of IOUs, public-private money hybridity, the hierarchy of money, as well as the onshore-offshore dualism of credit money creation. Section 3 maps the offshore dollar realm by studying the rise of offshore commercial bank deposits via the Eurodollar market, the rise of offshore shadow money forms via the emergence of the shadow banking system as well as the rise of offshore central bank money in conjunction with the C6 Swap Network. Finally, section 4 concludes with the argument that the offshore dollar realm is a key element of what we can legitimately refer to as the International Monetary *System* today.

2. The Money View as Conceptual Lens on Offshore Dollar Creation

Scholarly analyses of the monetary system typically do not specify how they conceptually understand money. They rather suggest that we somehow know what money is; as everybody is confronted with money in everyday life, everybody must have a preconception of money of some sort. We thus have implicit assumptions a priori about the ontology of money and how the monetary system operates. These assumptions predetermine our empirical findings about the ‘real world’ monetary system. However, money is an extremely contested category (cf. e.g. Hahn 1982; Romer 2016). For example, it is very often unclear what instruments money are, who creates money, what is part of the monetary system and what not. Moreover, what is commonly understood as money and what does not changes over time. Lack of clarity about the monetary theory applied then often leads to ambiguities and contradictions. Against this backdrop, this section explicitly presents the core theoretical concepts to approach the monetary system. It seeks to be outspoken about the analytical categories it applies a priori on today’s IMS and which in turn allow us to carve out the system-like qualities that have emerged through endogenous institutional transformation in recent decades.

Those categories are adopted from a contemporary body of literature that applies an institutionalist framework for the analysis of credit money systems which is often referred to as the Money View (cf. Mehrling 2011, 2013, 2017; Pozsar 2014). The Money View claims to chime in with the style of thinking that had been common sense among central bankers in the late 19th and early 20th century but was ousted after the World Wars (Mehrling 2011). It stands in contrast to the model-based, ahistorical approach of neo-classical economics as it takes historically contingent institutions seriously and focuses on the actual ‘financial plumbing’ of the ‘real world’. Arguments of the Money View are often based on balance sheet dynamics. In this, it takes the proverbial assessment of Minsky (1986) seriously, according to which money creation is nothing but a mere balance sheet operation.

In light of various intellectual traditions of monetary thought, the Money View is a market-based credit theory of money: First, it is a credit theory of money as opposed to a monetary theory of credit (Schumpeter 1954: 686) as it prioritizes the category of ‘credit’ over the category of ‘money’. It thus takes the credit character of modern monetary systems seriously, and suggests that while all modern forms of money are credit, not all forms of credit are money. The distinct characteristic of a credit money form is that it trades at par on demand to higher-ranking forms of money. Second, the Money View is a market-based theory. It places logical primacy on private money creation compared to public money creation, assuming that credit money is in the first place a creature of private issuers.

The specific argument of this paper is that the offshore dollar realm is the space where functionalist monetary transformation has taken place since the mid-20th century and has led to new institutional realities typically not accounted for in established representations of the IMS. Following Mehrling (2017) and Murau (2017b), this section introduces the Money View by presenting four analytical key concepts: endogenous money creation as a swap of IOUs, public-private money hybridity, hierarchy of money, and dualism of onshore and offshore credit money creation.

2.1 Money Creation as a Swap of IOUs

As a ‘credit theory of money’, the Money View suggests that money in its essence is nothing but circulating debt certificates (‘IOUs’, as in *I owe you*). The underlying notion of the monetary system is that of a payment system (Mehrling 2011; Bernes et al. 2014) or an ‘accounting system of exchange’ (Arnon 2011: 152ff): Payment occurs via tradable IOUs (‘inside money’) which are transferred between the accounts of the participating persons and institutions. Such inside money is a specific instrument promising convertibility into other ‘financial’ assets or ‘real’ commodities or services. A transaction within the payment system necessarily follows the accounting rules of double-entry bookkeeping, given that there are always two participants in the payment system affected. The creation

and destruction of money is ultimately a balance sheet operation, regardless of the physical shape of the money form (e.g. whether the IOU is printed or not). Hence, it is the analysis of balance sheet mechanics which is the most accurate analytical method that allows us to represent the dynamics in the payments system.

In such a credit money system, the money creation process follows a structure which manifests itself in different contexts—that of a ‘swap of IOUs’. Money creation takes place when financial institutions, in exchange for a long-term IOU owed to them, create a short-term IOU that can be traded on secondary markets against commodities, services or other financial instruments. The most common example is when banks issue loans by creating deposits as credit money. The loan constitutes an asset of the bank, as it is a long-term IOU owed to the bank; the deposit, as a short-term IOU owed by the bank, is the bank’s liability. In terms of balance sheet mechanics, when a bank hands out a loan, it expands its balance sheet on both sides and swaps IOUs of different maturities (cf. Figure 1). The short-term IOUs, if they are tradable on a secondary market, function as money that can be used by the receiver of the loan. Conceptually, money creation thus literally occurs out of nothing, it is merely an exchange of two promises to pay.

| Borrower | | Credit money issuer | |
|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| + Credit Money (short-term IOU) | + Loan or Bond (long-term IOU) | + Loan or Bond (long-term IOU) | + Credit Money (short-term IOU) |

Figure 1—Money creation as a swap of IOUs (conceptually)

If credit money created today essentially is nothing but a promise to pay credit money tomorrow, we seem to be approaching analytical difficulties. What is the payment of ultimate money supposed to be? A traditional argument is that it must be a money form with ‘actual value’. This is why until the 20th century, the majority of monetary theorists, who ultimately adhered to a ‘monetary theory of credit’ in one way or another, believed that it was not possible to decouple monetary systems from a scarce commodity such as gold (cf. Arnon 2011). A counter-argument comes from Mitchell-Innes (1914), one of the ‘founders’ of a modern credit theory of money, who postulates that we only need the highest money as an ‘idea’—as a ‘unit of account’. “The eye”, he argues, “has never seen, nor the hand touched a dollar. All that we can touch or see is a promise to pay or satisfy a debt due for an amount called a dollar” (Mitchell-Innes 1914: 155). This paper, in its analysis of the dollar-based international monetary system, will follow Mitchell-Innes's argument.

The notion of credit money creation via a swap of IOUs is, in the words of Mehrling (2017), the “alchemy of banking”—a process fundamentally at odds with our natural intuitions about what it means to ‘lend’ something, but crucial for the understanding of the ‘financial plumbing’ of capitalist monetary systems. The position is a radical expression of the idea of endogenous money creation. Traditionally, endogenous money theory is specific to deposit-banking and the interactions between a central bank and commercial banks (cf. e.g. Moore 1988). The ‘swap of IOUs’ argument goes further than that. By systematically tracing back money creation to a more basic root, any institution is structurally able to create money-like IOUs, while only facing the challenge to get them accepted (Minsky 1986: 228).

The ‘swap of IOUs’ logic can be applied to different institutions. The actual credit money then takes on the shape of various short-term IOUs, named differently and acceptable in different contexts. Therefore, ‘traditional’ forms of money co-exist with ‘shadow money’. In the traditional banking system, commercial banks—and similarly the central bank—create deposits as money by swapping them against loans or bonds. In the shadow banking system, various non-bank financial institutions—understood as ‘shadow banks’—create short-term IOUs that function as ‘shadow money’.

Info Box #1: Shadow Money and the 2007-9 Financial Crisis

Shadow money as a concept comes from the idea that shadow banking is connected to new ways of creating money. According to the definition of the Financial Stability Board, shadow banking is to be understood as “credit intermediation involving entities and activities outside the regular banking system” (FSB 2011: 1). Shadow banking and, more specifically, ABCPs, overnight repos and MMF shares as shadow money were inherently connected to the 2007-9 Financial Crisis. The events ranging from the near-failure of Countrywide Securities to the collapses of Bear Stearns and Lehman Brothers have convincingly been described as runs on the shadow banking system (cf. Gorton 2010, Mehrling 2011). As the runs took place on the wholesale money market, they were not as visible as classic runs on deposit-issuing commercial banks, with long queues of depositors lining up in front of bank branches. Other than that, however, there were barely any functional differences to previous bank runs.

The run on shadow banking during the 2007-9 Financial Crisis occurred in three waves: The first wave was associated with the near-failure of Countrywide Securities in August 2007 due to the implosion of the US real estate sector. It mainly affected ABCPs, which in consequence lost their significance, but also overnight repos. The second wave coincided with the shutdown and takeover of Bear Stearns in March 2008 and involved a major run on repos, which could only be tamed with the introduction of unprecedented measures of the Federal Reserve—notably by establishing the Primary Dealer Credit Facility and the Term Securities Lending Facility. Finally, the third wave started with the bankruptcy of Lehman Brothers in September 2008. A system-wide run emerged which heavily affected repos and MMF shares as shadow money forms. In a joint series of action, the Federal Reserve and the US Treasury intervened and effectively extended core aspects of the public-private partnership for deposit creation, which give deposits the status of private-public money, and introduced public backstops for overnight repos and MMF shares. This structure remained in place for roughly a year and was the key measure that tamed the run.

With regard to the regulation of shadow money in the aftermath of the crisis, two divergent processes have been taking place since 2009: On the one hand, the status of ABCPs and Prime MMF shares as shadow money has been abrogated. Both instruments no longer trade at par to bank deposits, hence their function as cash substitutes for institutional investors is gone. On the other hand, overnight repos and Government MMF shares have been consolidated as shadow money under public control. Thus, the process of extending the public-private framework for deposit creation on shadow money, which had been started during the crisis, has found continuation in the post-crisis regulatory process. However, this framework for deposits does not only comprise liquidity and solvency backstops but also measures for regulation and supervision. In this, the public-private framework for the creation of Government MMF shares and overnight repos—as tangible regulatory innovations did not materialize—has not reached the same degree of sophistication as that for bank deposits. Still, both shadow money forms constitute an even more integral part of the US money supply than before the crisis.

Source: Murau (2017a)

For Ricks (2012) and Pozsar (2014), three main forms of shadow money have been developed in the shadow banking system since the 1970s.³ First, asset-backed commercial papers (ABCPs) are issued by Special Purpose Vehicles (SPVs), which are typically set up by large commercial banks as off-balance-sheet constructs to circumvent capital requirements. Second, overnight repurchase agreements (overnight repos) are issued by Securities Dealers who issue them as private debt instruments which are constructed around the sale and repurchase of securities. Dealers swap overnight repos against term-repos with longer maturities. Third, Money Market Fund shares (MMF shares) are issued by Money Market Funds which pool the funds of institutional investors and households on the retail money market and invest them in the shadow banking system. Accordingly, MMFs swap their shares against other shadow bank liabilities, in particular ABCPs and overnight repos. Figure 2—taken from Murau (2017a)—shows how in the contemporary monetary system, commercial banks as well as different types of shadow banks issue credit money by swapping IOUs.

| | Assets | Liabilities |
|--------------------------|--|--------------------------------------|
| Commercial Banks | Loans and bonds (long-term IOUs) | Deposits (very short-term IOUs) |
| Special Purpose Vehicles | Asset Backed Securities (long-term IOUs) | ABCPs (short-term IOUs) |
| Securities Dealers | Term repos (long-term IOUs) | Overnight repos (short-term IOUs) |
| Money Market Funds | ABCPs and overnight repos (short-term IOUs) | MMF shares (very short-term IOUs) |

Figure 2—Traditional and shadow money, created as a swap of IOUs

2.2 Public-private Money Hybridity

Money that is created by swapping IOUs of different maturities can be issued both by public and by private institutions. The money supply in general is thus a hybrid of public and private money forms. In normal times, public and private money forms trade at par with each other. This makes them appear similar and often conceals inherent differences. Real-world monetary systems, therefore, are neither purely public (cf. Knapp 1905) nor are they purely private (cf. Menger 1892; von Hayek 1976). Instead, they are a mixture of both. The actual delineation between public and private money forms is historically contingent and can shift over time, especially through financial crises (cf. Info Box #1).

One way to account for the hybridity of credit money is to look at the public or private status of the issuing institution and ask whether public guarantees exist for the credit money issued. Along those lines, Pozsar (2014: 15) suggests to use a ‘Money Matrix’ as a heuristic tool (Figure 3). In this Matrix, the left column displays two different categories of public credit money: The money-like liabilities of a public institution, typically a modern-type central bank, are pure public money. The credit money forms issued in this way are currency and central bank deposits (or reserves). Both form what sometimes is referred to as the ‘monetary base’ or the monetary aggregate M0. Private-public money

³ Shadow money is a contested category within the current discourse. Therefore, a number of different definitions stand next to the one by Pozsar and Ricks. For example, Gabor and Vestergaard (2016) perceive repos as the only shadow money form, whilst Michell (2016) rejects the idea entirely that the liabilities of shadow banks are deposit substitutes that would deserve the name ‘shadow money’.

are the money-like liabilities of private institutions that have public liquidity and solvency backstops and can tap public institutions' balance sheets via the discount window or deposit insurance. Thus, a public-private partnership for money creation is in place, in which the public authorities also assume competences for regulating and supervising the private issuing institutions. This category applies to commercial banks which issue deposits subject to regulation and supervision, but also have access to liquidity and solvency backstops. Deposits are typically the main elements of the monetary aggregates M1 and M2, depending on their maturities. The right column displays two different categories of private credit money: The money-like liabilities of private institutions that do not have access to backstops on a public balance sheet are public-private money if issued against public assets and purely private money if issued against private assets. Shadow money forms typically correspond to this category, as they are issued outside any framework of public regulation, supervision or backstopping. Depending on the monetary jurisdiction, some shadow money forms may be part of broad money aggregates such as M3 or M4. More often, however, they are not represented in the official accounts of the money supply (cf. O'Brien 2007).

| Public Credit Money Forms | Private Credit Money Forms | | | | |
|---|----------------------------|----------------------|--|----------------|----------------------|
| <p>(1) Pure Public Money</p> <ul style="list-style-type: none"> Issued by a public institution (e.g. central bank) <p style="text-align: center;">Public Inst.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Any assets</td> <td style="width: 50%; text-align: center;">Pure Public Money</td> </tr> </table> | Any assets | Pure Public Money | <p>(3) Public-private Money</p> <ul style="list-style-type: none"> Issued by a private institution Public assets as collateral <p style="text-align: center;">Private Inst.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Public assets</td> <td style="width: 50%; text-align: center;">Public-private Money</td> </tr> </table> | Public assets | Public-private Money |
| Any assets | Pure Public Money | | | | |
| Public assets | Public-private Money | | | | |
| <p>(2) Private-public Money</p> <ul style="list-style-type: none"> Issued by a private institution Backstopped at public institution <p style="text-align: center;">Private Inst.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Any assets</td> <td style="width: 50%; text-align: center;">Private-public Money</td> </tr> </table> <p style="text-align: right; margin-right: 20px;">↙ Public Backstops</p> | Any assets | Private-public Money | <p>(4) Pure Private Money</p> <ul style="list-style-type: none"> Issued by a private institution Private assets as collateral <p style="text-align: center;">Private Inst.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Private assets</td> <td style="width: 50%; text-align: center;">Pure-Private Money</td> </tr> </table> | Private assets | Pure-Private Money |
| Any assets | Private-public Money | | | | |
| Private assets | Pure-Private Money | | | | |

Figure 3—The Money Matrix (conceptually)

An additional way to account for the hybridity of the credit money system is to look at the public or private status of the debt certificates involved in the process of swapping IOUs to create credit money. Do the institutions issuing those certificates have a public or private status? We can imagine that in the swap of IOUs logic, public or private short-term IOUs are issued as credit money against public or private longer-term IOUs. This leads to the four options depicted in Figure 4, which adds nuance to the categories of pure public and private-public money in Pozsar's Money Matrix. Accordingly, central bank money such as bank notes or central bank deposits can be created by purchasing public debt, e.g. government bonds as is traditionally the case in the US, or by 'discounting' private debt, as was common for example in the banking system of the British Empire (cf. Mints 1944 on the 'real bills doctrine'). While the terminology varies, both acts of money creation correspond to the swap of IOUs logic with the main difference being the type of the longer-term IOU against which the short-term IOU is swapped. The same thought can be applied to credit money issued by private institutions. For example, a bank can create a deposit by purchasing public or private bonds, or by handing out loans to public or private institutions.

| | | Credit Money issuer | |
|----------|--|---|---|
| | | Public institution (central bank) | Private Institution (bank or shadow bank) |
| Borrower | Public institution (e.g. Treasury) | (I.) Central bank deposits — Government bond | (II.) Bank Deposit, — Government bond, loan to Treasury |
| | Private institution (e.g. corporations) | (III.) Bank Deposit, — Bill of exchange | (IV.) Bank Deposit, — Bill of exchange, loan to corporation |

Figure 4—Hybridity in the swap of IOUs logic (conceptually)

2.3 Hierarchy of Money

The Money View perceives the monetary system as a payments system that is fundamentally hierarchical (Mehrling 2000, 2017). This hierarchy refers to two different aspects: On the one hand, the domestic money supply within a monetary jurisdiction is made up of different credit money forms which are located on different layers in a hierarchical relationship. On the other hand, the international monetary system is structured hierarchically, with one monetary jurisdiction situated at its apex and other monetary jurisdictions forming the periphery to it.

In its first dimension, the concept of hierarchy applies to different forms of credit money within a domestic payments system and the various institutions issuing them as their liabilities. Through this prism, money forms higher up in the abstract hierarchy can be seen as safer, more acceptable forms from a demand side and more stable in value, yet scarcer and more exclusive to supply; money forms further down the hierarchy are less scarce, more ‘elastic’ to create and more accessible from the supply side, but are less sought after from a demand side because they are less widely accepted and more prone to be affected in a financial crisis. Figure 5—based on Mehrling (2012a)—shows that we can look at the different forms of money as constituted within a hierarchy of a pyramid, inclusive of both private and public dimensions of it .

At the top of the monetary pyramid—well in line with the verdict of Mitchell-Innes (1914)—is a unit of account, e.g. gold or dollar, respectively. Below this are a range of institutions issuing debt claims as inside money. In today’s world, the IOUs issued by the central bank are usually ranked higher than those of the commercial banking system, which in turn are ranked higher than those of the shadow banking system. Thus we can see the hierarchy with the various IOUs imply a promise to pay the higher-ranking form of money. The money form situated at the top is the final means of settling payment (cf. Pozsar 2014: 7-8).

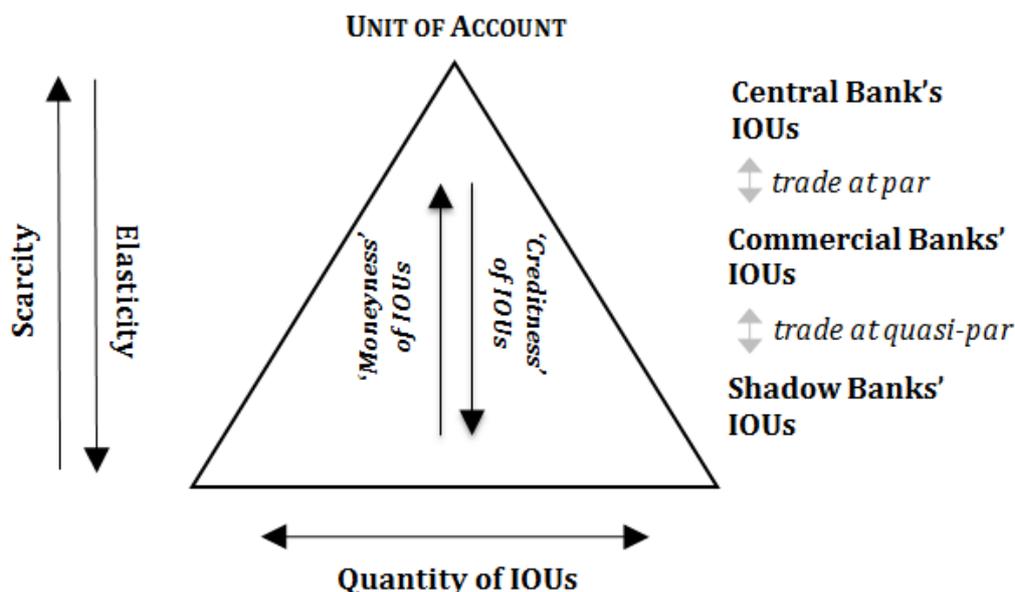


Figure 5—The conceptual hierarchy of money within a monetary jurisdiction

What determines whether an IOU is part of the money pyramid or not? Are all debt certificates ‘credit money’ according to this approach? In other words, can there be credit instruments that are not money? The Money View literature suggests one key criterion to decide whether an IOU is money or not: if it trades at par on demand to another form of credit money that is further up in the hierarchy (cf. Pozsar 2014; also Gabor and Vestergaard 2016; critical: Michell 2016). As to Pozsar (2014: 7), it is “the quintessential attribute of money—that money always trades at par on demand”. This line of thinking implies that those public or private IOUs are part of the ‘monetary pyramid’ which can instantaneously or almost instantaneously be converted into higher-ranking money. In turn, the money form at the top of the hierarchy must be defined as trading at par to the unit of account (see Murau 2017b for a discussion of this argument).

Importantly, the promise to pay at par on demand is not equally strong for all credit money forms. The further we go down in the monetary pyramid, the higher is the risk of breaking away from par. The reason for this is that par clearance cannot be taken for granted but needs to be actively established, either by political measures and guarantees or via market forces and private guarantees (cf. Mehrling 2015a; Pozsar 2014: 7). This implies that we have IOUs at the top of the domestic monetary hierarchy that are clearly and unambiguously considered money because their promise to trade at par is very strong. These are central bank IOUs (i.e. currency and central bank deposits) and commercial bank IOUs (i.e. deposits). Further down in the hierarchy, there are IOUs issued by non-banks that are not conventionally portrayed as money. These may occasionally trade at par but then also break away from it. These shadow money forms or ‘near monies’ are difficult to measure and not always represented in the official monetary aggregates. Often they are left aside in analyses of the monetary system although they have important political economic implications, not the least for financial crises (cf. Info Box #1).

The second dimension of monetary hierarchy refers to the international sphere. The IMS can be imagined as a hierarchically structured entity with various overlapping monetary jurisdictions that issue credit money in their respective national units of account (Mehrling 2000; Bernes et al. 2014). Different national units of account thus have a different status internationally. Those that are

hierarchically higher are more widely used, more sought after and more credible. To account for this fact, Strange (1971: 217) presents a ‘taxonomy’ of different types of international currencies—Top Currencies, Master Currencies, Passive or Neutral Currencies, as well as Political or Negotiated Currencies—that also implies a form of hierarchy. Following the view of Kindleberger (1970) and his Hegemonic Stability Theory, there is typically one country situated in the apex of the hierarchical IMS (critical: Eichengreen 2014). For international payments, this country plays a unique and critical role. It defines the most important international unit of account, international payments flows are channeled through accounts located in the center, and its central bank also plays the role of the world’s central bank. The apex is connected to different regional monetary jurisdictions that are situated on a level further down in the international hierarchy and are connected to peripheral monetary jurisdictions (cf. Mehrling 2015c).

Empirically, throughout the 19th century until World War I, the center of the world’s financial system was the United Kingdom. The Gold Standard was in fact a Sterling standard run by the Bank of England: Gold as the money form at the top of the international monetary pyramid was defined in sterling, and all other national currencies had to establish a fixed exchange rate vis-à-vis the sterling. International payments had effectively to be channeled through the London money market (cf. Mehrling 2016). After World War II, the United States took on the role of the apex of the international financial system. During the Bretton Woods era, the US dollar still used to be defined in terms of gold and other currencies were connected with fixed but adjustable exchange rates to it. The gold standard was abrogated with the inception of generalized floating in the 1973. Today, the Federal Reserve is the central bank of the world, situated at the top of the international payments system.

Figure 6 sketches a picture of how we can imagine the two dimensions of monetary hierarchy, both domestically and internationally. It implies that we think about the IMS as a pyramid of pyramids.

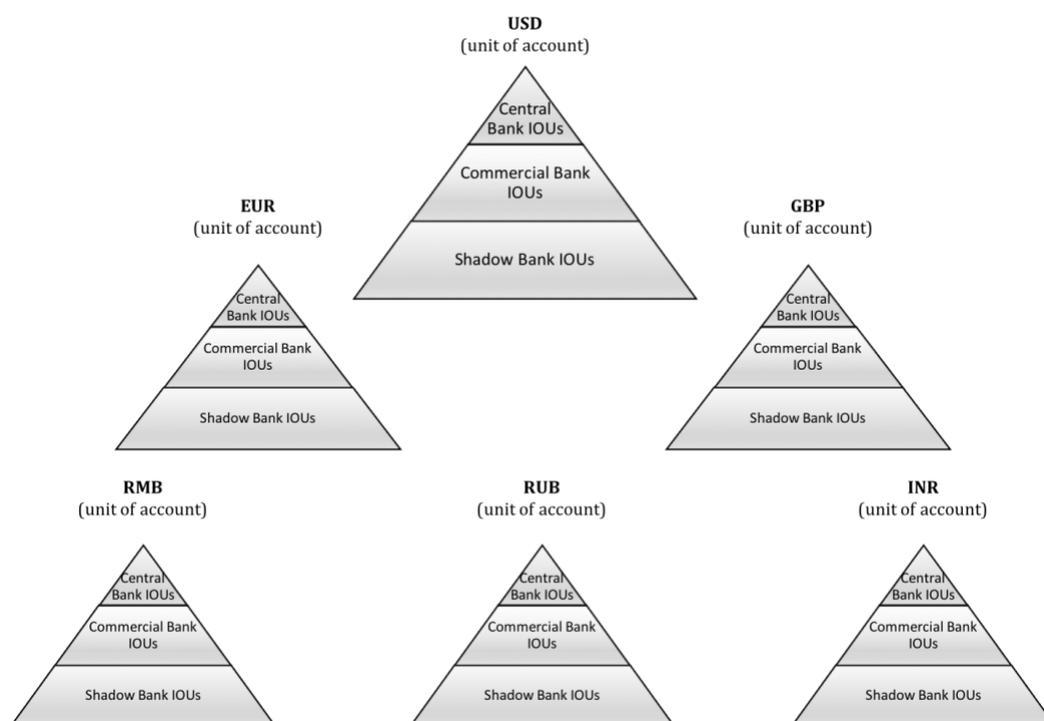


Figure 6—The international hierarchy of monetary jurisdictions (conceptually)

Accordingly, various monetary jurisdictions which use their particular unit of account to denominate public and private credit money claims in a hierarchical way form themselves an international hierarchy with a dominant monetary jurisdiction and its unit of account at the top, which in turn is connected to other more peripheral monetary jurisdictions. In this schematic and incomplete representation, the United States provide the USD as the key international unit of account. One layer below it, more ‘peripheral’ units of account are located, here exemplarily represented by the euro (EUR) and the British pound (GBP). The hierarchy can be further extended to more peripheral layers which are even more distant to the apex, such as China issuing renminbi (RMB), Russia issuing ruble (RUB) or India issuing rupees (INR).

2.4 Onshore-offshore dualism of credit money creation

The fourth aspect of a Money View perspective on the IMS is the onshore-offshore dualism of credit money creation, which challenges common state-centric notions of money creation in a further way.

The standard approach to the IMS assumes that money creation only takes place onshore, inside any monetary jurisdiction, while using that jurisdiction’s unit of account (cf. Avdjief et al. 2015). The IMS then refers to the regulations between monetary jurisdictions and their respective onshore money forms (see Figure 7).

| Onshore Dollar Realm | | Other Monetary Areas |
|--|---|---|
| USD-denominated credit money issued <i>in</i> the US Federal Reserve IOUs • Fed deposits • Fed currency US commercial bank IOUs • US bank deposits | exchange rate choice, degree of capital mobility  “Textbook <i>international</i> monetary system” | Non-USD-denominated credit money issued <i>outside</i> the US Non-US central bank IOUs • Non-USD CB deposits • Non-USD currency Non-US commercial bank IOUs • Non-USD bank deposits |
| | “Textbook <i>domestic</i> monetary system” | |

Figure 7—Conventional representation of the IMS (conceptually)

A good example of this rationale of pure onshore money creation is to be found in the analytical concept of the ‘Impossible Trinity’ (see Figure 8). Developed on the basis of Mundell (1960, 1963) and Fleming (1962), it has been popularized by scholars such as Cohen (1993) as well as Broz and Frieden (2001). The concept suggests that in any particular setup of the IMS only two of the following three policy goals can be realized: fixed exchange rates, free capital movements, and autonomous domestic monetary policy. Figure 8 portrays this structural dilemma and sketches how historical formations of the IMS—the Classical Gold Standard, the Bretton Woods System as well as Generalized Floating—are typically said to be located within this structure.

In contrast, this paper argues that it is not a logical necessity that all money is issued inside a given monetary jurisdiction. What is required in the first place to issue a public or private credit money form is the unit of account, as the fictional idea to denominate debt. It is true that as a result of historical processes, the units of account we have today are connected to state structures (cf. Desan 2014): the US dollar, the British pound (GBP), the Chinese renminbi (RMB), and also the euro (EUR), if we accept to treat the European Union as a state in this regard (cf. Murau 2016). However, the swap of IOUs which is required for actually creating this credit money form does not have to occur onshore,

inside that monetary jurisdiction. If we follow the logic of the Westphalian monetary system according to which each country only issues and uses its own currency (Cohen 1998), we normalize this view of onshore money creation. Yet, it is well possible to issue credit money offshore, simply by swapping IOUs denominated in a monetary jurisdiction’s unit of account while the public or private issuing institution is located outside of that monetary jurisdiction. Outside here may mean geographically or, even more importantly, legally (Palan 1998). Institutions legally operating offshore are able to create money without any restrictions or limitations imposed by the regulations of the monetary jurisdiction, which is particularly attractive for profit-maximizing private financial institutions in economic boom times. The downside, of course, is that—once the bullish times are over—the credit money created is not protected by the established crisis protection framework, notably the liquidity backstops of the central bank’s discount window and the solvency backstops provided by deposit insurance.

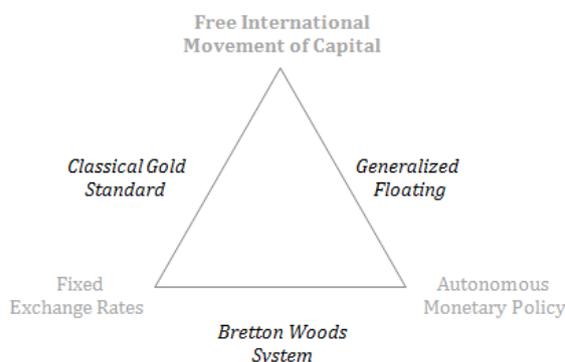


Figure 8—International monetary systems and the ‘Impossible Trinity’

Empirically, significant offshore credit money creation occurs for the major units of account. This typically refers to forms of wholesale money issued through the lending that takes place in between financial institutions, and not so much to retail credit money forms that actually reach the ‘real economy’. Due to the US’s position at the apex of the international hierarchy of money (Figure 6), the US dollar is by far the most important unit of account used to create credit money offshore. Figure 9 shows the conceptual idea of the IMS as a hierarchy of various monetary jurisdictions with the US in its center, connected by the offshore dollar realm, in which private and public institutions issue dollar-denominated international credit money.

| Onshore Dollar Realm | Offshore Dollar Realm | Other Monetary Areas |
|---|---|--|
| USD-denominated credit money issued in the US | USD-denominated credit money issued outside the US | Non-USD-denominated credit money issued <i>outside</i> the US |
| Federal Reserve IOUs <ul style="list-style-type: none"> • Fed deposits • Fed currency | | Non-US central bank IOUs <ul style="list-style-type: none"> • Non-USD CB deposits • Non-USD currency |
| US commercial bank IOUs <ul style="list-style-type: none"> • US bank deposits | | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Non-USD bank deposits |
| US shadow bank IOUs <ul style="list-style-type: none"> • US shadow money | | Non-US shadow bank IOUs <ul style="list-style-type: none"> • Non-USD shadow money |

Figure 9—Money View representation of the IMS (conceptually)

3. Mapping the Offshore Dollar System

As portrayed in Figure 9, the offshore dollar realm is the crucial source for international credit money in the contemporary setup of the IMS. As a conceptual idea, the offshore dollar realm—understood primarily as a legal space—comprises all notions of the Money View perspective introduced in the previous section: endogenous money creation via swapping IOUs, onshore or offshore, by public or private institutions that use their balance sheets to create money as short-term IOUs, which pile up in various layers of a monetary hierarchy and trade at par to higher-ranking money.

To understand how credit money creation in the offshore dollar realm has historically emerged, the paper applies a distinct functionalist understanding of the monetary system's transformation (cf. Murau 2017a). Following the Money View's logic of endogenous credit money creation, the monetary system is portrayed as a self-referential network of expanding yet unstable debt claims (Murau 2017b). With its ability to create money *ex nihilo* by simply swapping IOUs of different maturities, the credit money system may be thought of as a large, all-embracing Ponzi scheme that continuously extends its scope, unless it is scaled back by endogenous forces in a financial crisis. Upon the initiative of private, profit-driven financial institutions, new forms of credit money are brought into being and extend the monetary system by supplying new types of credit instruments that rely on a swap of IOUs, finding customers who are willing to hold these instruments and eventually establishing par clearance vis-à-vis higher-ranking forms of money. These near monies, or private credit money forms, are typically off the radar of monetary analyses but are actually where the music is playing: Here is where the profit opportunities lie and the expansionary dynamics take place, but it is also here that the main risks of the system are created. These innovative financial instruments are prone to overpromising and abrupt contraction, in particular when no safety nets have been constructed (Murau 2017b). In the particular case of the IMS, private institutions spread their activities to the offshore dollar realm and, to circumvent the regulations of their time, established distinct offshore versions of the USD-denominated onshore deposits. In line with this logic of a market-based credit theory of money, public authorities could only follow suit to the expansion of private credit money and react to necessities that came up once a financial crisis occurred.

In line with this functionalist theory, this section sets out to 'map' the offshore dollar realm as it has been 'filled' historically with various forms of private and public credit money in order to develop an understanding of what the IMS looks like today. The result will be a depiction of the IMS that, compared to conventional approaches, is closer to the real world and at the same time is able to carve out its system-like qualities on a more abstract level. The depiction begins with the emergence of offshore USD-denominated bank deposits with the rise of the Eurodollar market, followed by the development of offshore USD-denominated shadow money in the form of MMF shares, ABCPs, overnight repos and FX swaps, until it was completed with the 'public layer' of offshore USD-denominated central bank deposits set up through the network of central bank swaps that emerged during and after the 2007-9 Financial Crisis.

3.1 Offshore Bank Deposits in the Eurodollar Market

The first major step in the institutional evolution of the offshore dollar realm took place on the level of offshore commercial bank IOUs, via the emergence of the Eurodollar market. Eurodollars, by definition, are USD-denominated bank deposits which are not subject to US banking regulations as they are issued by a non-US commercial bank, the non-US branch of a US commercial bank or, since 1981, via an International Banking Facility (IBF) in the US. Eurodollars are typically fixed-rate time deposits with maturities ranging from overnight to several years but mostly between one week to six months, with the London Interbank Offered Rate (LIBOR) representing the Eurodollar market's average interest rate (Goodfriend 1993: 48; Stigum and Crescenzi 2007: 210).

The Eurodollar market came into existence in 1957, when banks in the City of London started dealing in USD-denominated bank deposits and initiated what Einzig (1964: x) calls “a revolutionary reform of the monetary system”. Offshore USD deposits on the Eurodollar market emerged “as a convenient and profitable device, without even thinking about the broader implications” (ibid). Kindleberger (1970) notes that the Eurodollar market “came into being more or less by accident” (ibid: 173) and that it is “a product not of planning by economists but of evolutionary practice” (ibid: 177). Offshore banking allowed for the circumvention of the restrictive financial relations of the Bretton Woods System; it was done in various national units of accounts (e.g. in ‘Eurofrancs’ and ‘Euromarks’) and for instruments with various maturities (e.g. in the form of longer-term ‘Eurobonds’). Still, offshore USD deposits were by far the most important instrument (ibid: 173-177). Therefore, the Eurodollar market soon became the ‘heart’ of what today constitutes the offshore dollar realm and may be thought of as an extension of the Fed Funds market, for example, the onshore money market for USD wholesale bank deposits (cf. Figure 10).

| Onshore Dollar Realm | Offshore Dollar Realm | Other Monetary Areas |
|--|--|--|
| USD-denominated credit money issued in the US | USD-denominated credit money issued outside the US | Non-USD-denominated credit money issued outside the US |
| Federal Reserve IOUs <ul style="list-style-type: none"> • Fed deposits • Fed currency → since 1913 | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Eurodollar deposits → since 1957 | Non-US central bank IOUs <ul style="list-style-type: none"> • Non-USD CB deposits • Non-USD currency |
| US commercial bank IOUs <ul style="list-style-type: none"> • US wholesale deposits • US retail deposits → since 19 th century | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Eurodollar deposits → since 1957 | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Non-USD bank deposits |

Figure 10—Rise of Eurodollars deposits in the offshore dollar realm

Several factors contributed to the rise of the Eurodollar market, and the dynamics of the Eurodollar market’s growth changed over time (He and McCauley 2012). In its early years, socialist state banks, for example, from China and the Soviet Union, were interested in keeping bank deposits denominated in USD outside the US jurisdiction to avoid the danger of having these blocked by US authorities (Bell 1973). Moreover, international trade financing was required in the post-war boom years but not always easy to attain in the restrictive Bretton Woods System. Many basic commodities such as oil are traded in US dollars, thus the infamous ‘petrodollars’ are typically Eurodollar deposits, created outside the US’s monetary jurisdiction (Kaminska 2015). This demand for dollar liquidity was met by banks in the City of London who had been traditionally oriented towards financing international trade in Sterling, but with the decline of the UK’s currency after the Second World War had lost key parts of their business model (Bell 1973: 8). Helleiner (1994) and Burns (2006), in their studies on the political economic origins of the Eurodollar market, therefore attribute key relevance to the British “Bank of England-Treasury-City of London” nexus which triggered the emergence of offshore banking. In this, they could use structures of the old Victorian bills market while exploiting accounting rules introduced in the late 1930s (Palan 1998).

In the 1960s, large US banks discovered the advantages of the Eurodollar market for their own purposes and turned the Eurodollar market into a functional part of the New York money market (Kindleberger 1970: 173-177). On the one hand, by shifting their activities to the Eurodollar market, US bankers were able to circumvent the New Deal banking reforms such as reserve requirements and

interest rate ceilings through ‘Regulation Q’, which enabled them to offer higher interest rates. (Bell 1973, Helleiner 1994). At that time, ‘roundtrip’ transactions, originating and ending in the US, became a dominating feature of Eurodollar transactions (He and McCauley 2012). On the other hand, US bankers were able to avoid the restrictions placed on their international activities by the Bretton Woods System and the associated capital controls by channeling their financial activities through the Eurodollar market. US authorities, who could have prevented the emergence of the Eurodollar market by introducing capital controls, refrained from doing so, for example by making it comparatively easy for US banks to establish branches abroad that would then engage in Eurodollar activities. In this, the US authorities’ motivation was both to support the domestic banking industry and to promote the international role of the US Dollar (Helleiner 1994: 88-91).

While the City of London remained the geographical heart of the Eurodollar market, offshore USD deposits soon started to be created in many other places of the world (cf. Einzig 1964: 14-15). This does not only refer to major financial centers such as Zurich and Tokyo, but also to places inside the US. Effectively, making transactions on the Eurodollar market merely meant using a different desk at one of the New York banks. In practice, the Eurodollar market became just one funding channel next to the onshore Feds Fund market (cf. Bell 1974: 18-31). Eurodollar, a mid-20th century term, is therefore anachronistic and is a misnomer of a kind. At the time, the label ‘euro’ was understood synonymously as being located outside the US in Europe and typically in London. However, Eurodollars are not necessarily created in Europe but can be issued everywhere in the world. Moreover, the term is confusing as Eurodollars have nothing to do with the actual EU’s unit of account. To avoid this ambiguity, it would perhaps be best to refer to Eurodollars as ‘offshore dollar deposits’.

Since the emergence of the Eurodollar market, scholars have debated about how to conceptualize the financial activities associated with Eurodollar banking. Typically, they rejected the view that on the Eurodollar market autonomous money creation took place (cf. Strange 1971, Willms 1976). The dominant view was that existing national bank deposits were shifted around internationally, using the Eurodollar market as a ‘transmission belt’ (Meier 1974), yet without increasing the money supply overall. By contrast, Bell (1973: 15) explains that banks, through their activities in the Eurodollar market, do indeed autonomously create USD-denominated credit money and, while leaving the supply of onshore dollars unchanged, increase the world supply of USD deposits. Figure 11 puts this argument in stylized balance sheets and, in line with the Money View perspective, depicts the creation of Eurodollars as a swap of IOUs of different maturities (cf. e.g. Bell 1973: 15, Stigum and Crescenzi 2007: 214) to explain why the creation of Eurodollar deposits in the offshore dollar realm parallels the autonomous creation of onshore dollar deposits.

| Borrower | | Non-US Bank | |
|--|---------------------------|---------------------------|--|
| + Eurodollar deposit (short-term IOU) | + Loan (long-term IOU) | + Loan (long-term IOU) | + Eurodollar deposit (short-term IOU) |

Figure 11—Eurodollars as offshore bank deposits, created as a swap of IOUs

To quantify the dimension of offshore dollar creation, Figure 12—taken from Burn (2006: 19)—displays the volume of eurocurrency markets from 1957 to 1977. Since the Bank for International Settlements (BIS) only started to collect data on Eurodollars in 1963, the volumes for the earlier years are estimates (ibid: 18). Its sharp rise went along with the demise of the Bretton Woods System and its international monetary institutions. As Helleiner (1994) famously describes, the rise of the Eurodollar markets was the gateway of the financial globalization process that would ultimately take down the ‘embedded liberalism’ of the Bretton Woods era.

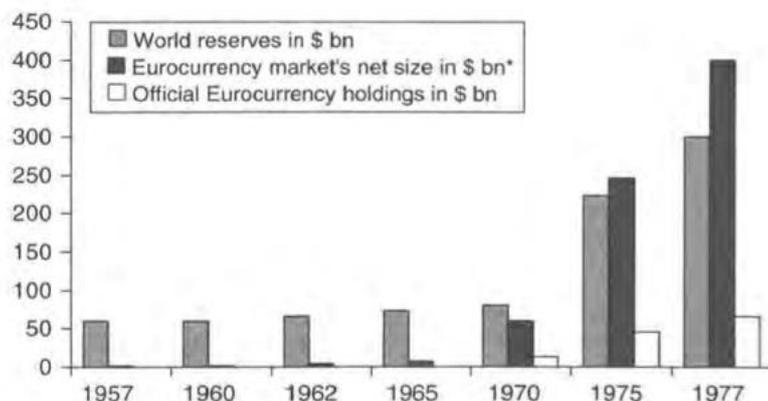


Figure 12—Eurocurrencies and world reserves, 1957-1977

Only after the demise of the Bretton Woods System did regulators begin to systematically account for the financial activities of the Eurodollar market. The Fed acknowledged the moneyness of Eurodollars for the first time in 1980 when it included them in their monetary aggregates (Whitesell and Collins 1995: 3). In 1979-80, the Fed had still attempted to convince central bankers in other Western countries to re-regulate the Eurodollar market in order to prevent it from interfering with US domestic monetary policy. This, however, proved unsuccessful, both due to opposition within the US and by Britain as well as Switzerland (Helleiner 1994: 11). In 1981, instead, the Fed changed its strategy and introduced International Banking Facilities as regulatory creations that would allow US banks to participate in the Eurodollar market from inside the US. The Fed's goal was to exercise control on Eurodollar creation without threatening its influence on the domestic money supply and at the same time restore international competitiveness of US banks (Breedlove 1982: 301).

In the following years and decades, the Eurodollar market continued to grow in size even further. Exact numbers are hard to come by, not least due to statistical difficulties (cf. He and McCauley 2012; Ricks 2016: 51). Figure 13—taken from Denbee et al. (2016), compiled on the basis of BIS data—depicts offshore markets' sizes of the main units of account from 1980 to 2015.

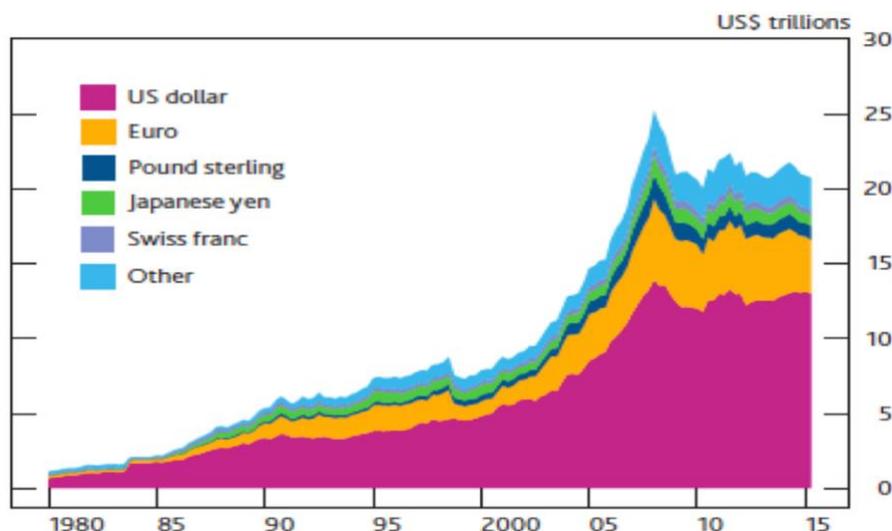


Figure 13—Banking sector foreign currency liabilities, 1980-2015

On the one hand, Figure 13 visualizes the relative significance of the Eurodollar market compared to offshore EUR (or the preceding currencies, respectively), offshore GBP, offshore JPY and offshore SFR. On the other hand, it illustrates the steady growth of the Eurodollar market until the mid-2000s as well as the reversion of its expansion in the 2007-9 Financial Crisis. Overall, this data shows how the emergence and the extended use of Eurodollar deposits as a private credit money form—in line with the theoretical perspective adopted in this paper—corresponds to an expansion of the monetary system as a self-referential network of expanding yet unstable debt claims. This process was driven by private initiative and supported by regulatory decisions.

3.2 Offshore Shadow Money in the Shadow Banking System

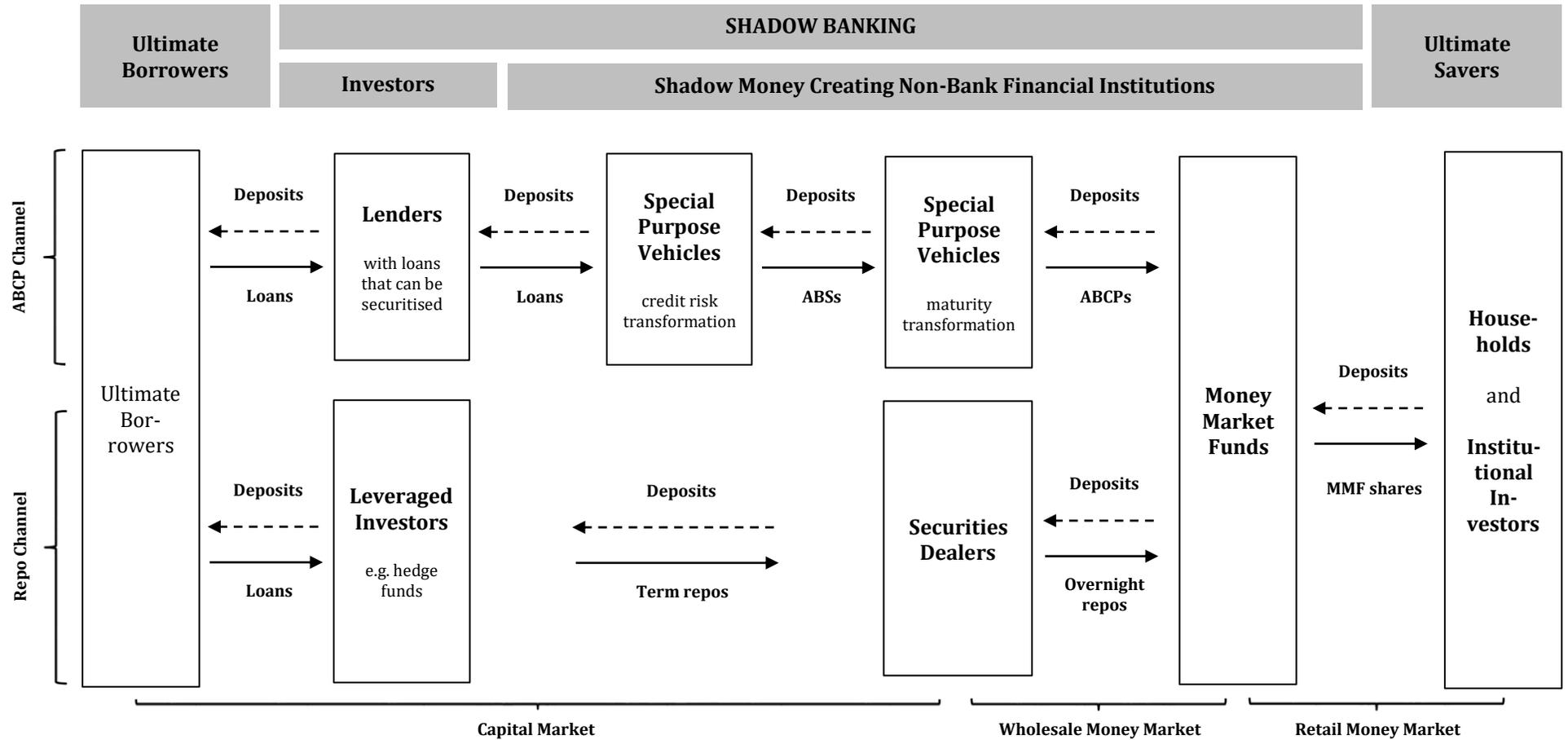
With the liberalization and globalization of finance in the context of the Bretton Woods System's demise, the monetary system as a self-referential network of expanding yet unstable debt claims disseminated further. New forms of USD-denominated private credit money emerged at a lower level of the hierarchy of money, first occupying the onshore and later the offshore dollar realm.

The new financial structures that would expand private money creation developed mainly in the 1970s and built up what in the 2007-9 Financial Crisis became known as shadow banking system (cf. McCulley 2009; Pozsar 2008). Centered in the US but with global ramifications, the shadow banking system is a web of specialized non-bank financial institutions that has developed a complex service chain for conducting the same financial functions as the classical banking system, yet outside the public regulatory framework (Pozsar et al. 2012). Shadow banking is connected to financial innovation and the development of new financial instruments that have become substitutes for bank deposits and are often referred to as 'shadow money'. While there is profound disagreement among monetary theorists as to what instruments represent shadow money and for which reasons (cf. Gabor and Vestergaard 2016; Murau 2017b), the Money View literature suggests that MMF shares, overnight repos and ABCPs are the three most relevant financial instruments created in the shadow banking system that function as shadow money. The issuing non-bank financial institutions—MMFs, securities dealers and SPVs—in this regard function as shadow banks (Mehrling 2011; Pozsar 2014; Murau 2017a).

Figure 14—based on Claessens et al. (2012)—demonstrates systematically how the creation of ABCPs, overnight repos and MMF shares takes place within the shadow banking system. ABCPs, overnight repos and MMF shares are produced via two main channels of shadow banking (cf. McMillan 2014: 65-79): the 'repo channel' (connected to collateralized lending) and the 'ABCP channel' (operating via securitization of structured assets). MMFs connect both these channels with institutional investors and, to a much lesser extent, households. Taken together, this market-based credit system conducts 'money market funding of capital market lending' (Mehrling et al. 2013: 2). Following the analytical perspective of Pozsar et al. (2012), what a classical commercial bank did on its own singular balance sheet with regard to the transformation of maturity, liquidity, risk and size occurs in the shadow banking system on different connected balance sheets "through a daisy-chain of non-bank financial intermediaries in a multi-step process" (Pozsar et al. 2012: 10).

MMF shares, ABCPs and overnight repos have opened up a new 'layer' in the domestic US hierarchy of money. They have gradually adopted properties that, despite different regulatory treatment, have made them functionally equivalent to bank deposits in a range of respects. They are high-quality short-term debt instruments created via swapping IOUs of different maturities, have been developed to directly compete with bank deposits and came to be considered as 'cash' by some financial market participants as they eventually adopted par clearance vis-à-vis higher-ranking money forms (Murau 2017a).

Figure 14—Shadow money creation in the stylized shadow banking system

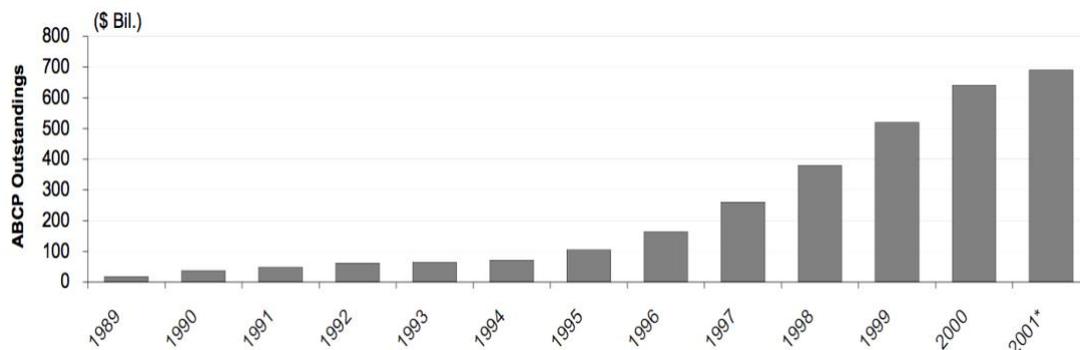


Accordingly, MMF shares emerged in the 1970s as the liabilities of MMFs, whose business model was developed in response to regulatory restrictions on commercial banks, in particular the cap of interest rates paid on bank deposits due to ‘Regulation Q’. MMFs pool funds from their customers, households and institutional investors, and invest them in highly liquid assets on the ‘wholesale money market’ (cf. Jackson 2013: 379). In doing so, MMFs pass on their customers funds either to SPVs using the ‘securitization channel’ or to Securities Dealers using the ‘collateral intermediation channel’. MMFs promise their customers a constant net-asset value for their shares, i.e. a one-to-one exchange rate vis-à-vis the hierarchically higher onshore bank deposits. Figure 15—taken from Nutting (2013)—sketches the rise in the volumes of MMF share issuance from 1975 to 2012. It displays a peak in 2008 when a run emerged on MMFs following the bankruptcy of Lehman Brothers and with the Prime Money Market Fund ‘breaking the buck’, i.e. not sustaining par clearance (Murau 2017a).



Figure 15—Volumes of MMF shares issued, 1975-2012 (in billion USD)

ABCPs are high-quality, short-term debt instruments issued by Special Purpose Vehicles (‘SPVs’) or legally different but functionally equivalent ‘Structured Purpose Vehicles’, ‘Special Investment Vehicles’, ‘ABCP conduits’ or ‘ABCP programs’. SPVs are entities typically set up by large commercial banks as sponsors, which used them as off-balance-sheet institutions to circumvent capital requirements (Covitz et al. 2009: 6-7). Although not regulated as banks, SPVs conduct bank-like activities as they hold medium-term or long-term debt claims as assets and finance them by issuing ABCPs as short-term debt (Acharya et al. 2010: 1). The rise of ABCPs as deposit substitutes in the mid-1980s was closely connected to the way they were classified by regulators, especially via ‘favorable risk capital treatment’ (cf. Chen 2015). Before 2007, ABCPs had been specifically constructed as wholesale money for cash pools and were mostly held by MMFs. The majority of ABCPs issued had maturities of one to four days. This short-termness made them deposit-like and allowed them to virtually trade at par (Covitz et al. 2009: 2). Figure 16—taken from FitchRatings (2001: 2)—depicts the sharp rise in ABCP issuance between 1989 and 2001. In the 2007-9 Crisis, ABCPs were the first shadow money form to face a run and were subsequently de-monetized (Murau 2017a).



*As of Sept. 30. ABCP – Asset-backed commercial paper. Source: Federal Reserve Board.

Figure 16—Rise of ABCP issuance, 1989-2001

Overnight repos are privately issued financial instruments constructed around the sale and repurchase of securities, typically government bonds and later also securitized private debt. The repo market is run by Securities Dealers (or ‘Broker Dealers’ or ‘Dealer Banks’) who act as market makers as they are willing to buy and sell repos at different prices, creating an inside and outside spread (Mehrling 2013b). Overnight repos, i.e. repos with the shortest possible maturity, are “high-quality, highly liquid, short-term IOUs [... that as] a result of these characteristics [...] are subject to negligible price fluctuation”, which makes their value compared to higher-ranking money forms very stable (Ricks 2011: 79). While repo as a financial instrument is much older and dates back into the 19th century, it was the development of the ‘tri-party repo market’ in the late 1970s that made repos as easy as bank deposits due to custodian banks facilitating the transactions (Jones 1997, Garbade 2006). Figure 17—taken from Task Force (2010)—shows how repo issuance increased in the 2000s, with a quantitative peak in 2008.

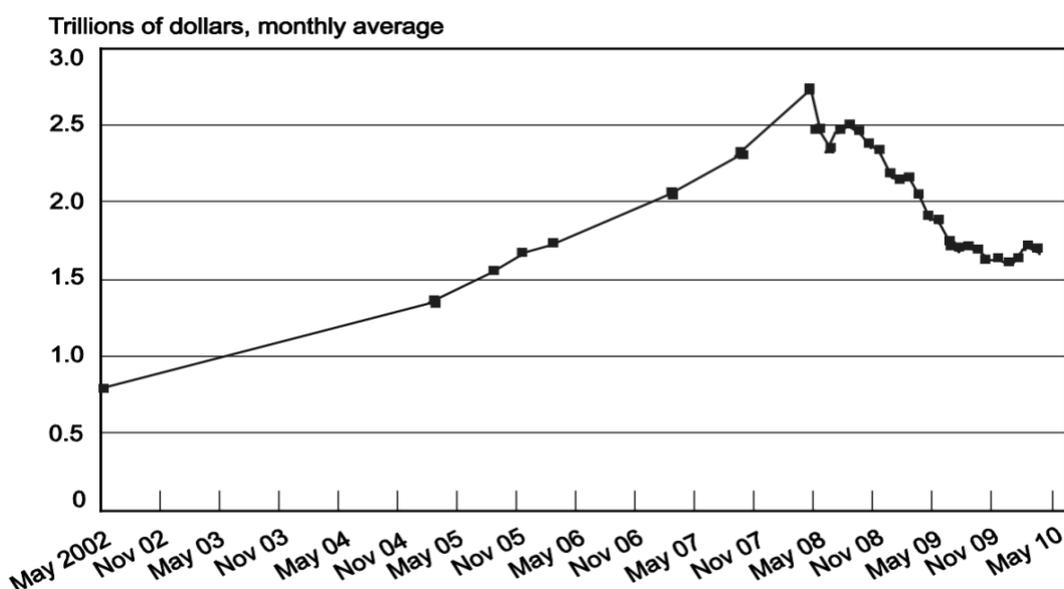


Figure 17—Volumes of overnight repos issued, 2002-2010 (in trillions of USD)

Originally, the shadow banking system represented an onshore alternative to the offshore Eurodollar market (Minsky 1980, as interpreted by Haberly and Wójcik 2017: 239). From the 1980s onwards, however, shadow money creation was increasingly shifted into the offshore dollar realm. At that time, offshore MMFs were founded with their products at first tailored towards the retail market. From the mid-1990s onwards, MMF shares were issued also for institutional investors. The MMFs targeted not only offshore USD investors but also GBP and later EUR investors. As no regulatory authority had been in charge of overseeing offshore MMFs, its managers could easily attain AAA-ratings for their products. The volume of offshore MMFs rose from 1 billion USD in 1995 to 626 billion USD in 2008 (Hannam 2008). The ABCP issuing SPVs had predominantly been set up in offshore financial centers in the first place (Palan et al. 2010). In light of the opaque reporting and data situation, Haberly and Wójcik (2017) have reconstructed the shape of the ABCP market at the onset of the 2007-9 Financial Crisis. They find that the vast majority of ABCP issuance occurred on the Cayman Islands, followed by Jersey and Ireland.

As concerns the offshore issuance of repos as shadow money, the instrument that bears functional equivalence to a USD-denominated offshore repo contract are Foreign Exchange (FX) swaps—an instrument that may also be referred to as a ‘cross-border repo’ (Pozsar 2017a-c; Interview J). FX swaps have conventionally been referred to as a derivative, but may also be interpreted as a money market instrument (Toporowski 2017). As they involve the swap of two currencies on the spot and the reversion of the transaction at a future point in time, they can be used as an alternative funding channel to established forms of interbank lending (McGuire and von Peter 2008: 52). The main institutions involved in FX swaps are typically banks and securities dealers (Stenfors 2017a: 2). These institutions use FX swaps to “convert liabilities in other currencies into the desired foreign currency for the purchase of the foreign currency assets” (McGuire and von Peter 2009a: 48). To an overwhelming extent, FX swaps have become used for USD funding (ibid; De Rosa 2014; Interview N). Using a ‘shadow money’ terminology, this implies that USD-denominated short-term private credit money is created outside of the US, which is not accounted for on-balance-sheet due to existing accounting regulations but effectively expands the self-referential credit money system (Borio et al. 2017; cf. Info Box #2). Figure 18 presents a suggestion for how we could think about FX swaps from a Money View perspective to conceptualize them as a genuine form of USD-denominated shadow money created in the offshore dollar realm.

| Bank A | | Bank B | |
|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|
| + USD deposit (short-term IOU) | + EUR deposit (longer-term IOU) | + EUR deposit (longer-term IOU) | + USD deposit (short-term IOU) |

Figure 18—FX swaps as private credit money creation offshore

Figure 19—taken from Stenfors (2017b)—depicts the increasing volume of FX swaps that have been issued since 1989. It indicates a massive increase that is in line with the surge of other shadow money forms. As to McGuire and von Peter (2009a: 52), there was a massive increase in the use of FX swaps by European banking systems to attain USDs, funded via positions in EUR, GBP and SFR. This suggests that, while conceptually FX swaps can both be used to create USD and non-USD offshore shadow money, on an empirical level they are mainly employed to expand the USD credit money supply on a lower level of the monetary hierarchy. During the 2007-9 Financial Crisis, massive strains emerged on USD-denominated FX swaps, leading to a breakaway from covered interest parity (Baba and Packer 2008; Coffey et al. 2009). Still, as Stenfors (2017a: 2) emphasizes, FX swaps were virtually the only tradable funding instrument that continued to function without major impairments during the crisis. Therefore, offshore USD creation via FX swaps through European banks increased massively after 2009, especially during the ensuing Eurocrisis when they bridged their dollar funding gap by converting their EUR liabilities into USD liabilities (Miu et al. 2012).

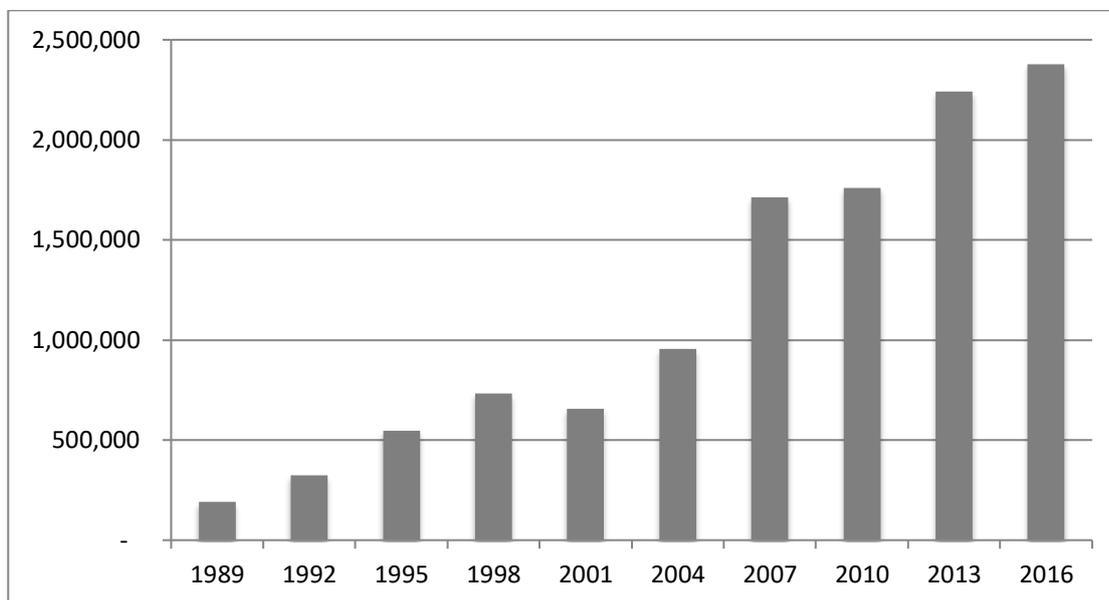


Figure 19—Volume of FX swap issuance, 1989-2016 (in millions of USD)

Figure 20—following up on this historical overview on the institutional development of the shadow money sector—presents a suggestion for conceptualizing how the rise of shadow money first expanded the USD monetary hierarchy onshore, before spilling over into the offshore dollar realm. The development of shadow money, purposefully driven by private profit-oriented institutions to supply alternatives to the highly regulated USD onshore bank deposits, involved exploiting various regulatory loopholes (cf. Nesvetailova 2015). From a macroscopic, system-oriented perspective, this process further transformed the setup of the IMS, fleshing out lower parts in the hierarchy of the onshore and offshore USD system.

| Onshore Dollar Realm | Offshore Dollar Realm | Other Monetary Areas |
|--|---|--|
| USD-denominated credit money issued in the US | USD-denominated credit money issued outside the US | Non-USD-denominated credit money issued outside the US |
| Federal Reserve IOUs <ul style="list-style-type: none"> • Fed deposits • Fed currency → since 1913 | | Non-US central bank IOUs <ul style="list-style-type: none"> • Non-USD CB deposits • Non-USD currency |
| US commercial bank IOUs <ul style="list-style-type: none"> • US wholesale deposits • US retail deposits → since 19 th century | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Eurodollar deposits → since 1957 | Non-US commercial bank IOUs <ul style="list-style-type: none"> • Non-USD bank deposits |
| US shadow bank IOUs <ul style="list-style-type: none"> • MMF shares • ABCPs • (Overnight) repos → since 1970s | Non-US shadow bank IOUs <ul style="list-style-type: none"> • Offshore MMF shares • Offshore ABCPs • FX Swaps → since 1980s | Non-US shadow bank IOUs <ul style="list-style-type: none"> • Non-USD shadow money |

Figure 20—Rise of shadow money in the offshore dollar realm

Info Box #2: FX Swaps as Offshore Shadow Money?

A Foreign Exchange (FX) swap, by definition, “involves an FX spot transaction with a simultaneous FX forward transaction in the opposite direction” (Stenfors 2017: 2): Two counterparties agree to change e.g. EUR and USD today and reverse the transaction at an agreed upon point of time in the future. In this, FX swaps “can also be seen as a loan in one currency versus a simultaneous deposit in another currency for the same maturity and with the same counterparty” (ibid; also see De Rosa 2014 and Shin 2017).

FX swaps have for a long time received relatively little attention both in the scholarly and regulatory discourse (Stenfors 2017: 2), or in the relevant textbooks (cf. Stigum and Crescenzi 2007). Knowledge about them remained mainly implicit among the trading community (Interview N). More recently, however, FX swaps have been attributed an increased relevance, especially due to their conceptual ambiguity as they can be seen both as derivatives, e.g. to hedge against FX risks, and money market instrument (Toporowski 2017). Background talks with regulators, academics and practitioners (Interviews A-N) have revealed that contemporary assessments on the conceptual status and the functioning of FX swaps are often fundamentally different, if not contradictory.

The main point of disagreement is whether issuing FX swaps is a form of credit creation or not. Formally, using prevailing accounting rules, FX swaps do not expand balance sheets (Interview B). Borio et al. (2017), by contrast, argue that FX swaps are functionally equivalent to other money market instruments such as loans and securities, and effectively create debt-like obligations. However, those obligations are not recorded on-balance-sheet. Therefore, the debt is effectively missing. According to their estimations, this could amount to around 10.7 trillion USD per day, for the USD alone. Pozsar (2017a-c), in this context, suggests to comprehend FX swaps as an instrument similar to repos, the only difference being that foreign currency is used as collateral instead of a treasury bond (Interview I). The FX swap may then be represented as a swap of IOUs, effectively bringing forth promises to pay (cf. Mehrling 2013a, Interview J). In this regard, an FX swap effectively creates on private banks’ balance sheets what happens on public balance sheets via central bank swaps.

These arguments combined—the conceptual ambiguity of FX swaps, their hidden credit character, the swap of IOUs logic and the repo analogy—point towards an interpretation of FX swaps as another form of substitutes for onshore deposits. Adopting a broad use of the ‘shadow money’ concept and terminology, they may be seen as a distinct offshore form of shadow money (cf. Interview I; critical: Gabor 2017; Comotto 2017). From a supply side perspective, FX swaps share the structural parallels to the creation of other credit money forms through the swap of IOU logic. From a demand side perspective, they are used as USD funding instruments. The key question, following the criteria of Murau (2017a), is if they satisfy the criterion of par clearance vis-à-vis higher-ranking forms of money. This ultimately is a matter of their maturity, exchange rate developments and market sentiments.

Why does it matter if we think of FX swaps as shadow money or not? In Murau, Rini and Haas (2018), we develop scenarios for the future of the IMS by 2040. We argue that if the credit money system continues to expand as throughout recent decades in absence of a systemic financial crisis, FX swaps—due to their opacity but also their resilience in the 2007-9 Financial Crisis—may attain the key systemic role in the privatized USD system as the primary form of offshore shadow money.

3.3 Offshore Central Bank Money in the C6 Swap Network

The latest major institutional innovation in the offshore dollar realm occurred at the level of central bank IOUs via the establishment of permanent central bank (CB) liquidity swap lines between the Federal Reserve and other non-US central banks. From a *Money View* perspective, these swap lines put the non-US central banks in the position to autonomously and upon their own discretion issue USD-denominated CB deposits on their balance sheets—effectively offshore. In doing so, the monetary system as a self-referential network of expanding yet unstable debt claims disseminated further, this time at the top of the hierarchy of money.

The origins of this innovation lie in the 2007-9 Financial Crisis. In 2007, at the outset of the system-wide run on shadow banking, the Fed installed temporary, limited emergency swap lines with the European Central Bank (ECB) and the Swiss National Bank (SNB) (Ceccetti 2008). As the crisis unfolded further, the Fed extended these lending agreements to a total of 14 bilateral swap lines with ever larger volumes (Broz 2015). Those arrangements terminated in February 2010 but were continued three months later in a modified form between the Federal Reserve and five major central banks of closely allied countries to the US—notably the ECB, the SNB, the Bank of England (BoE), the Bank of Japan (BoJ) and the Bank of Canada (BoC). In October 2013, these swap lines were announced to be made permanent and unlimited (Federal Reserve Board 2017). These ‘C6 Swap Lines’ (Mehrling 2015) are now considered the key feature of the Global Financial Safety Net (GFSN) that emerged after the crisis (IMF 2015a-b).

Figure 21 sketches how the 2007-9 Financial Crisis affected the setup of the offshore dollar realm. The C6 swap lines represent an additional layer in the hierarchy of offshore USDs as they allow non-US central banks to effectively issue USD-denominated public credit money. At the same time, as discussed in Murau (2017a), the Federal Reserve’s intervention in the first year of the crisis demonetized ABCPs, both issued onshore and offshore, and made them lose their status as shadow money.

| Onshore Dollar Realm | Offshore Dollar Realm | Other Monetary Areas |
|--|---|---|
| USD-denominated credit money issued in the US | USD-denominated credit money issued outside the US | Non-USD-denominated credit money issued outside the US |
| Federal Reserve IOUs • Fed deposits • Fed currency → since 1913 | Non-US central bank IOUs • Eurodollar CB deposits → since 2008 | Non-US central bank IOUs • Non-USD CB deposits • Non-USD currency |
| US commercial bank IOUs • US wholesale deposits • US retail deposits → since 19 th century | Non-US commercial bank IOUs • Eurodollar deposits → since 1957 | Non-US commercial bank IOUs • Non-USD bank deposits |
| US shadow bank IOUs • MMF shares • ABCPs • (Overnight) repos → since 1970s | Non-US shadow bank IOUs • Offshore MMF shares • Offshore ABCPs • FX Swaps → since 1980s | Non-US shadow bank IOUs • Non-USD shadow money |

Figure 21—Rise of C6 swap lines in the offshore dollar realm

The 2007-9 Financial Crisis, from a monetary perspective, may be thought of as a system-wide run on the USD-denominated private credit money system that had been piling up from the 1950s. In times of financial expansion, it had been profitable for profit-driven financial companies to extend the private credit money supply. The crisis, in turn, represents the ‘Minsky moment’ at which the expansion

reverted itself as the credit money issuers had overpromised and the belief in a further expansion of the system stalled. Using the heuristics of the offshore dollar table, the run can be represented as the various holders of deposit substitutes trying to shift their credit money balances back to the USD-denominated onshore bank deposits, which were protected by deposit insurance and whose issuing institutions had liquidity backstops via the Fed's discount window. This put substantial strains on the guarantee for par conversion between the various layers of the hierarchy of money (Mehrling 2011; Murau 2017a).

The run had both an onshore and an offshore dimension. From the onshore perspective, the first wave of the crisis began in August 2007 with the default of the Californian financial firm Countrywide Securities, which triggered a run on ABCPs and triparty repo. The run could be tamed by public authorities with conventional measures but led to a drying out of the ABCP market. The second and third wave took place with the near-failure and take-over of Bear Stearns in March 2008 and the bankruptcy of Lehman Brothers in September 2008. The runs on overnight repos and MMF shares could only be tamed by setting up emergency facilities and guarantees by the Fed and the US Treasury—measures which had been unprecedented so far and amounted to establishing ad hoc public backstops for overnight repos and MMF shares functionally similar to those for bank deposits (Murau 2017a).

From the offshore perspective, the Eurodollar market and the FX swap market faced severe strains as holders of USD-denominated offshore credit money sought to convert it onshore (cf. Goldberg et al. 2010). This became evident in the LIBOR-OIS spread, i.e. differences between the interest charged on offshore and onshore USD deposits which prior to the crisis had been virtually nonexistent (Mehrling 2015: 317). Figure 22—taken from Mehrling (2015: 318)—highlights these strains in relation to the three waves of the crisis.

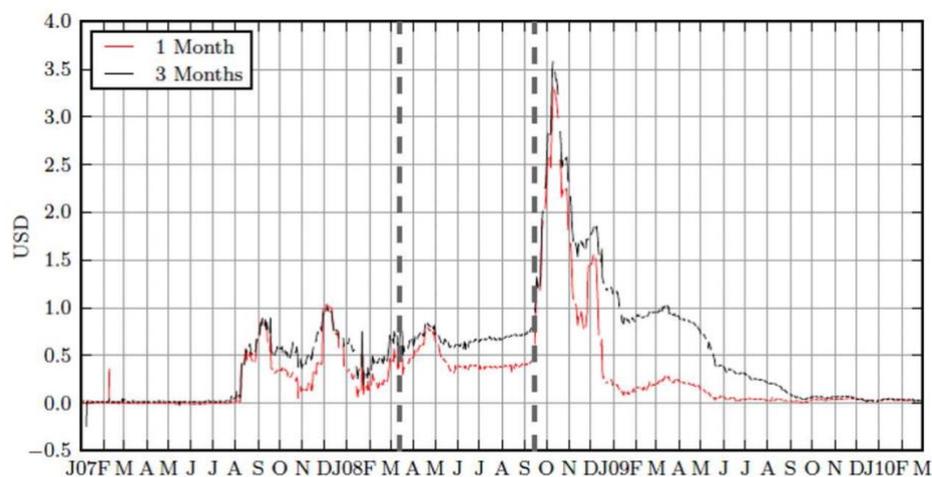


Figure 22—The LIBOR-OIS spread in the 2007-9 Financial Crisis

To react to this offshore dimension of the run, the Fed created swap lines with those central banks in whose monetary jurisdictions offshore dollar creation had been taking place. The goal was to channel emergency USD liquidity to non-US banks that did not have access to the Fed's discount window (Bordo et al. 2015). Effectively, the Fed turned the non-US central banks into its own branches that were able to create USD public credit money ex nihilo and pass it on to the banks and shadow banks in their monetary jurisdiction that had created offshore dollars and were in dire need for emergency liquidity assistance (Mehrling 2015b). Through these actions, the Fed became effectively the world's lender of last resort (Broz 2015).

Figure 23—taken from Miu et al. (2013), and compiled on the basis of Federal Reserve data—presents an overview on the lending activities of the emergency swap lines during the 2007-9 Financial Crisis, indicating a massive peak in September 2008 when Lehman Brothers collapsed. At this time, the main drawings were from the ECB with 314 billion USD, the BoJ with 128 billion USD and the BoE with 95 billion USD (Denbee et al. 2016:9).

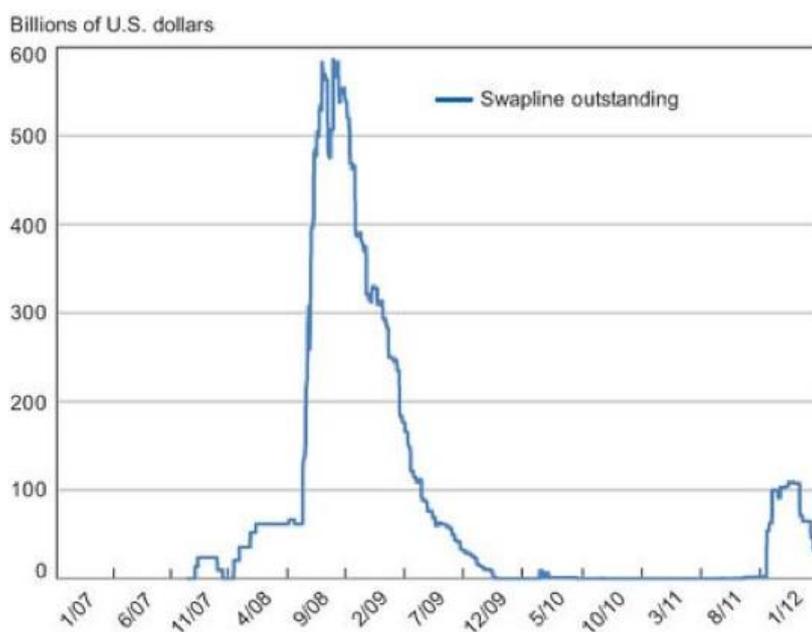


Figure 23—Amount outstanding at the Fed's swap facility, 2007-2012

Formally, the swap lines are reciprocal. This implies that not only the ECB is able to create USD upon its discretion but also the Fed could create EUR if deemed necessary. Effectively, however, the swap lines are used to provide USD to non-US central banks (cf. Interviews A, B, I, J). In this, the swap lines were not a novel instrument at all. The Fed had been using swap lines since 1961 to manage balance of payments needs in the context of the Bretton Woods System. The emergency swap lines set up in 2007 follow up on this previous system, but in a fundamentally different way. The official rhetoric is that, instead of financing balance of payments deficits, they are a means to ensure global financial stability via financing global lender-of-last-resort operations in USD (Bordo et al. 2015; Destais 2016; Interview A).

From a Money View perspective, these central bank swap lines imply the creation of public credit money on the respective central banks' balance sheets—a transaction that in some respects can be thought of in functional analogy to an FX swap (cf. Mehrling 2015: 318-319). The central bank swaps involve two transactions: Today, on the spot, the non-US central bank (e.g. the ECB) sells a specific amount of its currency (e.g. the EUR) at the prevailing market exchange rate to the Fed in exchange for USD. Both central banks agree to reverse the transaction at a future point in time at the same exchange rate, plus an interest rate to the Fed. The maturities for those USD liquidity swaps range between overnight to three months (Federal Reserve Board 2017). Figure 24 depicts the creation of central bank swaps as a swap of IOUs to explain why they correspond to a form of offshore public credit money creation, bearing in mind that the transaction eventuates upon the initiative of the foreign central banks:

| Federal Reserve | | ECB | |
|--------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|
| + USD CB deposit (short-term IOU) | + EUR CB deposit (longer-term IOU) | + EUR CB deposit (longer-term IOU) | + USD CB deposit (short-term IOU) |

Figure 24—Central bank swaps as public credit money creation offshore

With the transformation of the ad hoc created emergency swap lines to the permanent network of C6 swap lines, the hierarchical setting of central banks and the units of account they are issuing their credit money in has been further formalized, with the Fed at the top of the international hierarchy (Mehrling 2015c). At the layer below the C6 swap lines, other bilateral swaps are located as well as regional pooling institutions and IMF facilities, followed by various other domestically created forms of credit money. Notably, the ECB, the BoJ and the SNB have also established emergency swap lines with more ‘peripheral’ monetary jurisdictions to provide emergency liquidity in their respective units of account. This can be seen in analogy to developments in Asia where an extensive network of swaps has emerged in the 2000s with the Chiang Mai Initiative, which has further been developed through swaps lines set up by the People’s Bank of China (PBoC) (Bordo et al. 2015). Figure 25 portrays the C6 Swap Lines in greater detail. Accordingly, the Federal Reserve—situated in the apex of the system—holds unlimited lines for credit money creation with the BoE, the ECB, the SNB, the BoJ and the BoC:

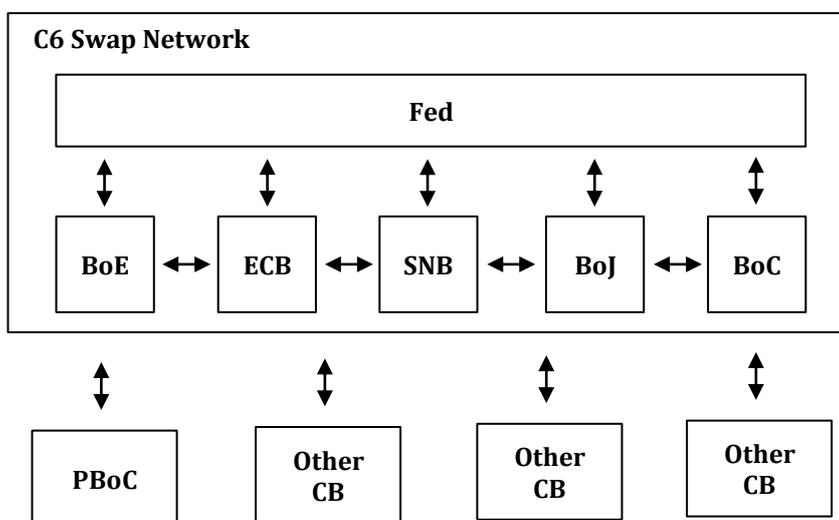


Figure 25—Structure of the hierarchical C6 swap network

Figure 26—taken from Denbee et al. (2016:10)—visualizes the shape of the global central bank swap network that has emerged out of the 2007-9 Crisis from a systems perspective. As the network graphic indicates, the Fed’s C6 swap network connects the eminent monetary jurisdiction and has the highest potential volume. However, other nodes in the system have emerged as well, most notably China as the PBoC has built up a substantial network of 31 swap lines, among others to promote RMB internationalization (ibid; also see Bernes et al. 2014; Volz 2016). It visualizes how, in a process driven by public decisions in reaction to the dynamics of a defaulting private credit money system, new arrangements to create offshore public credit money have developed.

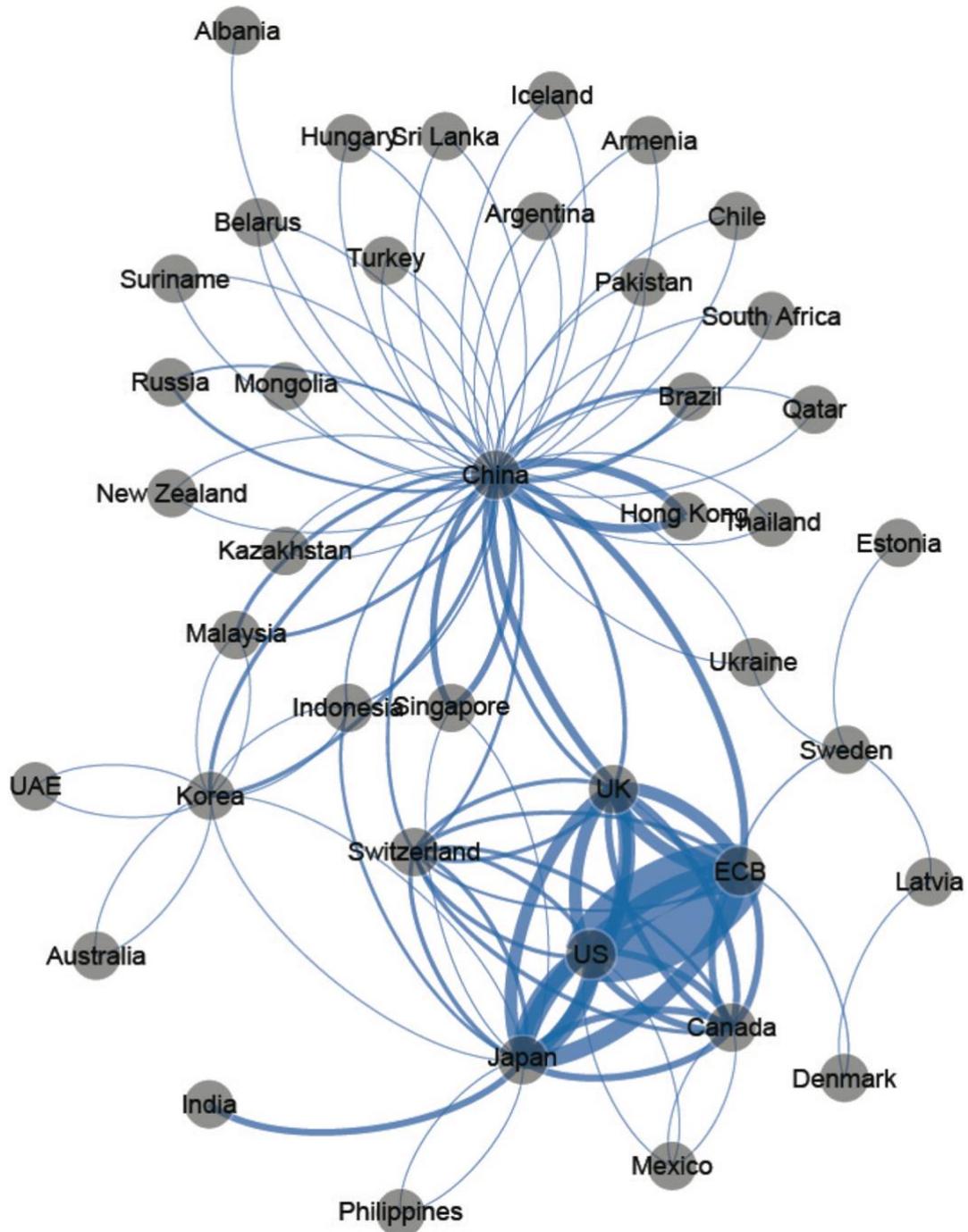


Figure 26—The global central bank swaps network as of October 2015

4. Conclusion: The post-2008 International Monetary System

This paper has set out to develop a systematic credit money perspective on the contemporary IMS. In contrast to the prevalent notion that today’s IMS is a non-system and lacks the ability to provide genuine international liquidity, the paper started with the conceptual argument—rooted in the Money View framework—that the actual core for international credit money creation in the IMS is the offshore dollar realm. This is the place where the international liquidity necessary for the age of financial globalization can be created out of thin air while using the USD as the unit of account outside the US’s monetary jurisdiction (section 2). Based on this conceptual idea, section 3 has mapped the setup of the offshore dollar realm and sketched its institutional development since the 1950s. The offshore dollar realm first became occupied by private credit money forms, with Eurodollars developing in the 1950s, shadow money forms such as overnight repos, MMF shares and ABCPs in the 1970s, and FX swaps in the 1980s. Since the 2007-9 Financial Crisis, also public credit money occupies the offshore dollar realm which is created on non-US central banks’ balance sheets via the unlimited C6 swap lines. Today, therefore, the offshore dollar realm fully mirrors the domestic US monetary system as a public-private hybrid. It is made up of the money-like IOUs of central banks, commercial banks and shadow banks. Figure 27 synthesizes this view and presents an institutionalist take on the current setup of today’s IMS.

International Credit Money Supply

| Onshore Dollar Realm | Offshore Dollar Realm | Other Monetary Areas |
|--|---|---|
| USD-denominated credit money issued in the US | USD-denominated credit money issued outside the US | Non-USD-denominated credit money issued outside the US |
| Federal Reserve IOUs • Fed deposits • Fed currency → since 1913 | Non-US central bank IOUs • Eurodollar CB deposits → since 2008 | Non-US central bank IOUs • Non-USD CB deposits • Non-USD currency |
| US commercial bank IOUs • US wholesale deposits • US retail deposits → since 19 th century | Non-US commercial bank IOUs • Eurodollar deposits → since 1957 | Non-US commercial bank IOUs • Non-USD bank deposits |
| US shadow bank IOUs • MMF shares • (Overnight) repos → since 1970s | Non-US shadow bank IOUs • Offshore MMF shares • FX Swaps → since 1980s | Non-US shadow bank IOUs • Non-USD shadow money |

Figure 27—Setup of today’s International Monetary System (empirically)

With its take on how offshore dollar creation emerged historically, the paper has adopted a functionalist perspective on monetary transformation which comes along with a political economic interpretation of the Money View framework (cf. Murau 2017a, 2017b). From this functionalist point of view, new forms of private credit money develop in conjunction with the dissemination of the monetary system as a self-referential network of expanding yet unstable debt claims. The emergence of offshore commercial bank and shadow bank IOUs is an expression of how profit-driven private financial institutions ‘tapped’ loopholes to further advance their business opportunities and via financial innovation contributed to an expansion of the monetary system. The innovations in the market for offshore USD deposits were re-definitions of pre-existing structures. The Eurodollar market, in its early form, was built upon the mechanisms of the 19th century London bills market. First, the City-Treasury-Bank of England nexus used to re-establish London as a financial center after

the Second World War. From the 1970s onwards, large American banks appropriated the structures in London and turned the Eurodollar market effectively into an offshore version of the New York money market to circumvent U.S. onshore restrictions. Similarly, the emergence of shadow money exploited regulatory loopholes to circumvent US banking regulation that had resulted from the New Deal banking reforms. Repos, for example, had existed since the 1950s, if not since the 19th century. Via the tri-party repo market, they were turned into systematic deposit substitutes from the 1970s onwards.

Complementary to its expansionary tendency, it is a necessity deeply engrained in the logic of the credit money system that the expansion of the debt network has to come to a halt at some point and start reverting itself. This happened in the 2007-9 Financial Crisis—the Minsky moment in which a run on USD-denominated onshore shadow money as well as the offshore dollar realm emerged. In this case, the monetary system’s implosion could only be avoided by an ‘external’ intervention by public institutions to preserve the system. Technocratic elites—in this case via the Federal Reserve—had to react to the run on shadow money and the Eurodollar market as issue-specific problems framed in a highly technical way. They established the emergency swap lines driven by functional necessities, in response to the endogenous unfolding of the disintegration of the credit money system (cf. Murau 2017a). Those emergency swap lines used pre-existing swap lines as their basis which had been in place since the Bretton Woods era as a means of influencing the balance of payments. In the aftermath of the crisis, the Fed consolidated and streamlined the structures set up via the immediate crisis intervention by developing the C6 swap lines, thus creating the post-crisis IMS as depicted in Figure 26.

Figure 28—taken from Borio (2017)—presents a summarizing empirical view on how the offshore realm developed in quantitative terms from 2000 to 2016.

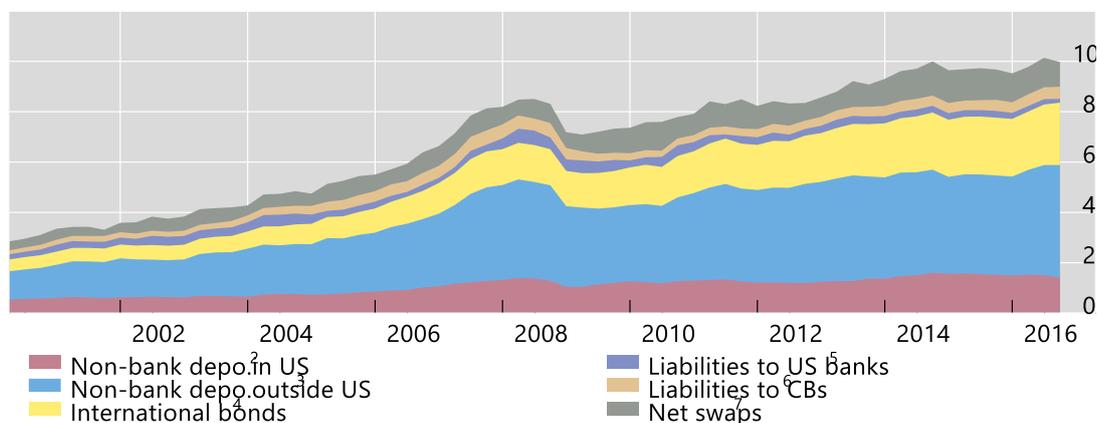


Figure 28—Dollar funding of non-US banks (amounts outstanding, trillion USD)

The conceptual and empirical arguments of this paper may provide the starting point for further research. Three aspects stand out in particular:

First, the conceptualization of FX swaps as offshore shadow money is a contribution that connects the up and coming debate on FX swaps, which for a long time have been off the radar of academics (cf. Stenfors 2017), with the literature on shadow money (cf. Gabor and Vestergaard 2017). The argument that FX swaps represent a form of shadow money—or are on the way towards developing into a shadow money form—is based on considerations in particular of Borio et al. (2017) and Pozsar (2017a-c). It sharpens their position and puts it in the context of a conceptual discussion about the shape of the IMS. At the same time, the argument requires further scrutiny, both from a conceptual and an empirical point of view.

Second, the functionalist theory of the monetary system as a self-referential network of expanding yet unstable debt claims may be seized by other research strands such as systems science. The credit money system, with its ability to create money out of thin air, may be said to correspond to the logic of an autopoietic system (Luhmann 1986) and can thus be used as a case study to analyze the behavior of complex adaptive systems. In its expansionary phase, the credit money system, understood from a Money View perspective, exploits regulatory loopholes via financial innovation, ‘taps’ new legal spaces—onshore and offshore—and brings forth new forms of private credit money. Once the expansionary phase comes to an end, a contraction sets in in the form of a crisis and the system must potentially be stabilized and backstopped through the intervention of public authorities. In the 2007-9 Financial Crisis, this occurred domestically for shadow money with the interventions by the Fed and the Treasury (Murau 2017a) as well as internationally, as depicted in Section 3.3 of this paper, via the Fed’s emergency swap lines. The switch from the expansionary to the contractionary state of the system can be thought of as the persistent prevalence of systemic risk, which in the case of the IMS even extends to global dimensions. Renn et al. (2017) provide a starting point for the study of global systemic risks, which may potentially be merged with the conceptual ideas of the Money View.

Third, the depiction of the contemporary setup of the IMS with a focus on offshore dollar creation provides the starting point for more policy-oriented work that seeks to evaluate the future of the IMS. This has been a recurring theme in IPE and international economics, with various positions repeatedly being brought forth (cf. e.g. Farhi, Gourinchas and Rey 2011; Eichengreen, Mehl and Chițu 2018). However, none of these positions has so far taken into account the outstanding role of offshore dollar creation. If we follow the strand of thinking proposed in this paper, which argues that the offshore dollar realm is the main source of credit money creation in the IMS, we may ask: What will be the future of offshore dollar creation? To deal with this question, Murau, Rini and Haas (2018)—in a IASS Discussion Paper complementary to this one—develop four scenarios about what the IMS could look like by 2040, using the present post-2008 setup as its starting point: In the Continued Dollar Hegemony scenario, we depict the sustained dominance of private international money creation via offshore dollars within the Pax Americana. In the Competing Monetary Blocs scenario, we envision the US, the EU and China as three gravitational centers with private international money creation in the blocs’ peripheries via offshore dollars, offshore euros and offshore renminbi, respectively. In the International Monetary Federation scenario, we sketch a situation in which countries have created a strong publicly organized IMS, comprising a multilateral framework of one international and several regional clearing unions, based upon Keynes’ ideas for an International Clearing Union. Finally, with the scenario of an International Monetary Anarchy, we portray what an actual ‘non-system’ could look like, in a post-crisis situation with a substantial breakdown of public and private international monetary cooperation and creation.

Literature

Acharya, Viral V., Schnabl, Philipp, and Suarez, Gustavo A. (2010) Securitization without Risk Transfer, National Bureau of Economic Research, Working Paper 15730.

Aizenman, Joshua, Jinjark, Yothin, and Park, Donghyun (2011) 'International Reserves and Swap Lines. Substitutes or Complements?', *International Review of Economics and Finance* 20 (1), pp. 5-18.

Aizenman, Joshua and Pasricha, Gurnain K. (2010) 'Selective Swap Arrangements and the Global Financial Crisis. Analysis and Interpretation', *International Review of Economics and Finance* 20 (1), pp. 353-375.

Allen, William A. and Moessner, Richhild (2010) Central Bank Co-Operation and International Liquidity in the Financial Crisis of 2008-9, Bank for International Settlements, BIS Working Papers No. 310.

Arnon, Arie (2011) *Monetary Theory and Policy from Hume and Smith to Wicksell. Money, Credit, and the Economy*, Cambridge: Cambridge University Press.

Avdjiev, Stefan, McCauley, Robert, and Shin, Hyun Song (2015) Breaking Free of the Triple Coincidence in International Finance, Bank for International Settlements, BIS Working Papers No. 524.

Awrey, Dan (2017) 'Brother, Can You Spare a Dollar? Designing an Effective Framework for Foreign Currency Liquidity Assistance', *Columbia Business Law Review* (forthcoming), 20 April 2017.

Baba, Naohiko and Packer, Frank (2008) Interpreting Deviations from Covered Interest Parity During the Financial Market Turmoil of 2007-08, Bank for International Settlements, BIS Working Papers No 267.

Bell, Geoffrey (1973) *The Euro-Dollar Market and the International Financial System*, New York and London: John Wiley.

Bernes, Thomas A. et al. (2014) China's Engagement with an Evolving International Monetary System. A Payments Perspective, Centre for International Governance Innovation (CIGI) and Institute for New Economic Thinking (INET), Special Report.

Bibow, Jörg (2008) The International Monetary (Non-)Order and the 'Global Capital Flows Paradox', Levy Economics Institute, Working Paper No. 531.

Bordo, Michael D., Humpage, Owen F., and Schwartz, Anna J. (2014) The Evolution of the Federal Reserve Swap Lines Since 1962, National Bureau of Economic Research, Working Paper 20755.

Borio, Claudio (2014) The International Monetary and Financial System. Its Achilles Heel and What to Do About It, Bank for International Settlements, BIS Working Papers No 456.

- Borio, Claudio, McCauley, Robert, and McGuire, Patrick** (2017) 'FX Swaps and Forwards. Missing Global Debt?', BIS Quarterly Review September 2017, pp. 37-54.
- Braun, Benjamin and Krampf, Arie** (2017) Unlimited Protection for the West, Conditionality for the Rest? The Political Economy of the Global Financial Safety Net, Harvard University, Paper prepared for the ISA Annual Convention, February 22-25, Baltimore.
- Breedlove, John P.** (1982) 'International Banking Facilities – A Pacific Perspective', Pacific Basin Law Journal 1 (2), pp. 285-301.
- Broz, J. Lawrence** (2015) 'The Politics of Rescuing the World's Financial System: The Federal Reserve as a Global Lender of Last Resort', Korean Journal of International Studies 13 (2), 323-51.
- Burn, Gary** (2006) The Re-Emergence of Global Finance, London: Palgrave Macmillan.
- Calomiris, Charles W., Marc Flandreau, and Luc Laeven.** 2016. "Political foundations of the lender of last resort: a global historical narrative." Journal of Financial Intermediation 28: 48-65.
- Chen, Jiakai** (2015) Off-Balance Sheet Financing and Bank Capital Regulation. Lessons from Asset-Backed Commercial Paper, Haas School of Business, UC Berkeley, Job Market Paper.
- Claessens, Stijn et al.** (2012) Shadow Banking. Economics and Policy, International Monetary Fund, IMF Staff Discussion Paper SDN/12/12.
- Coffey, Niall, Hrungr, Warren B., Nguyen, Hoai-Luu and Sarkar, Asani** (2009) 'The Global Financial Crisis and Offshore Dollar Markets', Current Issues in Economics and Finance 15 (6), pp. 1-7.
- Cohen, Benjamin J.** (1998) The Geography of Money, Ithaca and London: Cornell University Press.
- Cohen, Benjamin J.** (2008) Global Monetary Governance, New York: Routledge.
- Comotto, Richard** (2017) Are FX Swaps and Forwards Missing Global Debt? Why the BIS is Wrong, ICMA Centre, ICBlog, 22 September 2017
- Covitz, Daniel M., Liang, Nellie, and Suarez, Gustavo A.** (2009) The Evolution of a Financial Crisis. Panic in the Asset-Backed Commercial Paper Market, Federal Reserve Board, Finance and Economics Discussion Series 2009-36.
- Denbee, Edd, Carsten Jung, and Francesco Paternò.** 2016. "Stitching together the global financial safety net" Financial Stability Paper no. 36, London: Bank of England.
- De Rosa, David** (2014) Foreign Exchange Operations. Master Trading Agreements, Settlement, and Collateral, Hoboken: Wiley.
- Desan, Christine** (2014) Making Money. Coin, Currency, and the Coming of Capitalism, Oxford: Oxford University Press.
- Destais, Christophe** (2016) Central Bank Currency Swaps and the International Monetary System', Emerging Markets Finance and Trade 52 (10), pp. 2253-2266.
- Dooley, Michael P., Folkerts-Landau, David, and Garber, Peter** (2003) An Essay on the Revived Bretton Woods System, National Bureau of Economic Research, NBER Working Paper 9971.

Duran, Camila Villard (2015a) The International Lender of Last Resort for Emerging Countries. A Bilateral Currency Swap?, University of Oxford, Global Economic Governance Programme, CEG Working Paper 2015/108.

Duran, Camila Villard (2015b) Avoiding the Next Liquidity Crunch. How the G20 Must Support Monetary Cooperation to Increase Resilience to Crisis, University of Oxford, Global Economic Governance Programme, Policy Brief October 2015.

Eichengreen, Barry J. (2007) Global Imbalances and the Lessons of Bretton Woods, Cambridge: MIT Press.

Eichengreen, Barry J. (2008) Globalizing Capital. A History of the International Monetary System, Princeton: Princeton University Press.

Eichengreen, Barry J. (2014) International Currencies Past, Present and Future. Two Views from Economic History, Bank of Korea, BOK Working Paper No. 2014-31.

Eichengreen, Barry J., Mehl, Arnaud and Chițu, Livia (2018) How Global Currencies Work. Past, Present and Future, Princeton: Princeton University Press.

Einzig, Paul (1964) The Euro-dollar System, London: Macmillan.

Farhi, Emmanuel, Gourinchas, Pierre-Olivier, and Rey, Hélène (2011) Reforming the International Monetary System, London: Centre for Economic Policy Research (CEPR).

Federal Reserve Board (2017) Credit and Liquidity Programs and the Balance Sheet, 24 May 2017, Washington (DC); https://www.federalreserve.gov/monetarypolicy/bst_liquidityswaps.htm (accessed 14 June 2017).

Federal Reserve Bank of New York (2017) Central Bank Liquidity Swaps, New York (NY); https://www.newyorkfed.org/markets/liquidity_swap.html (accessed 14 June 2017).

FitchRatings (2001) Asset-Backed Commercial Paper Explained, FitchRatings, Asset-Backed Criteria Report.

Friedman, Milton (1969) The Euro-Dollar Market. Some First Principles, University of Chicago, Selected Papers No. 34.

FSB (2011) Shadow Banking. Scoping the Issues, Financial Stability Board, Background Note, 12 April 2011.

Gabor, Daniela (2016) 'The (Impossible) Repo Trinity. The Political Economy of Repo Markets', Review of International Political Economy 23 (6), pp. 967-1000.

Gabor, Daniela (2017) 'Is the BIS Wrong about FX Swaps and Forwards as Missing Debt?', unpublished manuscript, September 2017.

Gabor, Daniela and Vestergaard, Jakob (2016) Towards a Theory of Shadow Money, Institute for New Economic Thinking, INET Working Paper.

Gallarotti, Giulio M. (1995) The Anatomy of an International Monetary Order. The Classical Gold Standard, 1880-1914, Oxford and New York: Oxford University Press.

Garbade, Kenneth D. (2006) 'The Evolution of Repo Contracting Conventions in the 1980s', Economic Policy Review 12 (1), pp. 27-42.

- Gilpin, Robert** (1987) *The Political Economy of International Relations*, Princeton: Princeton University Press.
- Goldberg, Lisa S., Kennedy, Craig, and Miu, Jason** (2010) *Central Bank Dollar Swap Lines and Overseas Dollar Funding Costs*, National Bureau of Economic Research, Working Paper 15763.
- Goodfriend, Marvin** (1993) 'Eurodollars', in: Timothy Q. Cook and Robert K. Laro (ed.) *Instruments of the Money Market*, Richmond: Federal Reserve Bank of Richmond, pp. 48-58.
- Haberly, Daniel and Wójcik, Dariusz** (2017) 'Culprits or Bystanders? Offshore Jurisdiction and the Global Financial Crisis', *Journal of Financial Regulation* 3 (2), pp. 233-261.
- Haldane, Andrew G.** (2014) *Managing Global Finance as a System*, Bank of England, Maxwell Fry Annual Global Finance Lecture, Birmingham University.
- Hannam, Mark** (2008) *The Case for Central Bank Liquidity Facilities for Institutional Money Market Funds in the Offshore Market*, Institutional Money Market Fund Association, Essay, available at <http://www.markhannam.com/essays/essay7a.htm> (17 January 2018)-
- Haas, Armin, Murau, Steffen and Rini, Joe** (2018) *On Tight and Loose Coupling in the International Monetary System*, Institute for Advanced Sustainability Studies, IASS Working Paper (forthcoming).
- Haberly, Daniel and Wójcik, Dariusz** (2017) 'Culprits or Bystanders? Offshore Jurisdiction and the Global Financial Crisis', *Journal of Financial Regulation* 3 (2), pp. 233-261.
- Hahn, Frank** (1984) *Money and Inflation*, Cambridge: MIT Press.
- Hayek, Friedrich August von** (1976 [1990]) *Denationalisation of Money - The Argument Refined. An Analysis of the Theory and Practice of Concurrent Currencies*, London: The Institute of Economic Affairs.
- He, Dong and McCauley, Robert** (2012) *Eurodollar Banking and Currency Internationalisation*, Bank for International Settlements, BIS Quarterly Review June 2012.
- Helleiner, Eric** (1994) *States and the Reemergence of Global Finance. From Bretton Woods to the 1990s*, Ithaca and London: Cornell University Press.
- Henning, C. Randall** (2015) *The Global Liquidity Safety Net. Institutional Cooperation on Precautionary Facilities and Central Bank Swaps*, Centre for International Governance Innovation, New Thinking and the New G20 Series Paper No. 5.
- International Monetary Fund** (2016a) *Strengthening the International Monetary System—A Stocktaking*, Washington D.C.: International Monetary Fund.
- International Monetary Fund** (2016b) *Adequacy of the Global Financial Safety Net*, Washington D.C.: International Monetary Fund.
- Jackson, Patricia** (2013) 'Shadow Banking and New Lending Channels - Past and Future', in: Morten Balling and Ernest Gnan (ed.) *50 Years of Money and Finance. Lessons and Challenges*, Vienna: SUEF - The European Money and Finance Forum, pp. 377-414.
- Jaeger, Carlo C., Haas, Armin, and Töpfer, Klaus** (2013) *Sustainability, Finance, and a Proposal from China*, Institute for Advanced Sustainability Studies, IASS Working Paper December 2013.

Jones, Phillipa (1997) 'The Fight for Tri-Party Repo', *iCB* 13 (4), pp. 28-33.

Kaminska, Izabella (2015) Petrodollars are Eurodollars, and Eurodollar Base Money is Shrinking, *Financial Times Alphaville*, 25 January 2016, available at <https://ftalphaville.ft.com/2016/01/25/2151037/petrodollars-are-eurodollars-and-eurodollar-base-money-is-shrinking/> (10 January 2018).

Kindleberger, Charles P. (1970) *Power and Money. The Economics of International Politics and the Politics of International Economics*, New York: Basic Books.

Knafo, Samuel (2013) *The Making of Modern Finance. Liberal Governance and the Gold Standard*, Abingdon: Routledge.

Knapp, Georg Friedrich (1905) *Staatliche Theorie des Geldes*, Leipzig: Duncker & Humblot.

Luhmann, Niklas (1986) 'The Autopoiesis of Social Systems', in: Van Der Zouwen, Johannes and Geyer, Felix (eds.) *Sociocybernetic Paradoxes. Observation, Control and Evolution of Self-Steering System*, London: SAGE Publications, pp. 172-192.

Mateos y Lago, Isabelle, Duttagupta, Rup and Goyal, Rishi (2009) *The Debate on the International Monetary System*, International Monetary Fund, IMF Staff Position Note, 11 November 2009, Washington (DC).

McCulley, Paul (2009) 'The Shadow Banking System and Hyman Minsky's Economic Journey', *PIMCO. Global Central Bank Focus*.

McDowell, Daniel (2012) 'The US as 'Sovereign International Last-Resort Lender'. The Fed's Currency Swap Programme during the Great Panic of 2007-09', *New Political Economy* 17 (2), pp. 157-178.

McDowell, Daniel (2016) *Brother, Can you Spare a Billion? The United States, the IMF, and the International Lender of Last Resort*, Oxford and New York: Oxford University Press.

McGuire, Patrick and von Peter, Goetz (2009a) *The US Dollar Shortage in Global Banking*, Bank for International Settlements, *BIS Quarterly Review* March 2009.

McMillan, Jonathan (2014) *The End of Banking. Money, Credit, and the Digital Revolution*, Zero/One Economics GmbH.

Mehrling, Perry (2000) 'Modern Money. Fiat or Credit?', *Journal of Post Keynesian Economics* 22 (3), pp. 397-406..

Mehrling, Perry (2011) *The New Lombard Street. How the Fed Became the Dealer of Last Resort*, Princeton and Oxford: Princeton University Press.

Mehrling, Perry (2012) 'The Inherent Hierarchy of Money', in: Lance Taylor, Armon Rezai, and Thomas Michl (ed.) *Social Fairness and Economics. Economic Essays in the Spirit of Duncan Foley*, Oxon and New York: Routledge, pp. 394-404.

Mehrling, Perry (2013a) 'Essential Hybridity. A Money View of FX', *Journal of Comparative Economics* 41 (2), pp. 355-363.

Mehrling, Perry (2013b) 'Financial Globalization and the Future of the Fed', in: Toshiaki Hirai, Maria Cristina Marcuzzo, and Perry Mehrling (ed.) *Keynesian Reflections. Effective Demand, Money, Finance, and Policies in the Crisis*, Oxford University Press, pp. 268-285.

Mehrling, Perry (2015) 'Elasticity and Discipline in the Global Swap Network', *International Journal of Political Economy* 44 (4), pp. 311-324.

Mehrling, Perry G. (2016) 'Beyond Bancor', *Challenge* 59 (1), pp. 22-34.

Mehrling, Perry G. (2017) 'Financialization and Its Discontents', *Finance and Society* 2 (2), pp. 138-150.

Mehrling, Perry and Tooze, Adam (2016) *Global Money*, Columbia University New York, Discussion Paper.

Meier, Gerald (1974) *Problems of a World Monetary Order*, Oxford and New York: Oxford University Press.

Michell, Jo (2016) Do Shadow Banks Create Money? 'Financialisation' and the Monetary Circuit, Post Keynesian Economics Study Group, Working Paper 1605.

Minsky, Hyman P. (1980) 'Capitalist Financial Processes and the Instability of Capitalism', *Journal of Economic Issues* 14 (2), pp. 505-523.

Minsky, Hyman P. (1986) *Stabilizing an Unstable Economy*, New Haven and London: Yale University Press.

Miu, Jason, Sarkar, Asani, and Tepper, Alexander (2012) The European Debt Crisis and the Dollar Funding Gap, Federal Reserve Bank of New York, Liberty Street Economics Blog August 8, 2012.

Mitchell-Innes, Alfred (1914) 'The Credit Theory of Money', *The Banking Law Journal* 31, pp. 151-168.

Moore, Basil J. (1988) *Horizontalists and Verticalists. The Macroeconomics of Credit Money*, Cambridge: Cambridge University Press.

Mundell, Robert A. (1960) 'The Monetary Dynamics of International Adjustment under Fixed and Flexible Exchange Rates', *Quarterly Journal of Economics* 74 (2), pp. 227-257.

Mundell, Robert A. (1972) 'The Future of the International Financial System', in: A. L. Keith Acheson, John F. Chant, and Martin F. J. Prachowny (ed.) *Bretton Woods Revisited*, London: Macmillan, pp. 91-104.

Mundell, Robert A. (2000) 'A Reconsideration of the Twentieth Century', *The American Economic Review* 90 (3), pp. 327-340.

Murau, Steffen (2017a) 'Shadow Money and the Public Money Supply. The Impact of the 2007-2009 Financial Crisis on the Monetary System', *Review of International Political Economy* 24 (5), pp. 802-838.

Murau, Steffen (2017b) 'The Political Economy of Private Credit Money Accommodation. A Study of Bank Notes, Bank Deposits and Shadow Money', PhD thesis, City, University of London, London, November 2017.

Murau, Steffen, Rini, Joe and Haas, Armin (2018) 'The Future of Offshore Dollar Creation. Four Scenarios for the International Monetary System by 2040', Institute for Advanced Sustainability Studies, IASS Discussion Paper, May 2018..

- Nesvetailova, Anastasia** (2015) 'A Crisis of the Overcrowded Future. Shadow Banking and the Political Economy of Financial Innovation', *New Political Economy* 20 (3), pp. 431-453.
- Nutting, Rex** (2013) Money-Market Funds are a Most Dangerous Investment, *Market Watch*, Blog.
- Oatley, Thomas et al.** (2013) 'The Political Economy of Global Finance. A Network Model', *Perspectives on Politics* 11 (1), pp. 133-153.
- Ocampo, José A.** (2015) *Reforming the Global Monetary Non-System*, United Nations University World Institute for Development Economics Research, WIDER Working Paper 2015/146.
- Ocampo, José A.** (2018) *Resetting the International Monetary (Non)System*, Oxford: Oxford University Press.
- Palan, Ronen** (1998) 'Trying to Have Your Cake and Eating It. How and Why the State System Has Created Offshore', *International Studies Quarterly* 42 (4), pp. 625-643.
- Palan, Ronen, Murphy, Richard, and Chavagneux, Christian** (2010) *Tax Havens. How Globalization Really Works*, Ithaca and London: Cornell University Press.
- Pozsar, Zoltan** (2008) 'The Rise and Fall of the Shadow Banking System', *Moody's Regional Financial Review* July 2008 pp. 13-25.
- Pozsar, Zoltan** (2014) *Shadow Banking. The Money View*, Office of Financial Research, Working Paper.
- Pozsar, Zoltan** (2015) *A Macro View of Shadow Banking. Levered Betas and Wholesale Funding in the Context of Secular Stagnation*, Institute for New Economic Thinking, Working Paper, 31 January 2015.
- Pozsar, Zoltan** (2017a) *Excess Reserves and Global Dollar Funding*, Credit Suisse, Global Money Notes #9.
- Pozsar, Zoltan** (2017b) *Sterilization of the Fracking of Reserves*, Credit Suisse, Global Money Notes #10.
- Pozsar, Zoltan** (2017c) *Dollar Funding after the Storm*, Credit Suisse, Discussion Paper, 8 December 2017.
- Pozsar, Zoltan and Sweeney, James** (2015) *The Money Market Under Government Control*, Credit Suisse, Global Money Notes #1.
- Pozsar, Zoltan, Adrian, Tobias, Ashcraft, Adam and Boesky, Hayley** (2012) *Shadow Banking*, Federal Reserve Bank of New York, Staff Report 458.
- Renn, Ortwin, Lucas, Klaus, Haas, Armin and Jaeger, Carlo** (2017) 'Things are Different Today. The Challenge of Global Systemic Risks', *Journal of Risk Research*, DOI: 10.1080/13669877.2017.1409252.
- Romer, Paul** (2016) *The Trouble with Macroeconomics*, Stern School of Business, New York University, Working Paper 14 September 2016.
- Rose, Andrew K.** (2007) 'A Stable International Monetary System Emerges. Inflation Targeting is Bretton Woods, Reversed', *Journal of International Money and Finance* 26 (5), pp. 663-681.

Rose, Andrew K. and Spiegel, Mark M. (2012) 'Dollar Illiquidity and Central Bank Swap Agreements During the Global Financial Crisis', *Journal of International Economics* 88 (2), pp. 326-340.

Scheubel, Beatrice, and Livio Stracca. 2016. "What do we know about the global financial safety net? Rationale, data and possible evolution" ECB Occasional Paper Series no. 177, Frankfurt: European Central Bank.

Schumpeter, Joseph Alois (1954 [2006]) *History of Economic Analysis*, New York: Oxford University Press.

Stenfors, Alexis (2017a) Bid-Ask Spread Determination in the FX Swap Market. Competition, Collusion or a Convention?, University of Portsmouth Business School, Working Papers in Economics & Finance 2017-03.

Stigum, Marcia and Crescenzi, Anthony (2007) *Stigum's Money Market*. Fourth Edition, New York: McGraw Hill.

Strange, Susan (1971) *Sterling and British Policy. A Political Study of an International Currency in Decline*, London and New York: Oxford University Press.

Strange, Susan (1986) *Casino Capitalism*, Oxford and New York: Basil Blackwell.

Toniolo, Gianni 2005. *Central bank cooperation at the Bank for International Settlements, 1930-1973*. Cambridge: Cambridge University Press.

Volz, Ulrich (2016) 'Toward the Development of a Global Financial Safety Net or a Segmentation of the Global Financial Architecture?', *Emerging Markets Finance and Trade* 52 (10), pp. 2221-2237.

Willms, Manfred (1976) 'Money Creation in the Euro-Currency Market', *Weltwirtschaftliches Archiv* 112 (2), pp. 201-230.

Whitesell, William and Collins, Sean (1995) A Minor Redefinition of M2, Board of Governors of the Federal Reserve System, Paper of the Monetary Affairs Division November 3, 1995.

Wyplosz, Charles (2010) 'Is the Era of the Dollar Over?', *Journal of Globalization and Development* 1 (2), Article 16, pp. 1-14.

Conference Presentations

Borio, Claudio (2017) What Is Wrong with the International Monetary and Financial System?, School for Oriental and African Studies, SOAS Conference 'Foreign Exchange Swaps in the Money and Financial Markets', 24 February 2017, London.

Gabor, Daniela (2017) Shadow Money and FX Swaps, School for Oriental and African Studies, SOAS Conference 'Foreign Exchange Swaps in the Money and Financial Markets', 24 February 2017, London.

Rajan, Raguram (2016) Rethinking the Global Monetary System, Lecture at the London School of Economics, 10 May 2016, London, available at <https://www.youtube.com/watch?v=SHnCazIdY6I> (17 January 2018)-

Shin, Hyun Song (2017) The Dollar, Bank Leverage and the Deviation from Covered Interest Parity, Lecture at Sciences Po Paris, 13 September 2017, available at: <https://livestream.com/sciencespo/events/7707197/videos/162710455> (13 December 2017)

Stenfors, Alexis (2017b) Uncovering the CIP from a Market Micro Foundation Perspective, School for Oriental and African Studies, SOAS Conference 'Foreign Exchange Swaps in the Money and Financial Markets', 24 February 2017, London.

Toporowski, Jan (2017) Currency Swaps and the Internationalisation of the Money Market, School for Oriental and African Studies, SOAS Conference 'Foreign Exchange Swaps in the Money and Financial Markets', 24 February 2017, London.

Interviews

Interview A, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 26 June 2017.

Interview B, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 26 June 2017.

Interview C, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 26 June 2017.

Interview D, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 27 June 2017.

Interview E, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 28 June 2017.

Interview F, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 28 June 2017.

Interview G, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 28 June 2017.

Interview H, Background talk with a member of staff at the Federal Reserve Board, Washington (DC), 28 June 2017.

Interview I, Background talk with a financial market practitioner, New York City (NY), 5 July 2017.

Interview J, Background talk with an academic of Columbia University New York, Martha's Vineyard, 12 July 2017.

Interview K, Background talk with an academic of the University of the West of England (UWE) Bristol, Bristol, 28 September 2018.

Interview L, Background talk with an academic of Sciences Po, Paris, Budapest, 20 October 2017.

Interview M, Background talk with an academic at City, University of London, London, 2 November 2017.

Interview N, Background talk with a former investment banker, London, 7 November 2017.

About the Author

Steffen Murau

Dr. Steffen Murau is a research associate at IASS and a postdoctoral fellow at the Weatherhead Center for International Affairs at Harvard University. He holds a Ph.D. in International Political Economy (IPE) from City, University of London, a Magister Artium in political science, philosophy and international law as well as a B.Sc. in Economics from Ludwigs-Maximilians-Universität München. During his PhD, Steffen taught political economy, international relations and economics at City, University of London, University College London and Columbia University, New York. Steffen has completed internships at Deutsche Bundesbank and Stiftung Wissenschaft und Politik (German Institute for International and Security Affairs).

ORCID ID: <https://orcid.org/0000-0002-3460-0026>



IASS Discussion Paper

June 2018

Institute for Advanced Sustainability Studies e.V. (IASS)

Berliner Strasse 130

14467 Potsdam

Tel: +49 (0) 331-28822-340

Fax: +49 (0) 331-28822-310

Email: media@iass-potsdam.de

www.iass-potsdam.de/en

Contact:

Steffen Murau: smurau@fas.harvard.edu

ViSdP: Prof. Dr Patrizia Nanz, Managing Scientific Director

Authorized to represent the institute

DOI: 10.2312/iass.2018.009

