

WHY IS WORLD MONEY WORLD MONEY? A VIEW FROM THE FUNCTIONS OF MONEY

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Why is World Money World Money?

A View from the Functions of Money

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Abstract:

The literature on currency internationalization, with its focus on the essential attributes of an international currency issuer, is largely inadequate for explaining what causes the currency of a country to be adopted and to remain as world money. This paper argues that embedded within the well-known framework of the functions of money – as a *medium of exchange*, *unit of account* and *store of value* – are fundamental assumptions about how Economics defines and understands money. Drawing on conventional and Post Keynesian approaches, it demonstrates that current theories of currency internationalization, and questions of international money more generally, are embedded in underlying theories of money that are very specific about the process through which currencies achieve and maintain an international position. It also finds that a better understanding of the functional approach to money can bring greater theoretical clarity to the positions of various authors on questions of international money. At the same time, it argues that shortfalls in both the conventional and Post Keynesian approaches to money are inevitably also transposed to the international level. These need to be addressed before a more comprehensive theory of currency internationalization can emerge.

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I. Introduction: The Question of International Money

At first glance, the question of what international money is rather straightforward. Utilizing Jevon's (1875) time-honored framework, an international currency is one that fulfills the three functions of money as a medium-of-exchange, unit-of-account and store of value at the international level. Economists further distinguish at the international level between the uses of money by private agents and by official actors such as central banks, leading to six international functions of money, outlined in Table 1 below. This provides for three private uses of money as a i) *vehicle currency*, ii) *invoicing currency* and iii) *investment currency*, and three public uses and as an iv) *intervention currency*, v) *reference currency* and vi) *reserve currency*.

Table 1: Functions of an international money

		Private use	Official use
1	Medium-of-exchange	Means of payment, vehicle currency	Intervention currency
2	Unit-of-account	Price setting, invoicing currency	Reference or anchor currency
3	Store-of-value	Investment and financing currency	Reserve currency

Source: Adapted from Krugman (1984), Subramanian (2013) and De Conti (2011)

The framework has proved beneficial to understand the uses of international currencies across the different functions as well as to measure the degree of internationalization of individual currencies. Economists have in fact long recognized the hierarchical relationship that exists among international currencies. In 1967, Kindleberger wrote that international currencies "stand in relationship to one another not as full equals, but in a hierarchical arrangement of ascending utility as international money".² Cohen (2012), for example, distinguish three tiers of international currency. At the top is the US dollar as the central world currency, fulfilling all six functions of money fully and extensively. It is followed by secondary currencies such as the euro and the yen, which also fulfill the six functions of money internationally but to a lesser extent than the dollar. Finally, there are third-tier international currencies such as the Australian and Canadian dollars and the Swiss franc, that have a more limited international use. The Swiss franc, for example, has a long-standing reputation as a safe-haven currency for investors.

When it comes to the question of international money, or the question of, for example, why the yen, euro or yuan are not international money to the same degree as the US dollar, the framework above is usually applied descriptively to measure how currencies compare by function, i.e. as a global payments, as an invoicing currency, or to denominate international debt obligations, such as in Wyplosz 2010; Williamson 2011. In addition to applying the framework descriptively, many authors then redirect the discussion away from the functions of money to focus on the essential characteristics or attributes of an international currency issuer, focusing on the US dollar and how it compares to potential rivals. For Cohen

² Charles P. Kindleberger, *The Politics of International Money and World Language* (The MIT Press, 2003), <https://doi.org/10.7551/mitpress/1977.003.0021>. (p4)

(2015), the US dollar is the leading international money because of the United States' 1) economic size 2) unrivaled "network externalities" in trade 3) the size, liquidity and openness of its financial markets, in addition to political and institutional factors such as its foreign policy ties, military reach and good governance (4 to 6). For Williamson (2012), similarly, the criteria are 1) economic size 2) a large "transactional network" 3) exchange convenience and liquidity and 4) confidence in the future value of the currency. Utilizing this approach, the authors then find that the *Eurozone* fulfills most of the criteria for international currency leadership but falls short because of the fragmentation of its financial markets as well as some loss of confidence in the currency following the 2009-2012 debt crises. Similarly, the *yuan* has enormous potential as a leading international currency, but limits on its convertibility and access to China's financial markets were slowing its expansion.³

These explanations are what Helleiner & Kirshner (2009) categorize as *market-based* theories of currency internationalization, which typically explain global currency leadership as a function of *confidence* in the value of a currency, *liquidity* – typically measured as transaction costs – and a large *transactional network*.⁴ Helleiner & Kirshner (2009) identify two other important approaches in the literature. *Instrumental approaches* are more concerned with the decisions of central banks with regards to the choice of reference and reserve currencies, as well as the governance and structure of the international monetary order established at Bretton Woods. Good examples of instrumental approaches are Aglietta et al. 2016 and Ocampo 2017.⁵ Thirdly, there are *geopolitical* approaches which see monetary dominance as an extension of empire and of global political and military ambitions. Susan Strange and Marcello de Cecco are among the leading scholars in this category.

The trouble with the *market-based* approaches most familiar in Economics is that they beg the question of how a currency attains the attributes of *confidence*, *liquidity* and a large *transactional network* in the first place. And were an issuer to attain all these attributes, does currency internationalization spontaneously follow? The standard answer is *no* as the international monetary system is subject to forces of inertia, such that once a currency is established as the central currency, it will remain there for a long-time, even after the issuer has declined as an economic power.⁶ The answer is also *yes*, as Eichengreen (2014) suggests in his study of the sterling-dollar transition that the lock-in effects favoring top currency have been exaggerated.⁷ Predications rooted in this approach can also be largely off the mark. Chinn & Frankel (2008), for example, using these same criteria, forecasted the *euro* displacing the *dollar* as an international reserve currency as early as 2015. Adding to the confusion is the fact that economists often draw on distinct underlying theoretical models of currency internationalization, leading to widely diverging views about questions of international money.⁸

What are these distinct underlying theoretical models? In reality, it is when looking beyond the attributes of international currency issuers that explicit and implicit elements from the underlying theories of money can be found in the literature. Cohen (2015), for example, argues that the principal factor

³ Agnès Bénassy-Quéré and Jean Pisani-Ferry, "Quel Système Monétaire International Pour Une Économie Mondiale En Mutation Rapide ?," *Working Papers*, Working Papers (CEPII research center, March 2011), <https://ideas.repec.org/p/cii/cepidt/2011-04.html>. (p19-20)

⁴ Eric Helleiner and Jonathan Kirshner, eds., *The Future of the Dollar*, Cornell Paperbacks (Ithaca: Cornell University Press, 2009). (p7)

⁵ Helleiner and Kirshner. (p12)

⁶ Paul Krugman, "The International Role of the Dollar: Theory and Prospect," NBER Chapters (National Bureau of Economic Research, Inc, 1984), (p268-9)

⁷ Barry Eichengreen, "International Currencies Past, Present and Future: Two Views from Economic History," *SSRN Electronic Journal*, 2014, p17

⁸ Helleiner and Kirshner, *The Future of the Dollar*. p2

sustaining the US dollar as an international currency is “above all, [its] unique advantages as an international store of value”, as reflected in sophisticated US financial markets and the liquidity and attractiveness of US debt obligations.⁹ This, of course, is distinct from the perspective adopted by McKinnon (2007), who argues that the US dollar owes its international position primarily to the need for one global medium-of-exchange that facilitates global flows in goods and capital, and that also serves as a reference currency for export-oriented emerging economies.¹⁰ In their early work on the euro, Portes & Rey (1998) adopt a similar position to that of Cohen’s (2015), arguing that the “future of the euro will be determined on the financial markets rather than on the goods markets.” They find that as euro securities markets become more integrated and transaction costs fall, the use of the euro as an international medium of exchange will also expand.¹¹ It is the store of value role of an international currency, for these latter authors, that primarily drives the medium of exchange role and unit of account roles.

What becomes apparent is that embedded in an otherwise neutral descriptive framework of the functions of money are fundamental assumptions about how Economics defines and understands money, and, by consequence, international money. While an understanding of the essential characteristics of an international currency issuer is important, it provides only a partial answer to the question of what causes the currency of a country to be adopted and to remain as world money. Refocusing the discussion on the functions of money provides greater theoretical clarity to the discussion of international money by bringing to the forefront basic questions embedded in monetary theory such as: What is money? What is its primary function? What are its secondary functions? What are the relationships or interdependencies between these functions? Answering these questions also provides a framework to better understand the positions adopted by leading economics on some of the most debated economic questions: is the US dollar at risk of losing its position as the central global currency? Can two or three global currencies co-exist? Could cryptocurrencies displace *fiat* money and serve as a credible alternative?

The objective of this paper is to discuss how current theories of currency internationalization are in fact rooted in underlying theories of money, and more specifically, in the debate on the functions of money. It will further argue that the conceptual issues and shortfalls associated with the underlying theories of money also carry over to the international level. The implication is that there is still some distance to go before a more comprehensive theory of currency internationalization can be developed to explain what causes a currency to be adopted and to remain world money. The paper is structured as follows: Section 2 sets out the debate on the functions of money covering, and limiting the discussion to, conventional and Post Keynesian approaches. Section 3 presents how current theories of international money are built on these same theoretical foundations. Section 4 provides an empirical review of the current international currency hierarchy from the functions perspective, identifying discreet but important shifts in the international monetary system. Section 5 applies the functional approach to specific cases of international money to reflect on its usefulness. Section 6 concludes.

⁹ Benjamin J. Cohen, “The Demise of the Dollar?: Plus Ça Change, plus c’est Pareil...,” *Revue de La Régulation*, no. 18 (October 19, 2015), (p5)

¹⁰ Ronald Ian McKinnon, “The US Current Account Deficits and the Dollar Standard’s Sustainability: A Monetary Approach,” *CESifo Forum* 08, no. 4 (2007): 12–23 (p12-13)

¹¹ Richard Portes and Helene Rey, “The Emergence of the Euro as an International Currency” (Cambridge, MA: National Bureau of Economic Research, February 1998), <https://doi.org/10.3386/w6424>.

II. Debate on the functions of money

The question of what causes the currency of a country to be adopted and to remain as world money cannot be answered without an understanding of the role and the functions of money. The question this section seeks to address is what is the defining function of money that causes anything to be adopted as money, what are the secondary functions and the relationships between the functions, as explained by monetary theory. It will limit the discussion to the standard approaches to money, covering conventional and Post Keynesian approaches.

The economics literature usually describes three functions of money. As a **medium-of-exchange** for the purposes of conducting trade and business transactions, as a **unit-of-account** to denominate and invoice payments, financial transactions and debt instruments, and as a **store-of-value**, for the purpose of savings and investment.¹² While these are hardly controversial, there is significant disagreement as to what constitutes the primary function of money, and the inter-relationships between the functions.

2.1 Conventional Approaches to Money

Conventional monetary theory stresses the primacy of the medium of exchange function, where all the functions of money can be derived from the medium-of-exchange function.¹³ This is because conventional approaches see money as originating in a decentralized barter economy, where transaction costs are high and where the double coincidence of wants is infrequent. Agents eventually select one commodity or object, seen as possessing inherent value or utility, as money, to facilitate the act of exchange, thanks to its special attributes of portability, divisibility, and other money-like characteristics.¹⁴ This medium-of-exchange, either a commodity itself, or a symbol representing a commodity or basket of commodities, then becomes the unit-of-account in which the value of all other goods and services is expressed.¹⁵ The *numéraire* as defined by Walras that serves to calculate the exchange ratio between money and all other commodities in an economy.¹⁶

This notion of money leads to one of the central tenets of conventional money theory concerning the exchange economy. This is that money, as a liquid and easily transacted commodity, serves as a substitute for what is in reality exchange of goods for goods in the underlying real economy. Ingham describes this conceptually as “object-object” relations,¹⁷ and it is equally stressed by Hayek: “[M]oney is in the strictest sense only an intermediary between definite quantities of goods”, writes Hayek, where “all the essential relations in the system are relations between goods (rates of substitution between certain quantities of goods determined by the total quantities of these goods.)”¹⁸ In addition to payments, credit and deferred payments are also understood in conventional approaches to be rooted in the medium of

¹² Josh RyanCollins et al., *Where Does Money Come from?: A Guide to the UK Monetary & Banking System.*, 2017. (p60-61)

¹³ Ludwig Von Mises, *The theory of money and credit*, trans. H.E. Batson (New Haven: Yale University Press, 1953). (p35)

¹⁴ William Stanley Jevons, *Money and the Mechanism of Exchange*, Cosimo Classics Economics (New York: Cosimo Classics, 2005). (p13-14)

¹⁵ Geoffrey K. Ingham, *The Nature of Money* (Cambridge, UK ; Malden, MA: Polity, 2004). (p18)

¹⁶ Renato Cirillo, “Leon Walras’ Theory of Money,” *The American Journal of Economics and Sociology* 45, no. 2 (1986): 215–21 (p215)

¹⁷ Ingham, *The Nature of Money*. (ibid)

¹⁸ Friedrich A. Hayek, *The Pure Theory of Capital* (Auburn, Alabama: Ludwig von Mises Institute, 2009). (p32)

exchange function. Von Mises, for example, describes credit as “nothing but the exchange of present goods against future goods.”¹⁹

For money to serve as a practical medium-of-exchange, as well as a standard for deferred payment and credit, classical authors stress stability of value as an essential attribute of money. Jevons highlights for example that lenders will only extend credit if they expect that the money denominating the contract can be exchanged for a similar amount of goods in the future as in the present, with large fluctuations resulting in harm to business and to society. “It is evidently desirable that the currency should not be subject to fluctuations of value,” writes Jevons. “The ratios in which money exchanges for other commodities should be maintained as nearly as possible invariable on the average.”²⁰

Finally, for the classical authors, once a money is established as a medium-of-exchange, it is expected that agents will store it for future use, transforming money into a transmitter of value across time. “[I]t is clear that a good which is a means of exchange must necessarily be a means of intertemporal reallocation and thus a ‘store of value’”, writes Hahn (1987)²¹. Agents could of course save physical money or reinvest it in interest-bearing assets, but the principle remains the same.²² Nonetheless, the classical account leaves some room for causality to go the other way. Menger, for example, suggests a mutually reinforcing relationship between the store-of-value and medium of exchange roles, where the suitability of a good for storing and hoarding is also an important factor in its subsequent adoption as a medium of exchange.²³

Menger also expressed reservations about the relationship between the medium of exchange role of money on the one hand, and the unit of account and store of value roles, on the other. While acknowledging that money fulfills the latter two functions well in practice, he states that there is no logical continuity between money’s fundamental function as a medium of exchange and its secondary functions as a unit of account and store of value. That these latter functions are attributed to money is likely “accidental” and he suggests that commodities other than money are probably better suited to serve as stores of value.²⁴

The primacy of the medium of exchange function permeates all of conventional monetary theory. It is formalized in the quantity theory of money and its axiom, the neutrality principle. Money, as a neutral exogenous variable that facilitates the circulation of goods and services, is seen as having no impact on real variables such as output, investment, savings, or employment, which are determined by real economic forces such as technology, productivity and factor endowments.²⁵ Following Fisher’s formulation of the quantity theory, an increase in the supply of money is therefore expected only to have an impact on prices (i.e. inflation) as well as other nominal variables such as wages, but is irrelevant for

¹⁹ Von Mises, *The theory of money and credit*. (p35)

²⁰ Jevons, *Money and the Mechanism of Exchange*. (p38-9)

²¹ Frank H. Hahn, “The Foundations of Monetary Theory,” *Monetary Theory and Economic Institutions*, 1987, 21–43, (p24)

²² Von Mises, *The theory of money and credit*. (p35)

²³ Ibid.

²⁴ Carl Menger, James Dingwall, and Bert F. Hoselitz, *Principles of Economics*, The Institute for Humane Studies Series in Economic Theory (New York: New York University Press, 1981). (p278-9)

²⁵ N. Gregory Mankiw, *Principles of Economics*, Eighth edition (Australia ; Boston, MA, USA: Cengage Learning, 2018). (p654)

real economic variables, particularly in the long-term.²⁶ As a policy prescription, the role of the central bank is to ensure the money supply steadily keeps pace with economic growth, enabling the price level to be stable.²⁷

Several problems have been raised with regards to conventional monetary theory, though here we will highlight only three related to the functions of money. The first concerns the notion of credit rooted in the medium-of-exchange function and representative of underlying object-object exchanges in the real economy. Economists have pointed out that this view is at odds with the modern understanding of the nature of bank credit, where it is the loans extended by banks that create new deposits and expand the money supply. Conventional approaches require credit to be determined by a pre-existing stock of loanable funds (i.e. savings), intermediated by the money rate of interest, leaving no room for the creation of *new* money through banks loans.²⁸ Disagreements about the nature of credit were at the heart of the traditional disagreement between conventional and Post Keynesian economists, concerning the exogenous or endogenous nature of money. “The essence of endogenous money theory” writes Fontana, “is that the stock of money in a country is determined by the demand for bank credit, and the latter is causally dependent upon the economic variables that affect the level of output.”²⁹

A second issue concerns the relationship between the medium-of-exchange and the unit-of-account functions of money. The main reservation here is whether a common standard of value centered on one commodity, or a basket of commodities, can in fact spontaneously emerge from a process of decentralized exchange between rational agents in a barter economy. “Even with a relatively small number of commodities” writes Ingham, “barter exchange produces myriad diverse exchange ratios.”³⁰ The question of how the value of money is determined is one that conventional and heterodox approaches have long grappled with (see Patnaik 2008)³¹.

A third issue for conventional approaches concerns how to derive the store of value role from the medium of exchange role. As mentioned earlier, conventional approaches hold money to be an inter-temporal store of value for the acquisition of future goods and services, however the challenge for has been to explain theoretically why it is specifically money, and not another commodity or asset with potentially higher returns, that is held as a store of value. “One of the oldest questions of monetary theory is why an agent should hold money which may have a zero-expected return when there are other assets whose expected return is positive,” writes Hahn (1987)³². While it is frequently argued that money’s lower transaction costs (or liquidity) relative to other assets justifies its holding as a store of value, Ingham points out that this results in a circular argument. Transaction costs are lower only because all other agents are

²⁶ $M \times V = P \times Y$, where M is the quantity of money, V its velocity, P the price level (i.e. consumer price index or GDP deflator), and Y is output. Causality in Fisher’s equation is meant to go from left to right, where an increase in money supply leads either to a fall in money’s velocity or an increase in prices or output. In practice, since velocity is generally assumed to be stable and output is a real variable, an increase in the money supply results in a proportional increase in prices (i.e. inflation), at least in the long-term. (Mankiw, p635)

²⁷ Robert P. Guttman, “Eichner’s Theory of Endogenous Credit-Money,” in *Money and Macrodynamics: Alfred Eichner and Post-Keynesian Economics*, ed. M. Lavoie, Louis-Philippe Rochon, and Mario Seccareccia (Armonk, N.Y: M.E. Sharpe, 2010), 139–54. (p140)

²⁸ Ingham, *The Nature of Money*. (p21-2)

²⁹ Arkadiusz Sieroń, “Endogenous versus Exogenous Money: Does the Debate Really Matter?,” *Research in Economics* 73, no. 4 (December 2019): 329–38, (p329)

³⁰ Ingham, *The Nature of Money*. (p25)

³¹ Patnaik, *The Value of Money* (New York: Columbia University Press, 2009).

³² Hahn, “The Foundations of Monetary Theory.” (p25)

using and accept money, but the question of how money attained its medium of exchange status in the first place remains unanswered.³³

Nonetheless, there have been significant efforts to accommodate money's store of value role into conventional approaches. Alfred Marshall's "portfolio balances" approach³⁴ to the quantity theory, for example, integrates the demand for money as a store of value within a supply and demand framework for money, where households weigh the costs and benefits of holding part of their wealth in cash form.³⁵ Marshall also contributed other important insights to the quantity theory, such as the short-term non-neutrality of money, resulting from sticky nominal wages and interest rates. Furthermore, not all conventional approaches are necessarily quantity approaches to money. The New Monetary Consensus (NMC) view associated with Woodford (2003) turn away from classical quantity theory, drawing closer to Post Keynesian approaches, with central banks controlling the short-term interest rate, but not the supply of money, which is seen endogenous to the economic process. The principle of long-term neutrality however is maintained.³⁶

In summary, conventional approaches to money see money primarily as a neutral medium of exchange and circulation, facilitating the movement and exchange of goods and services within the economy. The unit of account is deduced from the medium of exchange function, as it is practical and convenient to denominate prices and invoice debts in terms of the same money used as a medium of exchange. Finally, money is also an inter-temporal store of value with command over future goods and services, enabling it to be held in reserve as savings, transported across distances and re-invested.

2.2 Post Keynesian Approaches to Money

Despite the shortfalls, conventional economists can be said to have a more comprehensive theory of money and explanation of its functions than do Post Keynesian economists. In the Post Keynesian perspectives, two approaches can be identified. The first sets out the core theoretical notion of money as a relationship of debt and credit embedded in the modern production economy, however without fully explaining how the three functions of money can be deduced from this notion of *credit-money*. A second strand of literature, also rooted in Keynes' writings, defines money as a hedge against *fundamental uncertainty*, and derives the three functions of money principally from the store of value function. The challenge for Post Keynesian authors has been to reconcile the two approaches. This section will discuss both.

While conventional approaches see money primarily as a medium of exchange and circulation, Post Keynesians view money primarily as a relationship of debt or credit embedded in the modern production economy. "Modern money is bank money or credit issued for the purpose of production. As

³³ Ingham, *The Nature of Money*. (p23)

³⁴ Marshall's portfolio balances approach, as presented in Humphrey (2004) below, expresses the aggregate price level (P) as a function of the money supply (M) divided by the demand for money, $P=M/D$. The demand for money is expressed as the share K of national income Y that individuals wish to hold as money, $D=KY$. In practice, K was never easy to calculate and is determined by at least eight variables including inflationary expectations, the average rate of return of holding industrial or financial assets, bank credit offerings and the marginal utility of holding money versus other assets.

³⁵ Thomas M. Humphrey, "Alfred Marshall and the Quantity Theory of Money," *SSRN Electronic Journal*, 2004, (p2-3)

³⁶ Giuseppe Fontana, "Why Money Matters: Wicksell, Keynes, and the New Consensus View on Monetary Policy," *Journal of Post Keynesian Economics* 30, no. 1 (October 1, 2007): 43–60, (p57)

Keynes states clearly in his post-*General Theory* articles ... production begins only once firms have received credit from banks.” writes Rochon (2003)³⁷. One of the major contributions of Post Keynesian approaches is to highlight the role of credit in money creation, breaking with the savings–investment causality embedded in conventional approaches.³⁸ For Rochon (2003), money is the result of “intricate debt relationships” between a hierarchy of actors in the economy: households, firms, banks, the central bank and the state.³⁹ Firms obtain credit from banks to cover short-term expenditure (i.e. wages, working capital) and for longer term capital spending and investment. Workers’ wages then re-appear as deposits that are spent on consumption goods, while a portion returns to the state in tax payments. The state, for its part, finances its spending through taxes as well as by borrowing from the central bank. The central bank sets the interest rate, acts as the financial agent of the state and sets the reserve requirement for banks. A similar but more simplified framework consisting of firms, banks and workers is presented in Pégay (2003).⁴⁰

Descriptions of the monetary circuit re-state the central post-Keynesian proposition that it loans that create deposits, and that it is the demand for credit that creates money. “Post- Keynesians break with the orthodox view of money to stress its linkage to bank credit and derive from that connection its inherently endogenous nature.”⁴¹ While Post Keynesians agree that banks create money *ex nihilo*, out of nothing, in response to the demand for loans, there is debate as to whether money creation implies value creation. Rossi (2003), for example, argues that newly created money only has value because it is associated with the production process of firms. “It is production that gives purchasing power to money”, he writes, highlighting that “the flow of money and the flow of production are complementary aspects of the same (income-generating) process.”⁴² A second area of debate between heterodox economists has also concerned the role of banks within the monetary circuit. *Horizontalists* assigned a passive role to banks in the credit intermediation process, considering that the demand for credit will always be met with the required supply of credit. *Structuralists*, on the other hand, were more focused on the “liquidity preference” of banks and the risk assessment process, stressing that banks often do not meet all the demand for credit within an economy.⁴³ This also reflected the central Post Keynesian concern that high levels of liquidity preference by banks contributes to higher levels of unemployment by hindering investment.

Post Keynesians recognize that the relationship between credit-money and the functions of money has not been fully elaborated. Rochon (2003) states that Post Keynesian approaches must “first

³⁷ Louis-Philippe Rochon, “On Money and Endogenous Money: Post Keynesian and Circulation Approaches,” in *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, ed. Sergio Rossi and Louis-Philippe Rochon (Northampton, MA: Edward Elgar Pub, 2003), 115–41. (p116)

³⁸ Louis-Philippe Rochon, “Alfred Eichner, Post Keynesians, and Money’s Endogeneity,” in *Money and Macrodynamics: Alfred Eichner and Post-Keynesian Economics*, ed. M. Lavoie, Louis-Philippe Rochon, and Mario Seccareccia (Armonk, N.Y: M.E. Sharpe, 2010), 172–85. (p175)

³⁹ Rochon, “On Money and Endogenous Money: Post Keynesian and Circulation Approaches.” (p124)

⁴⁰ Pierre Piégay, “Post Keynesian Controversies on Endogenous Money: An Alternative Interpretation,” in *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, ed. Sergio Rossi and Louis-Philippe Rochon (Northampton, MA: Edward Elgar Pub, 2003), 246–62. (p256)

⁴¹ Guttman, “Eichner’s Theory of Endogenous Credit-Money.” (p139)

⁴² Sergio Rossi, “Money and Banking in a Monetary Theory of Production,” in *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, ed. Sergio Rossi and Louis-Philippe Rochon (Northampton, MA: Edward Elgar Pub, 2003), 339–59. (p343-4)

⁴³ Piégay, “Post Keynesian Controversies on Endogenous Money: An Alternative Interpretation.” (p251-2)

emphasize the creation of money, and only after discuss what this newly created money does”, in reference to the functions.⁴⁴ He acknowledges, however, that when it comes to the functions of money these approaches “have not fully incorporated into their theory the notion of money as bank debt”.⁴⁵ Both Rochon (2003) and Rossi (2003) suggest that whatever income remains with households as deposits, following the payment of wages and spending on consumption goods within the money circuit, can be considered a store of value or savings to be allocated between various assets, including money. For Rossi (2003), bank deposits may be the missing link between money defined as credit, and the medium of exchange and store of value functions. He states however that Post Keynesians have yet to develop a “more general monetary theory that allows for money being a means of payment as well as a store of wealth.”⁴⁶

A second approach found within Post Keynesian writings derives the functions of money from Keynes’ notion of *uncertainty*. Faced with uncertainty about the future, Keynes argues in *The General Theory* that agents choose to hold money for i) transactional purposes, as an immediate medium of exchange for goods and services ii) for precautionary purposes, as a cash equivalent of future resources and for iii) speculative purposes. While Keynes’ notion of uncertainty was specific to uncertainty about the future direction of interest rates⁴⁷, Post Keynesian economists often expand this definition to mean uncertainty about the general economic environment or “fundamental uncertainty”.⁴⁸ They associate the precautionary and speculative demands for money to the store of value function.⁴⁹ The other functions of money are then said to devolve from the store of value. “A moment’s reflection will indicate that money is able to perform its medium of exchange function primarily because it acts as a store of value,” write Shaw et. al. (2003), adopting an argument very similar to Menger’s in the conventional view. The unit of account the devolves from the medium of exchange for “efficiency” reasons.⁵⁰

For other Post Keynesian authors however, the unit of account function must precede the medium of exchange, with its value established by an external authority.⁵¹ This is because for many in this approach, the origins of money are to be found in the practice of states taxing their subjects, requiring them to determine *ex ante* what form the unit of account will take. There is therefore a “critical distinction” for Post Keynesians between money as a unit of account, whose value has been stabilized or formalized externally, and the medium of exchange which is, quoting Keynes is “the thing which answers to the description” of the unit of account.⁵² This distinction is important for Post Keynesians as it reverses the conventional position by making the medium of exchange function an outcome of the unit of account, and not the other way around.

⁴⁴ Rochon, “On Money and Endogenous Money: Post Keynesian and Circulation Approaches.” (p116)

⁴⁵ Rochon. (p136)

⁴⁶ Rossi, “Money and Banking in a Monetary Theory of Production.” (p361)

⁴⁷ John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (Zurich, Switzerland: ISN ETH Zurich, n.d.), (p85)

⁴⁸ Thomas I. Palley, “The Evolution of Money Debate: Functionalism versus Chartalism, Schumpeterian Dynamics, Gresham’s Fallacy, and How History Constrains Public Finance,” Working Paper (FMM Working Paper, 2018), (p3)

⁴⁹ Rochon, “On Money and Endogenous Money: Post Keynesian and Circulation Approaches.” (p119)

⁵⁰ Malcolm Sawyer, “Money: Means of Payment or Store of Wealth?,” in *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, ed. Sergio Rossi and Louis-Philippe Rochon (Northampton, MA: Edward Elgar Pub, 2003), 3–17. (p3-4)

⁵¹ L. Randall Wray, “Alternative Approaches to Money,” *Theoretical Inquiries in Law* 11, no. 1 (January 1, 2010), (p29-30)

⁵² L. Randall Wray, “Money,” in *The Elgar Companion to Post Keynesian Economics*, ed. John E. King, 2. ed (Cheltenham: Elgar, 2012), 261–65. (p261)

For Keynes, uncertainty drives agents to hold some portion of their wealth in cash for transactional purposes (i.e. the medium of exchange), and precautionary and speculative purposes (i.e. the store of value). This is formalized in Keynes' *liquidity preference theory*, which describes the quantity of cash households will hold for any given rate of interest, with the rate of interest seen as the risk-reward for exchanging cash, or immediate liquidity, for higher-yielding assets.⁵³ In Post Keynesian writings, liquidity preference theory has been transposed to the banking sector to analyze the risk appetite of banks in granting credit, as well as to portfolio management approaches to money. These consider money as "primarily a stock that must be allocated among the various reasons for which agents may demand it."⁵⁴

Modern Post Keynesian approaches build on the notions of economic uncertainty and liquidity preference theory described in Keynes' writings to derive the functions of money, taking as a starting point the store of value function. As discussed by Palley (2018), in "a world of fundamental uncertainty, there is a need for a 'liquid' store of value, by which is meant a store of value that is not subject to price fluctuation and is immediately realizable." In addition to the three standard functions of money, Palley argues that the "provision of liquidity" should be added as a fourth function to explain why money is held as a store of value in agents' portfolios, even if often surpassed in its rate of return by other assets.⁵⁵

Post Keynesians have enhanced our understanding of the role of money in modern production economies, and particularly the role played by bank credit in the value-creation process. However, unlike conventional approaches, on a conceptual-level, Post Keynesians have not fully established the relationship between their central notion of money as *credit* and the three functions of money. Rather, a parallel story has emerged that derives the functions of money from the existence of *fundamental uncertainty*. Liquidity preference theory, rooted in Keynes' writings, sees money as primarily a store of value and a hedge against uncertainty, which is demanded by agents for transactional, precautionary and speculative purposes. Post Keynesians are aware of the uneasy co-existence between these two approaches, as well as the need for a more general theory of money that bridges the two. "If money is endogenous, then it exists because of bank loans. Then again, Post Keynesians tell us that money exists because of uncertainty. Which is it?", asks Rochon (2003)⁵⁶. This ambiguity may also be found in Keynes widely quoted statement that one "can draw the line between money and debts at whatever point is most convenient," if *money* here is taken to refer to money's functions, and *debts* taken to mean money as *credit*.⁵⁷

III. The functions of international money

As with the domestic level, the six functions of money at an international level as a i) *vehicle currency*, ii) *invoicing currency* and iii) *investment currency* for private uses, and as an iv) *intervention currency*, v) *reference currency* and vi) *reserve currency*, for official uses, are widely accepted and discussed in the Economics literature. However, when it comes to the primary function of money at the

⁵³ Keynes, *The General Theory of Employment, Interest, and Money*. (p84) Keynes sets out his liquidity preference theory as, $M = L(r)$, where M is the quantity of money, L the function of liquidity preference, and r the rate of interest.

⁵⁴ Rochon, "On Money and Endogenous Money: Post Keynesian and Circulation Approaches." (p119)

⁵⁵ Palley, "The Evolution of Money Debate." (p3)

⁵⁶ Rochon, "On Money and Endogenous Money: Post Keynesian and Circulation Approaches." (p121)

⁵⁷ Wray, "Money." (p261)

international level, and the inter-relationships between the functions, it is a different matter. What can be shown is that theories of international money draw directly on the underlying theories of money as well as the debate on the functions discussed in the previous section. While this is expected, it is interesting to look more closely at these linkages and how this has shaped the way Economics addresses the question of international money. The implication also is that any conceptual issues and shortfalls associated with the underlying theories of money also carry over to the international level. The next section reviews how theories of international money draw on theories of money, as well as highlighting, where possible, some of the conceptual issues that arise.

3.1 Conventional versus Post Keynesian Approaches to International Money

As with conventional approaches to money outlined above, the primacy of the medium of exchange function re-appears in the discussion of international money, and particularly with regards to the matter of how money becomes international money. One of the clearest expressions of this position can be found in the work of Krugman (1984). For Krugman, currency internationalization is guided by “invisible hand” processes and results from choices of private agents with regards to world payments. Their choice of transaction currency combines with economies of scale to generally favor one currency to dominate over all others as an international medium-of-exchange.⁵⁸ Although *inertia* effects favor the top currency, the choice of transaction currency can change as other countries gain importance in economic size and world trade. This can lead to the emergence of secondary international currencies, or over the long-term, even to a tipping point where the dominant international currency is displaced in favor of another.⁵⁹ Krugman also discusses the possibility of a bipolar currency order, with two currencies sharing the international currency role, each with its own center-periphery arrangement.

In line with conventional approaches, Krugman deduces the unit-of-account and store-of-value roles from the medium of exchange function. Invoicing and denominating trade contracts and payments in the currency that is the most transacted provides greater ease and certainty for businesses and reduces “frictions”.⁶⁰ Secondly, the prevalence of exchanges dominated in the dollar, euro or other major international currencies, in turn encourages banks to hold balances in these currencies. Hence the dollar’s “medium-of-exchange role encourages both invoicing in dollars and holding dollars”, writes Krugman.⁶¹ He highlights that it is the liquid nature of the most transacted currencies that make them attractive as stores of value for banks and financial markets. This is, of course, a restatement of the conventional position that the money-object chosen by agents as a medium of exchange is also an adequate transmitter of value across time.

As with the classical authors, stability of value is also put forward by Krugman as an essential attribute of international money. He includes economic size, openness of capital markets and “stability of exchange rates” among the fundamental determinants of an international currency.⁶² He also identifies the floating rates adopted post-Bretton Woods as one of the disadvantages of the US dollar’s store of

⁵⁸ Krugman, “The International Role of the Dollar.” (p262)

⁵⁹ Krugman. (p267)

⁶⁰ Krugman. (p262)

⁶¹ Krugman. (p269)

⁶² Krugman. (p274-5)

value role compared to the gold-backed pre-war sterling, arguing that this encourages “wealth holders towards diversification” away from the dollar.⁶³ Krugman’s theory of international money has an important place in the literature, and the framework has been adopted by several subsequent authors including Portes & Rey 1998; Rey 2001; Subramanian 2011; Bénassy-Quéré 2015.

Similar statements that see currency internationalization as primarily driven by the medium-of-exchange function can be found in the writings of other leading economists, irrespective of whether they are closer to conventional or Post Keynesian approaches to money. McKinnon (2010), for example, closely follows Krugman, arguing that in a world of N countries with N currencies agents “will inevitably select one to be the central money [...] This Nth currency will then intermediate the clearing of international payments among banks, exporters will use it for invoicing most commodity trade.”⁶⁴ Once the market has converged on one currency as an international medium-of-exchange, the large number of transactions in that currency brings down transaction costs, making its foreign exchange markets the most liquid, and promoting the currency’s use across the other functions of money.⁶⁵ Cohen (2015), who has written much about the hierarchical nature of the international monetary system, similarly describes the competition between international currencies as a “Darwinian process of natural selection, driven above all by the forces of market competition. Only the fittest survive.”⁶⁶

This view of currency internationalization as rooted in the medium of exchange function is also reflected in the conventional perspective of the interdependence between the six functions of money. The wide use of a currency as a vehicle for trade and international payments encourages its use as an invoicing currency, as well as a store-of-value for longer term investment and financing by private agents.⁶⁷ This can be in the form of security issues such as bonds or debt obligations. Yet the extent of private use also influences the official uses, as the currencies most widely transacted by private agents benefit from lower transaction costs, encouraging monetary authorities to also use them as intervention currencies, or to adopt them as reference or anchor currencies. This establishes a two-way relationship, as the choice of reference currency in turn encourages private agents to transact, invoice and save in the currency chosen as reference by monetary authorities.⁶⁸ This also creates an incentive for the central bank to hold the same currency in its reserves. Chart 1, developed by Bénassy-Quéré et al. (1998), helps to visualize these interdependencies and is reproduced below.

⁶³ Krugman. (p273)

⁶⁴ Ronald McKinnon, “Rehabilitating the Unloved Dollar Standard: Heinz W. Arndt Memorial Lecture, Canberra, 15 April 2010,” *Asian-Pacific Economic Literature* 24, no. 2 (November 2010): 1–18, (p3)

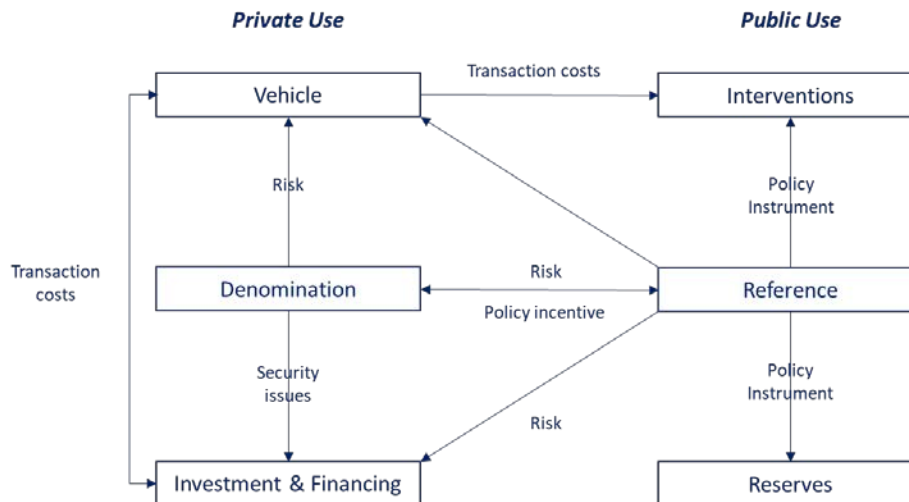
⁶⁵ McKinnon. p4

⁶⁶ Benjamin J. Cohen, “The Demise of the Dollar?: Plus Ça Change, plus c’est Pareil...,” *Revue de La Régulation*, no. 18 (October 19, 2015), (p2)

⁶⁷ Krugman, 1984, *ibid.*, p269

⁶⁸ Di Conti, B. & Prates, D. M., “The international monetary system hierarchy: current configuration and determinants”, Instituto de Economia, University of Campinas, No. 335, April 2018, p4

Chart 1: The interdependence of roles among international money functions



Source: adapted from Bénassy-Quéré et al. (1998), p11

On the other side of the divide, another set of economists address the question of international money primarily from the perspective of a relationship of debt or credit, associated with the Post Keynesian approaches to money. These approaches see the international monetary system as requiring a central country to play the role of “world banker” and provider of liquidity to all other countries in the world.⁶⁹ The debt of the central country is the principal mechanism through which international money is created. To meet world demand for liquidity, writes Wyplosz (2010), the United States must “permanently run balance of payments deficits. It can be current account deficits or capital account deficits, which can go on as long as the dollar is being acquired by central banks around the world.”⁷⁰ Similarly, Obstfeld (2013) writes that “global reserve growth requires the ongoing issuance of gross government debt. This requires, in turn, that the government run continuing deficits, or that it issue debt to acquire assets likely to be inherently riskier than the corresponding liabilities.”⁷¹

There is some debate as to whether the issuance of international money requires the central country to run fiscal or current account deficits, or simply intermediation on the capital account (i.e. provide international loans through its banking system).⁷² Nonetheless, all authors agree that only US financial markets are of sufficient quality, openness and size, to meet the world’s demand for liquidity. For Cohen (2015), US financial markets are “the strategic center of the global network of currency and capital markets” to which most countries of the world are strongly connected.⁷³ One of the most

⁶⁹ Pierre-Olivier Gourinchas, Hélène Rey, and Maxime Sauzet, “The International Monetary and Financial System,” *Annual Review of Economics* 11, no. 1 (August 2, 2019): 859–93, (p3)

⁷⁰ Charles Wyplosz, “Is the Era of the Dollar Over?,” *Journal of Globalization and Development* 1, no. 2 (January 27, 2010), p3

⁷¹ Maurice Obstfeld, *The International Monetary System: Living with Asymmetry*, NBER Book Chapter Series, no. c12596 (Cambridge, Mass: National Bureau of Economic Research, 2013). p308

⁷² Gourinchas et al. (2019) and Obstfeld (2013) argue that the mechanism through which international liquidity is principally created is government (fiscal) deficits and the issuance of government bonds. Wyplosz (2010) and Cooper (2005) however suggests that it is balance-of-payments (i.e. current account) deficit that supplies the global demand for liquidity via US financial markets.

⁷³ J. Cohen, “The Demise of the Dollar?” (p5)

prominent expressions of international money as a debtor-creditor relationship between the central country and the world economy can be found in the *Bretton Woods II* thesis of Dooley et al. (2003). What is important to highlight here is that the Bretton Woods II thesis, widely discussed in the literature (McKinnon 2007; Obstfeld 2013; Ilzetski et al. 2018, 2020), closely follows the contours of Post Keynesians endogenous money theory, where it is the demand for credit, or in this case, the debt of the central country that creates international money.

There are of course two interpretations of the *Bretton Woods II* thesis. Dooley et al. (2003) themselves suggest a *mercantilist* explanation, which see the acquisition of central country assets by emerging economies as part of an effort to keep their exchange rates undervalued through a soft-peg to the dollar, enabling them to sustain export-led growth.⁷⁴ A second explanation sees the demand for central country assets as being driven primarily by *self-insurance* motives. In this account, emerging economies are confronted with a “fear of appreciation” of their domestic currencies, which could severely undermine domestic aggregate demand, employment and export competitiveness. The problem for Obstfeld (2013) is that the sustained demand for US debt securities risks provoking a crisis of confidence in the dollar, as demand for US assets could surpass the safe levels of debt issuance by the United States, resulting in a Triffin-dilemma.⁷⁵ The two approaches diverge on how sustainable Bretton Woods II structure is, with *self-insurance* proponents much more pessimistic.⁷⁶

Yet what is the link between international money which is created or issued as debt, and the functions of international money? In other words, how does money seen as credit become an international medium-of-exchange, unit-of-account and store of value? Similar to the Post Keynesian perspectives reviewed above, the literature is largely silent on the matter. Rather the functions of international money are in many cases just taken as given (McKinnon 2007; Wyplosz 2010; Cohen 2011; Subramanian 2011; Williamson 2012).

Another set of authors however draw directly on the Post Keynesian notion of *fundamental uncertainty* and liquidity preference theory to derive the functions of international money. Gourinchas et al. (2019), for example, argue that the “safe assets” issued by the central country are inherently demanded by both official and private agents across the world, promoting the use of its currency across the other functions of money. This is because these assets represent the “safest and most liquid instrument” in the global economy, preserving future purchasing power and that are quickly convertible into a universally accepted medium of exchange. The “advantage of issuing the reserve currency spills over into other realms, such as the large amounts of private debt issued in US dollars in international markets and the large share of trade invoiced in US dollar,” they write.⁷⁷ In line with the Post Keynesian position, Gourinchas et al. (2019) see the store of value function of international money as driving the unit-of-account and medium-of-exchange functions.

⁷⁴ Michael Dooley, David Folkerts-Landau, and Peter Garber, “An Essay on the Revived Bretton Woods System” (Cambridge, MA: National Bureau of Economic Research, September 2003), p3

⁷⁵ Obstfeld, *The International Monetary System: Living with Asymmetry*. p311

⁷⁶ See Obstfeld (2013) and Ilzetski et al. (2018, 2020)

⁷⁷ Gourinchas, Rey, and Sauzet, “The International Monetary and Financial System.” (p6)

Obstfeld (2013) similarly argues that the liquidity issued by the central country plays an important role in “national self-insurance” strategies because governments, like households, “need access to liquidity – readily salable assets (including cash, of course) that may be spent on goods or (particularly in crisis situations) on other assets,” as well as to intervene in foreign exchange markets, or to provide loans to market actors.⁷⁸ Access to international liquidity is therefore an important constraint for central banks around the world. We can find in these perspectives a restatement of the Post Keynesian position that fundamental uncertainty that drives agents to hold money for transactional, precautionary and speculative purposes. At the same time, it is interesting to note that in his discussion of the functions of money, Obstfeld veers towards a more conventional approach similar to Hahn or Von Mises, arguing that it is primarily the acceptability of money as a global medium of exchange and unit of account at predictable value that makes it an attractive international store of value.⁷⁹

This brings to light an important matter, which is that there is often no straightforward way of classifying economists as purely “conventional” or “Post Keynesian” in their approach to the question of international money. Rather hybrid approaches can be found that draw on competing theories of money. Cohen (2015), for example, explains currency internationalization from the medium of exchange perspective, in line with the conventional account and focus on transaction costs, but then also integrates elements of endogenous money theory in explaining international demand for the dollar. In several other accounts (Kenan 2009; Wyplosz, 2010; Subramanian 2010), it is not easy to disentangle whether the authors see international money primarily as a medium of circulation or primarily as a relationship of debt-credit. Given the popularity of the Bretton Woods II thesis and more recent debates on quantitative easing, it can be argued that the Post Keynesian view of money as a relationship of debt and credit is the most prominent in discussions of international money. Nonetheless, an understanding of the underlying theories of money does help to better understand the perspectives put forward by various authors.

In summary, conventional approaches to international money stress the primacy of the medium exchange function. The money that is most transacted by agents internationally is the one that also benefits from the lowest transaction costs, making it the most liquid and attractive to hold as medium of exchange and store of value. Denominating trade contracts and financial instruments in the most transacted currency reduces frictions, with the unit of account also devolving from the medium of exchange function. Post Keynesian approaches, on the other hand, see international money as debt or credit issued by the central country within the international monetary system, where following endogenous money theory it is the demand for liquidity from public and private agents that drives the creation of international money. The literature is mostly silent however with regards to the relationship between *credit-money* and the functions of international money. Rather Post Keynesians revert to the notions of *fundamental uncertainty* and Keynes’ liquidity preference theory to derive the functions of money. In this view, the liquidity issued by the central country is inherently demanded as a risk-free asset by both public and private agents around the world, because of its assurance of value and easy convertibility into a medium of exchange. They suggest that it is the store of value function that drives the unit of account and medium of exchange. Nonetheless, the same charge leveled by Rossi (2003) against

⁷⁸ Obstfeld, *The International Monetary System: Living with Asymmetry*. (p302)

⁷⁹ Obstfeld. (p303)

Post Keynesian monetary theory can be leveled against the Post Keynesian approach towards international money: does international money exist because of credit, or because of *fundamental uncertainty*?

IV. The International Currency Hierarchy

The competition among different currencies in the international domain has resulted in what economists have long recognized as a hierarchical international monetary system, with some currencies more internationalized than others. For the purposes of this paper, we will follow a framework similar to that of Cohen (2012), distinguishing between the *central* international currency – the US dollar – followed by secondary international currencies such as the *euro* and the *yen*, and third-tier currencies such as the Australian and Canadian dollars and the Swiss franc. The objective of the following section is to use empirical data to map the current structure of the international monetary system in relation to the six functions of international money, within the limits of available data, to gain a better understanding of the current position of different currencies within the system. The structure followed is similar to that presented in De Conti & Prates (2018).

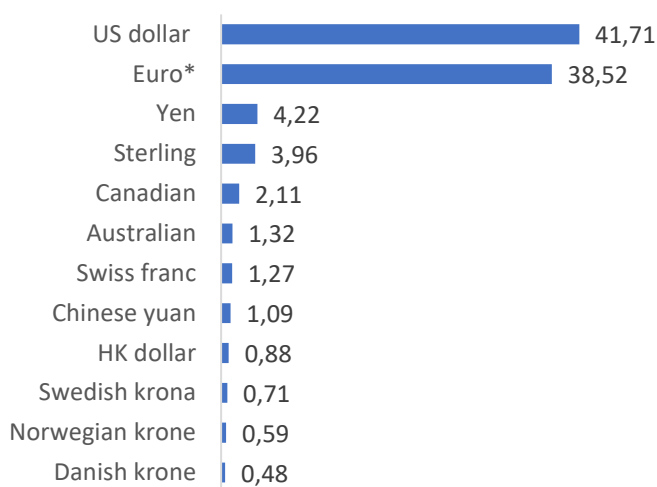
4.1 The International Currency Hierarchy – A View From The Functions

4.1.1 Private Use: Vehicle Currency

While there are no consolidated statistics for payment currencies across the world, an interesting resource is the Belgium-based Society for Worldwide Interbank Financial Telecommunication (SWIFT). The SWIFT electronic funds transfer system links more than 11,000 financial institutions across the world and accounted for half of cross-border payments by institutional and individual clients in 2019.⁸⁰

Chart 2: Global payments by currency via SWIFT, October 2020

In percent (%) total value



* Excludes intra-Eurozone payments

Source : SWIFT, Nov. 2020

⁸⁰ Martin Arnold, "Ripple and Swift Slug It out over Cross-Border Payments," *Financial Times*, June 6, 2018

Based on SWIFT, the dollar dominates cross-border transfers with close to 42 percent of all payments denominated in US dollar in October 2020, followed closely by the Euro at 39 percent. Another notable trend is the rapid progression of the yuan. In 2010, the yuan was in 35th position as a global payment currency, but had moved to 8th position in 2020. Given continued restrictions on yuan convertibility, yuan-denominated transfers are being supported by a network of off-shore clearing houses in major financial centers such as London, Singapore, New York and Hong Kong. Hong Kong has been the traditional clearing house, accounting for 74 percent of the total value settled in October 2020, but the UK is in the second place with 7 percent, growing significantly since a 2013 swap agreement signed between the UK and China.⁸¹ Collectively, the 12 currencies listed in chart 2 represent 97% of global SWIFT transactions by value.

Another important source for understanding the cross-border use of currencies is in the data on global foreign exchange markets, which is reported at three-year intervals by the Bank of International Settlements. The latest survey on foreign exchange market turnover is based on reports collected from 53 countries and 1,236 foreign exchange dealers which covers their transactions with counterparties including banks, insurance companies, mutual funds, central banks and non-financial corporations.⁸² The foreign exchange instruments covered are spot, outright forwards, forex swaps, currency swaps and options. An important feature of these reports is as there are two currencies involved in every exchange, the sum total of transactions is 200 percent. The latest report, for 2019, shows that the dollar is one or the other end of 87.6 percent of foreign exchange transactions, with its position virtually unchanged in the past 20 years. This also reflects the dollar's importance in payments, in trade invoicing and as a reference currency.

Another notable trend is the position of the euro, which in 2013 had accounted for 39 percent of global foreign exchange turnover, but which has since seen its position decline to 32.3 percent, most likely a consequence of the Eurozone debt crises.⁸³ The BIS attributes the recent growth in euro trading to an uptake in euro-Swiss franc and euro-yen markets.⁸⁴ The yen, the world's third most traded currency, has seen a five percent decline in its foreign exchange turnover since 2016 to reach 16.8 percent. The BIS attributes this decline to a slowdown in the yen-US dollar market, resulting from lower exchange rate volatility during the period. The sterling, for its part, has maintained its 12.8 percent share virtually unchanged since 2010, but lower than the 16.5 percent share it held in 2004.

⁸¹ SWIFT, RMB Tracker, Nov. 2020

⁸² Michael R. King and Carlos Mallo, "A User's Guide to the Triennial Central Bank Survey of Foreign Exchange Market Activity," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, December 1, 2010), (p75)

⁸³ J. Cohen, "The Demise of the Dollar?" (p9-10)

⁸⁴ BIS, "Foreign Exchange Turnover in April 2019," September 16, 2019, https://www.bis.org/statistics/rpfx19_fx.htm.(p4)

Table 2: Currency distribution of over-the-counter foreign exchange turnover, 2004-2019

Net-net basis, percent (%) share of average daily turnover for April for each year

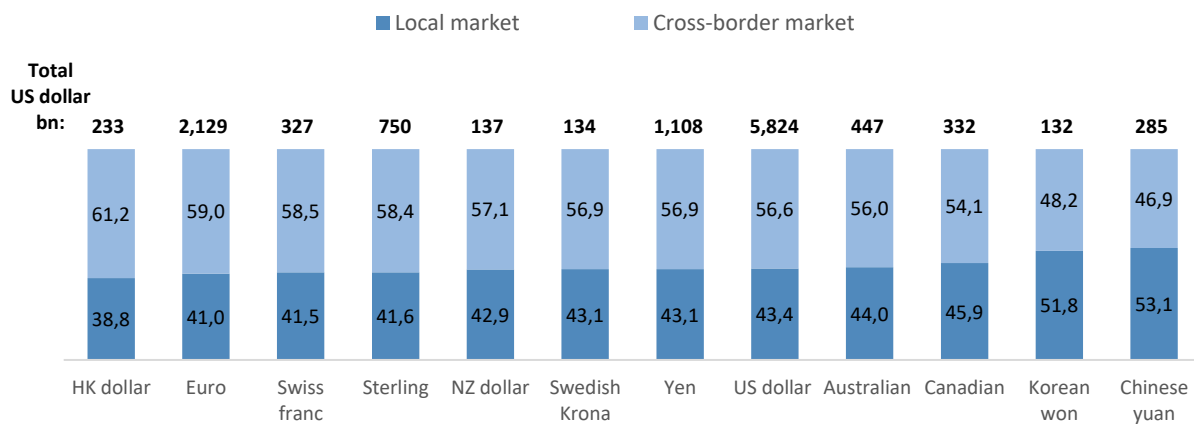
		2004	2007	2010	2013	2016	2019
1	US dollar	88.0	85.6	84.9	87.0	87.6	88.3
2	Euro	37.4	37.0	39.0	33.4	31.4	32.3
3	Yen	20.8	17.2	19.0	23.0	21.6	16.8
4	Sterling	16.5	14.9	12.9	11.8	12.8	12.8
5	Australian	6.0	6.6	7.6	8.6	6.9	6.8
6	Canadian	4.2	4.3	5.3	4.6	5.1	5.0
7	Swiss franc	6.0	6.8	6.3	5.2	4.8	5.0
8	Chinese yuan	0.1	0.5	0.9	2.2	4.0	4.3
9	HK dollar	1.8	2.7	2.4	1.4	1.7	3.5
10	NZ dollar	1.1	1.9	1.6	2.0	2.1	2.1
11	Swedish Krona	2.2	2.7	2.2	1.8	2.2	2.0
12	Korean won	1.1	1.2	1.5	1.2	1.7	2.0

Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

In the context of the declining shares of the euro, yen, and sterling in the past twenty years, it is interesting to consider which currencies have gained. The most notable evolution is that of the yuan, which in 2019 ranked as the world's eighth most traded currency at 4.3 percent, growing from 2.2 percent in 2013. The BIS acknowledges that the data on offshore trading for the yuan is incomplete for the years prior to 2013 and therefore underestimates its share. In addition to the yuan however, what also stands out is the increasing shares of third-tier international currencies, notably the Korean won and the Hong Kong dollar, in addition to the New Zealand dollar.

Chart 3: Local versus cross-border daily foreign exchange market turnover for top 12 currencies, April 2019

In percent (%) share and US dollar billion



Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

When looking at the share of local versus cross-border foreign exchange transactions, chart 3, what stands out is that for the majority of international currencies, cross-border foreign exchange markets, i.e. markets external to the country issuing the currency, are larger and more important than local markets. The lead currencies here are the Hong Kong dollar, euro, Swiss franc and the sterling, which

may be a reflection of these currencies being prized as diversification currencies or valued by carry traders as profitable currencies to trade in. The two exceptions are the Korean won and the yuan, where turnover in local foreign exchange markets is larger than in foreign markets. Finally, only three currencies, the euro, dollar and yen, surpass the \$1 trillion daily turnover mark, with the sterling in fourth place at \$750 billion.

4.1.2 Public Use: Intervention Currency

As set out in Ilzetzki et al. (2017), when it comes to official use the medium-of-exchange, unit-of-account and store-of-value roles of a currency are completely intertwined.⁸⁵ By this logic, countries anchored to the dollar or the euro, or using these currencies as reference will intervene in foreign exchange markets when necessary as part of their exchange rate strategy. Table 2 above therefore captures interventions in foreign exchange markets by monetary authorities as well as private agents.

4.1.3 Private Use: Invoicing Currency

The invoicing of trade and financial operations by private agents closely follows the medium-of-exchange function. One of the limitations to understanding the invoicing function is the disperse data related to trade invoicing. One of the most comprehensive recent efforts is the IMF and ECB's *Patterns in Invoicing Currency in Global Trade*, with data on invoicing currencies for 102 countries covering the period 1990 to 2019, which provided the basis for Table 3.

Table 3: Invoicing currency of exports and imports for selected countries, 2012 – 2019 (various)

Percent share in US dollar, euro and home currency

	Country	Export			Import			Year
		USD	EUR	Home	USD	EUR	Home	
1	Brazil	96.1	3.5	-	86.3	10.9	-	2012
2	United States	95.7	1.1	-	95.1	2.7	-	2018
3	Indonesia	93.6	1.0	1.1	87.5	4.5	3.2	2019
4	India	86.8	7.7	-	89.4	7.2	-	2014
5	Malaysia	83.0	3.8	5.4	79.0	4.5	4.5	2019
6	Australia	81.9	1.0	14.9	53.3	7.2	33.3	2016
7	Russia	62.4	20.4	14.9	34.8	30.1	30.8	2019
8	New Zealand	61.7	5.6	19.4	52.1	8.3	20.3	2019
9	Japan	49.8	6.5	37.0	69.2	3.8	24.1	2018
10	Norway	47.0	41.1	8.1	24.1	35.3	29.3	2018
11	United Kingdom	32.7	29.6	-	43.6	31.7	-	2019
12	France	22.0	72.3	-	23.4	74.2	-	2019
13	Switzerland	21.2	30.3	38.8	33.7	45.6	17.7	2018
14	Germany	17.7	75.9	-	20.2	77.4	-	2019

Source: Emine Boz et al., "Patterns in Invoicing Currency in Global Trade," *IMF Working Papers* 20, no. 126 (July 17, 2020)

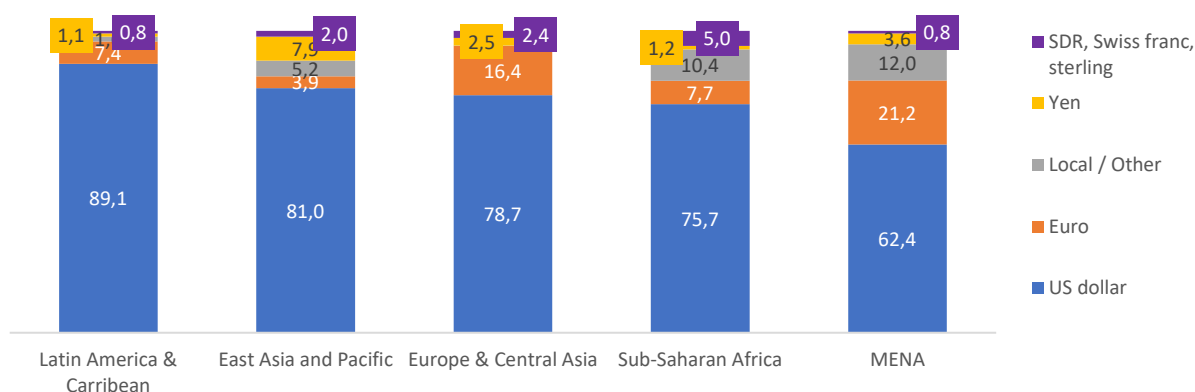
What stands out in this overview of 14 countries is the wide use of the dollar for both imports and exports for countries outside of Europe. This particularly holds for emerging economies such as Brazil, Indonesia, India and Malaysia, where the dollar dominates on both the import and export side, and where

⁸⁵ Ethan Ilzetzki, Carmen Reinhart, and Kenneth Rogoff, "Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?" (Cambridge, MA: National Bureau of Economic Research, February 2017), <https://doi.org/10.3386/w23134>. (p9)

the domestic currency is rarely, if ever, used for cross-border transactions. The picture is somewhat different in Europe. In Eurozone countries like France and Germany, the euro dominates for over 70 percent of transactions for both exports and imports, however in non-eurozone countries like Switzerland, the UK and Norway, the dollar and euro are almost evenly distributed, which likely reflects the importance of trade with their Eurozone neighbors. Krugman's finding that the exporters currency is preferred in trade among advanced countries holds true for Switzerland and Japan where more than a third of exports are denominated in the local currency. Finally, it is interesting to note that in relatively large economies like Russia and Australia, a third of imports are denominated in local currency.

Another important aspect of the private unit of account function is the denomination currency for public debt instruments. This can be considered private usage to the extent that most public debt obligations are held by private entities such as commercial banks and institutional funds, and are actively traded on secondary markets. Chart 4 outlines the currency composition of these obligations in all developing and emerging markets by region, excluding high income countries. Over 80 percent of long-term public debt obligations in Latin America and East Asia are denominated in US dollar, while the euro has an important share only in Europe's periphery, with a 21 percent share in Middle East and North African economies. Finally, public debt in local currency only accounts for just over 10 percent of debt obligations in Sub-Saharan Africa and MENA.

Chart 4: Currency composition of public & publicly guaranteed debt by currency of emerging markets by region, 2019 (excluding high-income countries)
In percent



Source: International Debt Statistics, The World Bank, 2020

4.1.4 Public Use: Reference Currency

The IMF's annual report on exchange rate arrangements provides a good overview of the variety of exchange rate regimes implemented by countries across the world. As noted earlier, contrary to the widely held view that floating exchange rates prevail, the IMF report shows that floating of free-floating exchange rates are implemented by 66 countries (34 percent) in the world, while 126 countries (66 percent) can be categorized as having either a fixed or managed exchange rate regime.

The report distinguishes between *type of regime*, i.e. hard peg, soft peg, managed arrangements and floating, and *type of monetary policy framework*. Within frameworks, what can be noted is that 80

countries have implemented an exchange rate anchor, as outlined in Table 4, with the dollar and euro as the most popular choices, while 67 countries have opted for either managed or floating arrangements with a monetary aggregate target or inflation targeting. Finally, for close to 25 percent of countries (45 countries) in the “other” category, no specific exchange rate regime was identified either due to insufficient information or more heterogenous policies such as undeclared reference currencies.

Table 4: Exchange Rate Arrangements by Country, 2019

Number of countries

		Exchange Rate Anchor				Monetary Aggregate Target	Inflation Target	Other
		US dollar	Euro	Composite	Other			
Hard Peg	No separate legal tender	7	3	-	3	-	-	-
	Currency board	8	2	-	1	-	-	-
Soft Peg	Conventional peg	14	18	3	5	1	-	1
	Stabilized arrangement	5	2	2	-	7	4	5
	Crawling peg	2	-	1	-	-	-	-
	Crawl-like arrangement	1	-	1	-	7	2	7
	Pegged exchange rate within horizontal bands	-	-	-	-	-	-	1
Other manag	Other managed arrangement	1	-	1	-	6	-	5
Float	Floating	-	-	-	-	5	25	5
	Free Floating	-	-	-	-	-	10	21
Total		38	25	8	9	26	41	45

Source: International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions 2019*. (S.I.: IMF, 2020).

4.1.5 Private Use: Investment and Financing Currency

Store of value private usage concerns the choice of currency for investment and financing purposes by private agents. This includes cross-border lending by banks, as well as the currencies in which institutional and individual investors choose to allocate their savings. In this section we will analyze the international banking and bonds market.

International Banking Market

Cross border assets and liabilities of banks as outlined in Table 5 consist mainly of long-term loans (i.e. over 12 months maturity) as well as a smaller proportion of debt securities. Assets are the loans extended by banks or the debt securities invested in, while liabilities are the loans received or debt securities owed. Table 6 presents the same data but for non-bank entities, which includes both financial

corporations such as investment funds and non-financial corporations. What stands out when comparing 2010 to 2019 is that the share of US dollar cross-border assets for both bank and non-bank entities has increased, while the share of euro has significantly dropped. In terms of bank assets and liabilities, the share of yen and sterling has also fallen compared to 2010, while gains can be noted for the Swiss franc and “other” currencies. This could reflect a desire by investors to diversify towards third-tier international currencies and away from the euro and the yen.

Table 5: Total banks’ cross-border assets and liabilities outstanding, 2010 & 2019

In percent and US dollar billion

	Assets		Liabilities	
	2010	2019	2010	2019
US dollar	46.9	51.1	50.1	53.8
Euro	38.6	33.1	35.2	29.0
Yen	5.4	4.4	4.5	4.1
Sterling	5.7	4.5	6.2	4.7
Swiss franc	1.8	2.4	1.4	1.9
Other currencies	1.6	4.5	2.6	6.6
Total	100	100	100	100
Total in US\$ billion	17,850	14,341	16,871	14,074

Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

Table 6: Total non-bank cross-border assets and liabilities outstanding, 2010 & 2019

In percent and US dollar billion

	Assets		Liabilities	
	2010	2019	2010	2019
US dollar	49.5	53.5	58.2	56.2
Euro	37.3	27.3	28.3	25.3
Yen	5.2	8.3	2.5	2.4
Sterling	5.2	5.5	6.8	5.8
Swiss franc	1.5	1.1	1.4	1.3
Other currencies	1.3	4.4	2.8	9.0
Total	100	100	100	100
Total in US\$ billion	10,107	14,163	6,867	8,535

Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

On the non-bank side, the picture is slightly more nuanced. On the asset side the US dollar, yen and sterling have increased their shares of cross-border lending and debt securities, as have “other” currencies and this has mainly taken place at the expense of the euro. Finally, while the overall value of bank cross-border assets and liabilities has decreased since 2010, this has been more than compensated by an increase in the assets and liabilities held by non-bank financial institutions and corporations.

International Financial Markets – Capital Market

The capital market covers longer-term financial and investment instruments, with maturities generally over 12 months, and includes equities and bonds, and other long-term debt obligations, issued and traded on primary and secondary markets. For the purposes of this analysis, we set aside equities to analyze the currency denomination of international debt securities issued by banks, financial and non-financial corporations. Table 7 shows how significantly this market has shifted since 2010.

In 2010, the euro held a larger share of the international bond issuances of banks and non-financial corporations than the dollar, but the two currencies were on par in 2020 for bank issuances, while the euro fell behind the dollar in the bond issuances of non-bank financial institutions and corporations. Overall, the dollar has significantly increased its share of private international debt securities at the expense of the euro and other currencies. A second notable trend is that while international bond issuance by banks have remained stable, issuances by non-bank financial institutions and corporations have grown significantly since 2010.

Table 7: International debt securities issued by banks, non-bank financial institutions and non-financial corporations, 2010 (Q2) vs 2020 (Q2)

In percent and US dollar billion

	Banks		Financial Corporations		Non-Financial Corporations	
	2010	2020	2010	2020	2010	2020
US dollar	24.1	41.4	47.1	51.9	35.2	47.1
Euro	53.8	41.3	38.7	34.7	43.4	39.6
Other currencies	22.0	17.3	19.7	13.4	21.3	13.3
Total	100	100	100	100	100	100
Total in US\$ billion	8,373	8,132	5,439	6,368	3,387	7,202

Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

4.1.6 Public Use: Reserve Currency

The US dollar continues to dominate in foreign exchange reserves, with a 60.7 percent share in 2019. Its share has declined slightly in the past 10 years, with some evidence of diversification towards secondary and third-tier international currencies, notably the yen and sterling, as set out in Table 8. In recent years, the IMF has also included the share of the yuan, Canadian and Australian dollars. Also significant is how the volume of foreign reserves has doubled in the past decade. This reflects the surge in demand for risk-free assets, particularly from emerging markets, highlighted in Section III, and which has animated the discussion among economists about the extent to which this demand is sustainable.

Table 8: International allocated reserves by currency, 2010 - 2019

In percent and US dollar billion

	2010	2015	2019
US dollar	62.2	65.7	60.7
Euro	25.8	19.2	20.6
Yen	3.7	3.8	5.9
Sterling	3.9	4.7	4.6
Other	4.3	2.8	2.5
Yuan	-	-	1.9
Canadian dollar	-	1.8	1.9
Australian dollar	-	1.8	1.7
Swiss franc	0.1	0.3	0.2
Total	100	100	100
Total in US\$ billion	5,156	7,413	10,862

Source: IMF, Currency Composition of Foreign Exchange Reserves (COFER), 2020

4.1.7 Summary of Findings: The International Currency Hierarchy

A review of the empirical data related to the international currency hierarchy reveals some notable trends. The first is that the dollar remains dominant across all six functions of international money, and in some cases, is in an even more favorable position than it was ten years ago. This is true in the foreign exchange market and in the cross-border assets and liabilities held by banks and non-bank private corporations. As a share of global payments as registered by SWIFT, the dollar's role is only slightly ahead of the euro, while its share of international reserves remains above 60 percent but has declined slightly compared to 2010, with some evidence of diversification towards the yen, sterling and third-tier currencies like the yuan, Australian and Canadian dollars.

A second major trend is related to the euro, which continues to hold second place behind the dollar, but with a lesser share than it did in 2010. This can be seen in its declining share in foreign exchange turnover, in cross-border assets and liabilities, and international reserves. The decline is particularly striking in capital markets with international bond issuances where the euro's share was larger than that of the dollar in 2010, but where it has fallen back to second place.

The third finding is that the lower share of the euro across the six functions of international money has been compensated by a reinforcement of the dollar, as well as in many cases a greater role for third-tier international currencies, with evidence of a push towards diversification. This can be seen in foreign exchange markets, with subtle but notable gains by the yuan, Korean won, Hong Kong dollar and New Zealand dollar, as well as in the cross-border loans by banks and non-bank corporations, where a similar trend can be seen. Likewise, the smaller share of the euro and slight ground lost by the dollar in international reserves has translated into larger shares for the yen, sterling, yuan, Canadian and Australian dollars. The most remarkable gains for the yuan can be seen in the international payments data provided by SWIFT, where it had taken the eighth position in 2020, compared to relative obscurity in 2010.

V. Applying The Functional Approach to Questions of International Money

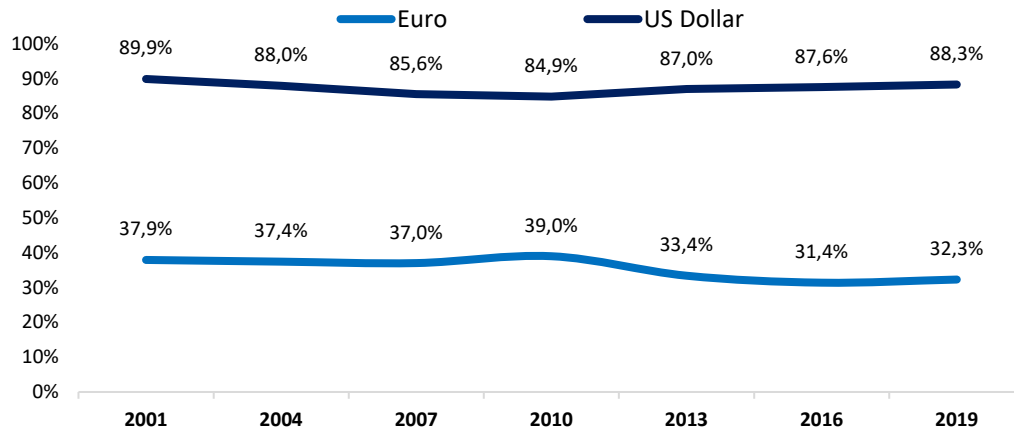
In this section, we apply the functional approach to international money to specific empirical cases to assess its potential usefulness. This section will look at the Euro and the Swiss Franc, followed by the special case of a cryptocurrency, Bitcoin. Finally, the functional approach will be applied to the historical sterling - dollar transition.

5.1 The Euro

It is difficult to draw conclusions about whether the internationalization of the euro was mainly driven by the medium of exchange function or by its store of value function. At its launch in 1999, the euro superimposed itself on the existing currencies of the Eurozone members, replacing them in their diverse uses as transaction, invoicing and investment currencies. What can be noted in the empirical data however is a decline in the international position of the euro from 2010 onwards, with the onset of the sovereign debt crises. The decline is particularly marked in international debt securities (Chart 6), which covers bonds issued in euro and which grew significantly on the back of public debt issuances by Eurozone central banks until the crisis. In this category, the euro had surpassed the dollar until 2014, when the dollar took the lead. Nonetheless, the euro still accounts for 38 percent of international debt securities, and 21 percent of global official allocated reserves, highlighting the importance of its store of value function.

Chart 5: Euro and US dollar as a percent of foreign exchange turnover, 2001 - 2019

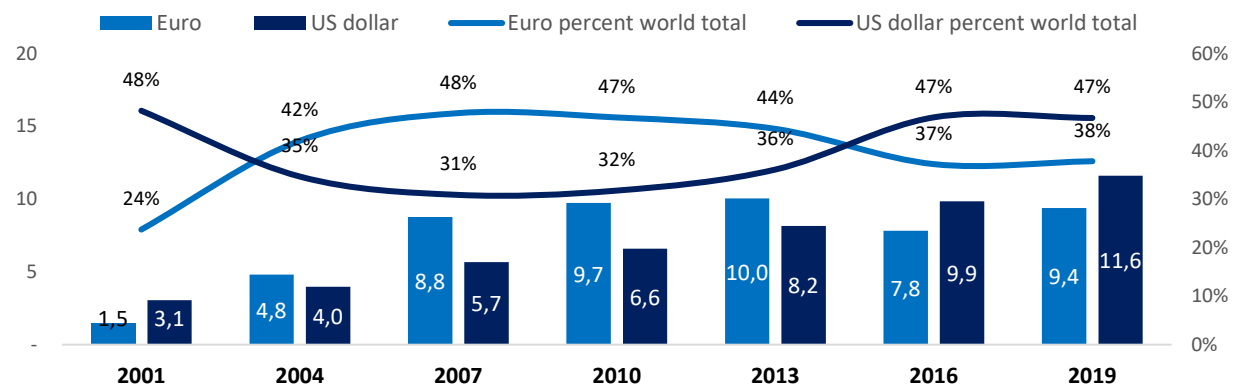
Net-net basis, percent (%) share of average daily turnover for April for each year



Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

Chart 6: International Debt Securities in Euro and US dollar, 2001 - 2019

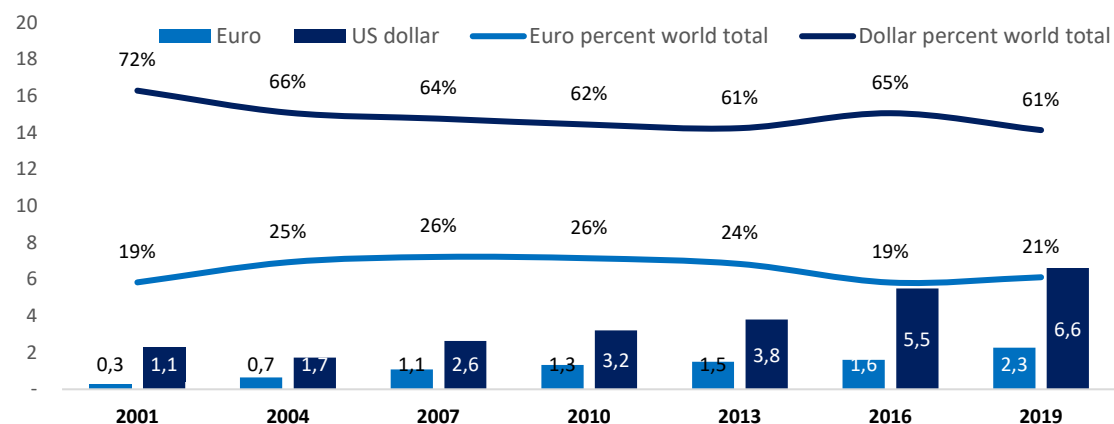
In US dollar trillion (lhs) and as a percent of total outstanding international debt securities (rhs)



Source: BIS, International Debt Securities, 2021

Chart 7: International Reserves in Euro and US dollar, 2001-2019

In US dollar trillion and as a percent of total allocated international reserves



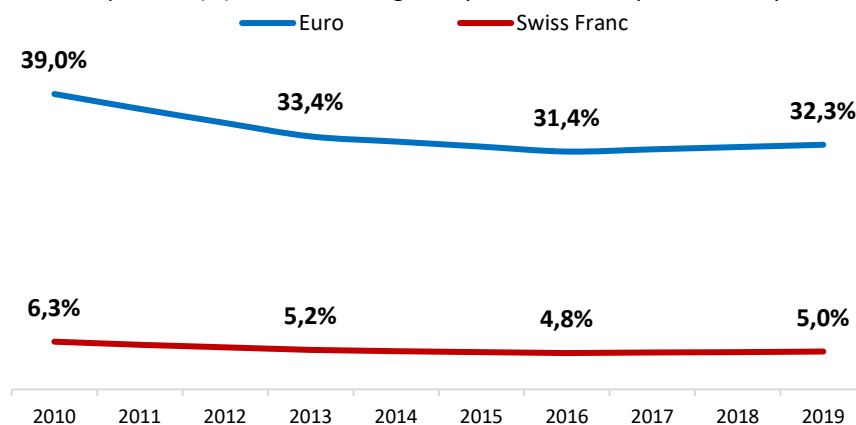
Source: IMF, COFER Database, 2021

5.2 The Swiss Franc

Switzerland accounts for 0.85% of world GDP and yet the Swiss franc (CHF) represents 5 percent of the global turnover on foreign exchange markets. The medium of exchange role appears to therefore play an important role in the internationalization of the franc by this measure. As a percentage of cross-border loans and debt securities, the franc also accounts for 1.3% of the world total. Its role as an international reserve currency is more modest, where it represents 0.2% of the world total, equivalent to around \$20 billion. Several studies have noted the safe-haven status of the Swiss franc, which is seen as a stable currency from an exchange rate and inflation perspective and is particularly prized by investors, particularly at times of heightened global risk (Grisse & Nitschka, 2015; Baltensperger & Kugler, 2016). It is however difficult to say whether the franc is an international currency primarily because it is a medium of exchange or primarily because it is a store of value. What can be said however is that the franc punches largely above its weight as an international currency.

Chart 8: Swiss Franc and Euro as a percent of foreign exchange turnover, 2010 - 2019

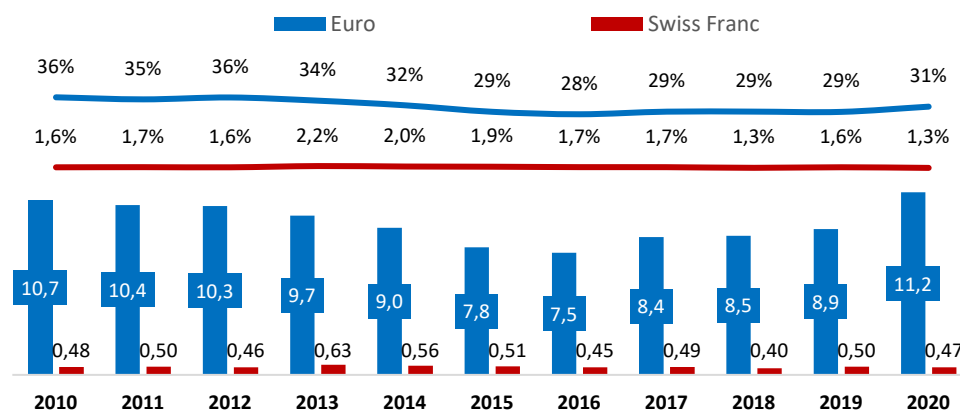
Net-net basis, percent (%) share of average daily turnover for April for each year



Source: BIS, Triennial Survey of FX and OTC derivatives trading, 2019

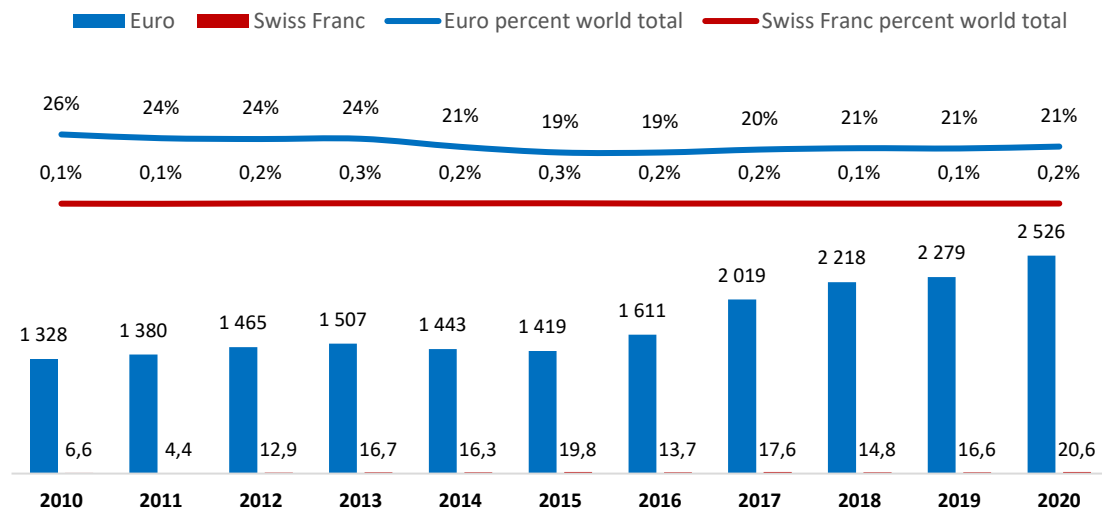
Chart 9: International loans and debt securities outstanding in Euro and Swiss Franc, 2010- 2020

In US dollar trillion and as a percent of total outstanding international loans & debt securities (public & private issues)



Source: BIS, Cross Border Loans and International Debt Securities, 2021

Chart 10: International Reserves in Euro and Swiss Franc, 2010-2020
In US dollar billion and as a percent of total allocated international reserves



Source: IMF, COFER Database, 2021

5.3 Bitcoin

One of the interesting aspects of Bitcoin is that it obliges us to answer the question of what money is and whether cryptocurrencies qualify as money. Bitcoin, the most famous of the cryptocurrencies, certainly claims to be a “new kind of money” and an “innovative payment network”. Yet the ambiguity surrounding it has been with us from the beginning. Carrick (2016), in assessing the money-characteristics of Bitcoin, alternatively describes it as a “cryptocurrency” a “financial asset” and a “useful economic instrument”.⁸⁶ Nakamoto (2008), Bitcoin’s elusive founder, for his part, certainly envisioned it as a type of “peer-to-peer” electronic cash that should serve to facilitate online payments, in other words, certainly a money.⁸⁷ What conclusions can be drawn about Bitcoin and other cryptocurrencies when confronted with the theories of money?

Taking the conventional approach to money, if money is whatever object agents choose to use as money because of its inherent properties or attractiveness, as argued by Jevons, then Bitcoin may qualify as money. However, conceptual problems arise. The first is that in the classical definition agents choose the money-object first and foremost as a medium of exchange and circulation, which then devolves to the unit of account and store of value functions. Few would argue that Bitcoin or most other cryptocurrencies are primarily used as a means of payment, with the exception of their privileged use in the shadow economy. Nonetheless, some cryptocurrencies are gaining traction in the payments domain. In March 2021, Visa trialed settling payments in *USD Coin*, a stablecoin pegged to the US dollar, via the Ethereum blockchain.⁸⁸ This choice of a stablecoin – a cryptocurrency backed and convertible into underlying fiat currencies, commodities or other assets – for payments betrays another issue with the qualification of cryptocurrency as money. In both the conventional and Post Keynesian accounts, stability of value is an essential attribute of the medium of exchange, unit of account and store of value, and it is conspicuously

⁸⁶ Jon Carrick, “Bitcoin as a Complement to Emerging Market Currencies,” *Emerging Markets Finance and Trade* 52, no. 10 (October 2, 2016): 2321–34, <https://doi.org/10.1080/1540496X.2016.1193002>.

⁸⁷ Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System,” October 31, 2008, <https://bitcoin.org/bitcoin.pdf>.

⁸⁸ Lea Cademenos, “Visa Becomes First Major Payments Network to Settle Transactions in USD Coin (USDC),” accessed December 14, 2021, <https://usa.visa.com/about-visa/newsroom/press-releases.html>.

lacking in the erratic fluctuations of Bitcoin and several other major cryptocurrencies. This is largely why BIS Governor Agustín Carstens describes Bitcoin as “more of a speculative asset than money.”⁸⁹

Nonetheless, it would not be farfetched to consider a widely used stablecoin as a form of money or money substitute. It would indeed be the digital counterpart to many community currencies adopted and used at a local level and freely convertible into fiat currency. That said, challenges remain for cryptocurrencies in the payments space. Anonymity of payments means transacting refunds is time consuming for merchants and requires solid record keeping. The tax implications are also problematic, as cryptocurrencies are considered assets by most governments and therefore subject to capital gains tax when received and resold, again requiring further bookkeeping efforts by merchants.⁹⁰ Cryptocurrencies also present a third major challenge when confronted to the conventional theory of money and which relates to the notion of “transaction costs”. As we have seen, money is money because of its attribute as the most liquid of assets. This is particularly the case for international money, with the most transacted currency benefiting from the lowest transaction costs and hence network increasing returns.

From this standpoint, Bitcoin behaves very differently from money. As the volume of Blockchain transactions increases, such as during a Bitcoin bull-run, transactions costs increase instead of decrease. This can be seen in Chart 12, which presents the average Bitcoin transaction fee, which has alternated between \$2 and \$10 in 2021, but which previously reached highs of over \$50. This is because blockchain relies on the payment of transaction fees and incentives to professional miners to process and validate transactions on the network, the “proof of work” protocol.⁹¹ Not only is proof of work highly energy intensive, but since block rewards, which are distributed to miners as new Bitcoins are issued, periodically decline, transaction fees will need to further rise to compensate miners and are therefore on an upwards trend. For the end-user, added to the transaction fees are also the exchange or trading fees charged by crypto exchanges, particularly for depositing and withdrawing money, and which can also be quite hefty.⁹² From a transaction cost perspective as well as from a trading volume perspective, as another measure of liquidity, Bitcoin does not behave as money or make a good candidate for international money. Bitcoin’s trading volume of around \$500 million per day (Chart 14) represents a fraction (0.008%) of the \$6.6 Trillion daily turnover of global foreign exchange markets.

Does Bitcoin fit the Post Keynesian definition of money as a store of value that serves as a hedge against fundamental uncertainty? While Bitcoin is certainly held for speculative and diversification purposes by both individual and institutional investors, there are two factors that disqualify it from being considered money in the Post Keynesian account. The first, as we saw earlier, is the question of stability of value. The second is that in the Post Keynesian account, money is endowed with the attributes of trust and confidence associated with the external issuing authority, which is responsible for defining what the unit of account is and establishing its value. Can the notion of legitimate issuing authority, such as that accorded to a central bank, be transposed to the decentralized governance system of a cryptocurrency such as Bitcoin, where network participants oversee the system and authorize transactions by consensus. Conceptually, there is no reason why not. However, Carstens (2021) argues that an entirely privately operated and anonymous e-money system is unviable and unsafe. The frequency of attacks on crypto-currency platforms, theft from individual wallets, the funding of illicit activities, the setup of fake crypto exchanges and the temptation to deviate from proper asset backing in the case of stablecoins to maximize returns

⁸⁹ Agustín Carstens, “Digital Currencies and the Future of the Monetary System” (Hoover Institution Policy Seminar, Basel, Switzerland: Bank of International Settlements, 2021), 1–17, <https://www.bis.org/speeches/sp210127.htm>.

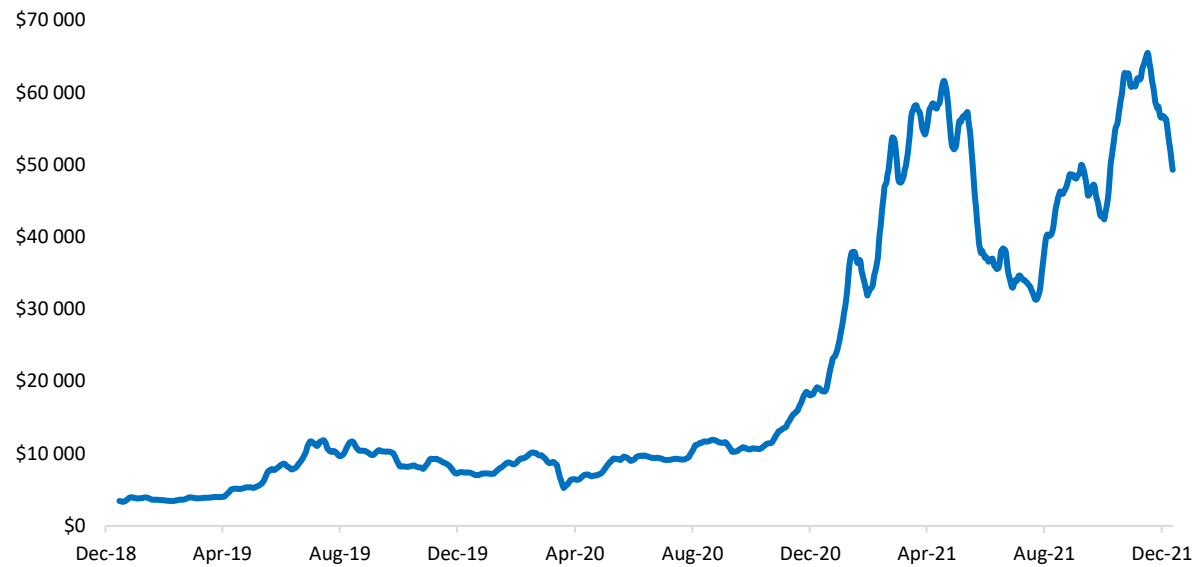
⁹⁰ Emily Heaslip, “Considering Accepting Cryptocurrency? What to Consider,” <https://www.uschamber.com/co>, September 24, 2021, <https://www.uschamber.com/co/co/run/finance/accepting-cryptocurrency-as-payment>.

⁹¹ Carstens, “Digital Currencies and the Future of the Monetary System.”

⁹² Harry Robertson, “Ethereum Transaction Fees Are Running Sky-High,” markets.businessinsider.com, December 9, 2021, <https://markets.businessinsider.com/news/currencies/ethereum-transaction-gas-fees-high-solana-avalanche-cardano-crypto-blockchain-2021-12>.

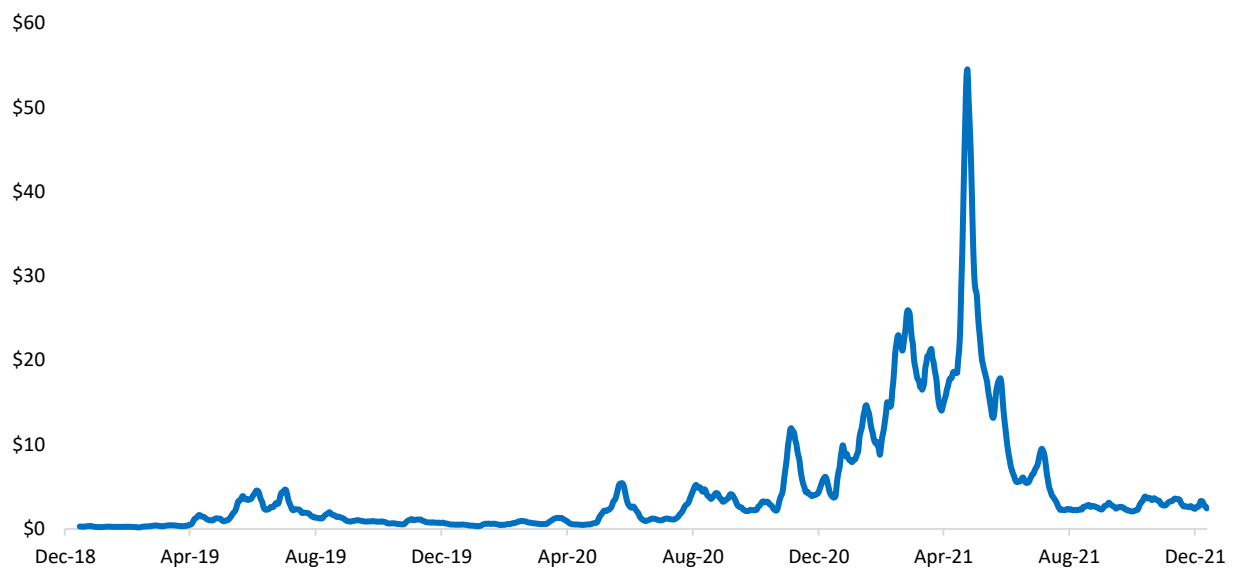
all point to the need for a minimum of official oversight, prudential regulations and traceability, if cryptos are to be considered as money.

Chart 11: Bitcoin average price, Dec 2018 – Dec 2021
In US dollar



Source: www.blockchain.com

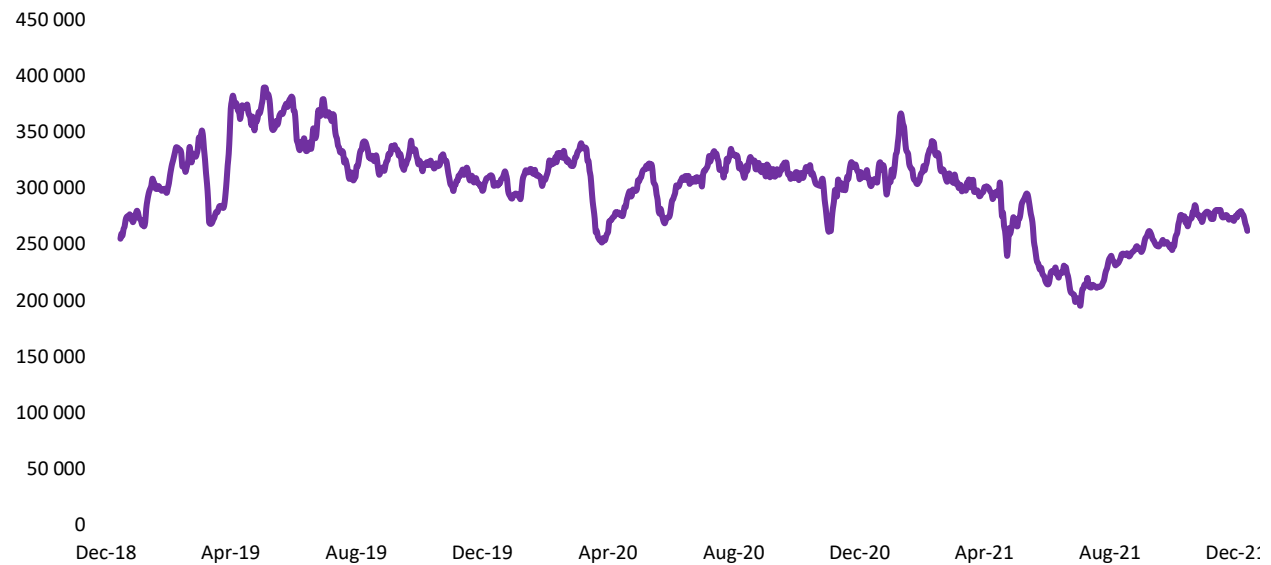
Chart 12: Average Transaction Fee, Dec 2018 – Dec 2021
In US dollar



Source: www.blockchain.com

Chart 13: Average Daily Bitcoin Transactions, Dec 2018 – Dec 2021

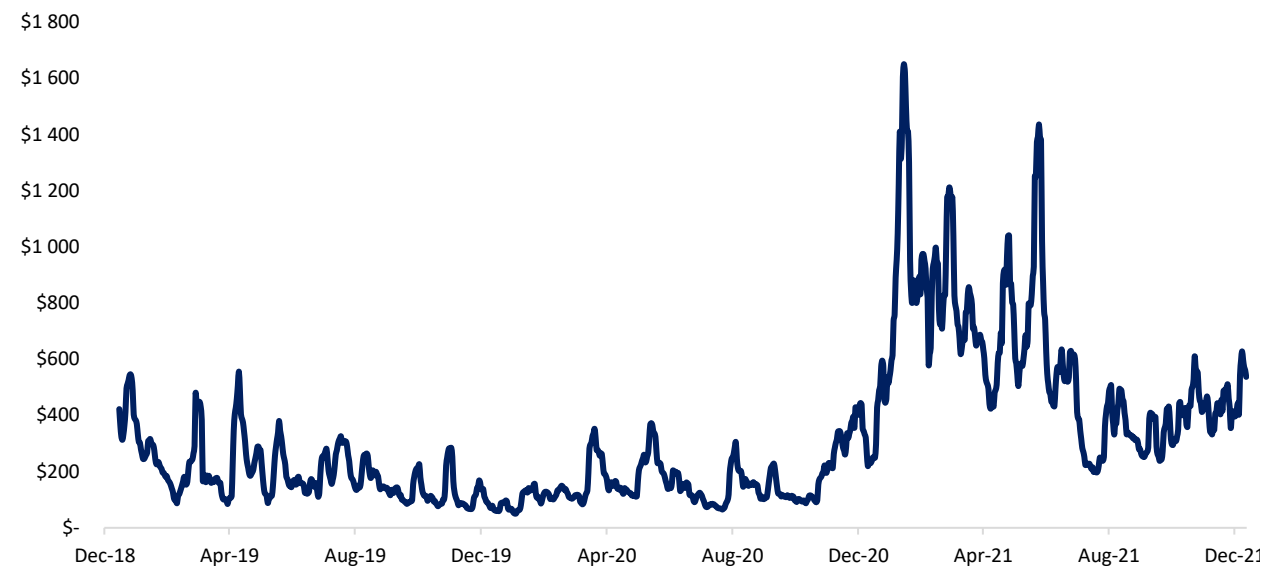
Number of transactions



Source: www.blockchain.com

Chart 14: Bitcoin Average Daily Value of Transactions, Dec 2018 – Dec 2021

US dollar million



Source: www.blockchain.com

5.4 The Sterling-Dollar Transition

The sterling-dollar transition in the early 20th century is perhaps the only historical episode of transitions between world monies where sufficient empirical evidence exists to contrast against theory. As mentioned earlier, the standard explanation that explains currency internationalization with reference to the attributes of an international currency issuer is largely insufficient to account for how currencies achieve and maintain international status. This is increasingly recognized in the literature (Eichengreen, 2014; Eichengreen & Flandreau, 2010; Flandreau & Jobst, 2009).

It would be tempting at first reading to consider Eichengreen (2014) and Eichengreen & Flandreau (2010) as standard Post Keynesian explanations of the dollar's internationalization, with their focus on the role of US financial markets and liquidity provision to the world economy as drivers of the dollar's international role. This is particularly the case of Eichengreen's (2014) concluding remarks where he explains the success of the dollar's internationalization in the 1920s as being the result of the stability, liquidity and size of US financial markets.⁹³ In reality, their accounts are closer to conventional than Post Keynesian approaches to money and it is here that an analysis from the functions of money helps to bring greater theoretical clarity to the arguments presented.

Eichengreen & Flandreau (2010) explain it was the growth of US trade in the early 20th Century, and with it the demand for US dollar trade financing, that set the basis for the growing international use of the dollar. Demand from US exporters for dollar-denominated trade acceptances played an important role in the establishment of the Federal Reserve. Despite the US already being the leading trading nation by the start of World War I, "no trade credit was provided by US banks or denominated in dollars," with exporters relying on sterling acceptances intermediated in London.⁹⁴ The Federal Reserve Act of 1913 lifted the restrictions on US banks branching abroad and permitted the provision of dollar-denominated trade financing, while also positioning the Federal Reserve as a buyer of last resort for these securities, supporting the development of a liquid secondary market. "US banks and bankers' acceptances followed US trade, and US trade followed the laws of gravity. Foreign branching by US banks occurred predominantly in places like Latin America where US trade, for reasons of geography, was most extensive," they write.⁹⁵

What we find in this account is closer to the conventional approach to money. It is the medium of exchange role, but more specifically, the unit-of-account function, i.e. the demand from the US export sector to denominate payments and trade finance instruments in US dollar, that contributed to a greater international role for the dollar. The store of value function followed. The authors set this mechanism out explicitly, stating that "[f]irst foreign exchange trading and trade finance went hand in hand ... Second, the use of a currency as central bank reserves and in foreign trade and payments went together, smoothing trade and payments being one reason why central banks hold reserves."⁹⁶ Yet they also make clear that it is not only "market forces", so prized in the conventional account, that contributed to the internationalization of the dollar, but also "policy support" from the Federal Reserve in shaping and supporting the growth of US financial markets.⁹⁷

They support this view of currency internationalization with empirical data, showing that by the late 1920s, the total value of dollar and sterling trade acceptances was practically equal on the world stage, while by 1929, the US dollar accounted for more than half of global foreign exchange reserves, from a position of relative obscurity a decade earlier.⁹⁸ The present paper brings further empirical evidence to support the account of Eichengreen & Flandreau (2010) in relation to the sterling – dollar transition, drawing on new historical time series for **GDP**, compiled by Frieler & Gieger (2019), for **trade**, provided by Federico & Tena-Jungito (2019) as well as the famous Angus Maddison database for **manufacturing output** provided by Smits, Woltjer & Ma (2009).

⁹³ Eichengreen, "International Currencies Past, Present and Future." (p18)

⁹⁴ Barry Eichengreen and Marc Flandreau, "The Federal Reserve, the Bank of England and the Rise of the Dollar as an International Currency, 1914-39," *SSRN Electronic Journal*, 2010, <https://doi.org/10.2139/ssrn.1717802>. (p3)

⁹⁵ Eichengreen and Flandreau. (p2)

⁹⁶ Eichengreen and Flandreau. (p4)

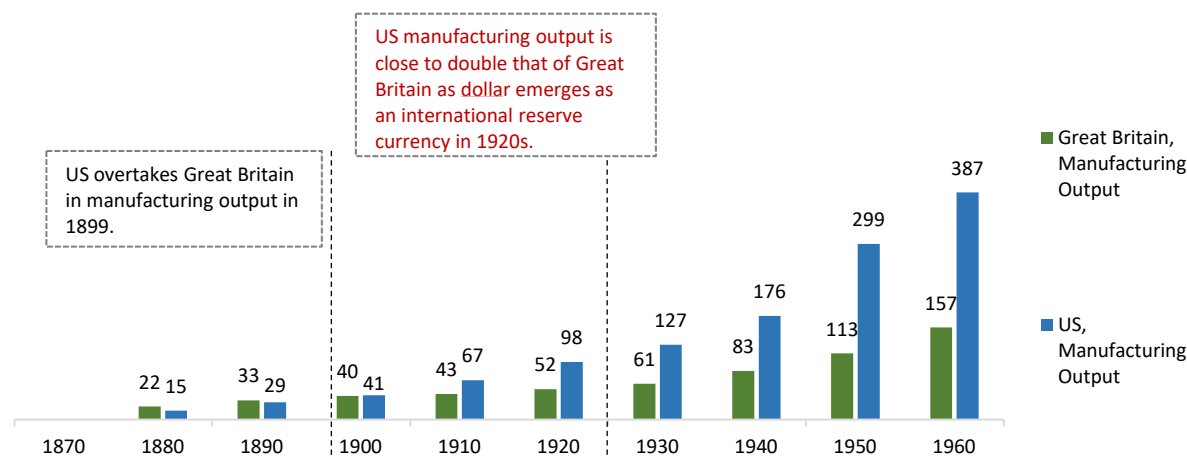
⁹⁷ Eichengreen and Flandreau. (pVII)

⁹⁸ Eichengreen, "International Currencies Past, Present and Future." (p11-12)

What this analysis shows is that the United States first overtook Great Britain in manufacturing output in 1899 (Chart 15), and in share of world GDP in 1901 (Chart 16). In the mid-to-late 1920s, when the US dollar surpassed the sterling as a global reserve currency, US manufacturing output was already double that of Great Britain's, while its GDP was one-third larger. Finally, the US' share of world trade overtook Great Britain's in 1914, with the United States accounting for 14% of world trade, however it was not until close to 10 years later, that the US dollar became the leading international reserve currency. It is also important to mention, as highlighted in these studies, that the US dollar lost ground to the sterling again in the 1930s, following the financial crisis as the Federal Reserve also withdrew its support from the acceptances market. It then regained its place at the top of the currency hierarchy following World War II.

This account suggests that, at least with regards to the sterling – dollar transition, that currency internationalization starts with the medium of exchange and unit of account roles, with the store of value role following. There are two important caveats. The first is that the conventional account asserts the primacy of the medium of exchange function, where agents converge on the money that is most attractive, liquid and stable to intermediate their transactions. Yet, as discussed in these studies, it was specifically pressure from US exporters to denominate trade and to be paid in US dollars, i.e. the unit of account function, that drove the shift in the medium of exchange. This diverges from Krugman's (1984) discussion of changes to the structure of payments as it concerns the choice of pricing and invoicing currency, not the choice of transaction currency or the liquidity of its underlying foreign exchange market.⁹⁹ The second caveat to the conventional account is that private agents were unable to change the choice of international medium-of-exchange alone. Although the US had by 1914 surpassed Great Britain in manufacturing output, GDP and in share of world trade, the dollar could not internationalize without the Federal Reserve stepping-in as a guarantor of last-resort for US trade finance, as well as authorizing US banks to deal in trade acceptances and branch abroad. A purely market-based account of the dollar's internationalization is therefore incomplete without a discussion of the role of institutional and policy factors in driving the dollar's adoption, as reflected in Eichengreen & Flandreau (2010) and which also feature prominently in other *instrumental* explanations of currency internationalization.

Chart 15: Manufacturing View - Great Britain and the United States Manufacturing Output (ISIC D), 1870 to 1960
US dollar billion, constant 2005

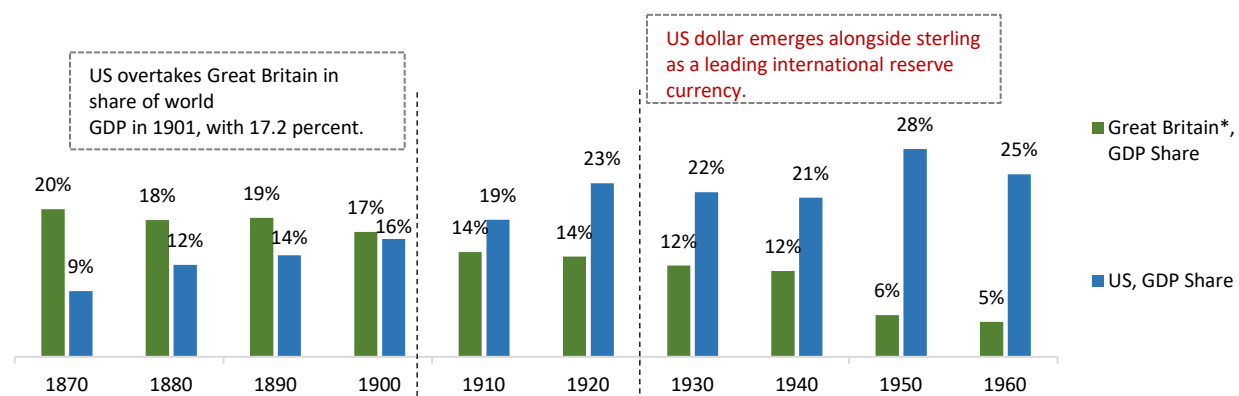


Source: Groningen Growth and Development Centre, Historical National Accounts Database, January 2009¹⁰⁰

⁹⁹ Krugman, "The International Role of the Dollar." (p20)

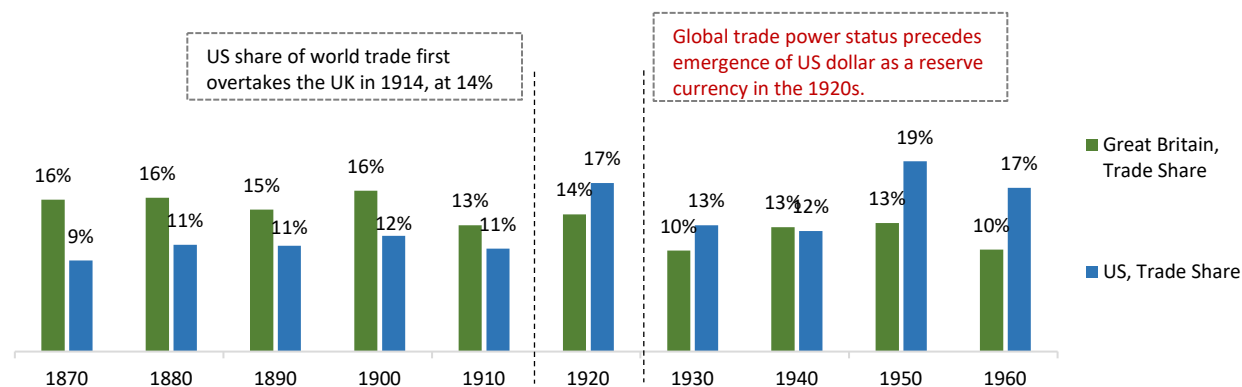
¹⁰⁰ J.P. Smits, P.J. Woltjer and D. Ma (2009), 'A Dataset on Comparative Historical National Accounts, ca. 1870-1950: A Time-Series Perspective', Groningen Growth and Development Centre Research Memorandum GD-107, Groningen: University of Groningen

Chart 16: GDP View - Great Britain and the United States Share of World GDP, 1870 to 1960
As share of world GDP in constant 2005 US dollar (PPP)



*Includes Commonwealth Australia until 1900, New Zealand until 1939, and India until 1947, in line with Benassy (2011)
Source: Frieler & Gieger (2019)¹⁰¹

Chart 17: Trade View - Great Britain and the United States Share of World GDP, 1870 to 1960
As share of world trade in constant 2005 US dollar (PPP)



Source: Pre-1940 trade statistics, Federico & Tena-Junguito, 2019¹⁰²; Post-1940, IMF, International Financial Statistics, 2020

¹⁰¹ Tobias Geiger and Katja Frieler, "Continuous National Gross Domestic Product (GDP) Time Series for 195 Countries: Past Observations (1850-2005) Harmonized with Future Projections According the Shared Socio-Economic Pathways (2006-2100)," application/x-zip-compressed,application/pdf (GFZ Data Services, 2017), <https://doi.org/10.5880/PIK.2017.003>.

¹⁰² Giovanni Federico and Antonio Tena-Junguito, "WORLD TRADE, 1800-1938: A NEW SYNTHESIS," *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* 37, no. 1 (March 2019): 9–41, <https://doi.org/10.1017/S0212610918000216>.

VI. Conclusions

The literature on currency internationalization typically focuses on the essential characteristics of an international currency issuer – namely economic size, liquidity, confidence and a large transactional network – and then uses these as criteria to compare the top international currency to its rivals. The functions of money framework is also often used descriptively to map the international currency hierarchy and understand how currencies are positioned relative to each other in their private uses as *payments*, *invoicing* and *investment* currencies, and in their official uses as *intervention*, *reference* and *reserve* currencies. This paper has argued that this approach is largely inadequate to explain what causes the currency of a country to be adopted and to remain as world money. Rather, it has sought to demonstrate that embedded within an otherwise neutral framework of money's functions are fundamental assumptions about how Economics understands and defines money, as well as very specific views about how currencies achieve and maintain an international position.

Drawing on conventional and Post Keynesian approaches to money, it has discussed how theories of currency internationalization as well as more generally, the debate on questions of international money, are in fact rooted in underlying theories of money. Conventional approaches assert the primacy of the medium of exchange function, with the choice of international money determined by agents choosing to transact in the currency that is the most liquid, stable and that benefits from the lowest transaction costs. The unit of account and store of value roles are in turn derived from the medium of exchange function. Post Keynesian approaches, such as that set out in the *Bretton Woods II* thesis, on the other hand, see money principally as a relationship of debt and credit, with a central country acting as “world banker” and provider of liquidity to the world economy. The debt of the central country is the principal mechanism through which international money is created. Post Keynesian approaches however have not fully elaborated on the relationship between money seen as debt and the functions of money. Instead, they revert to the notion of *fundamental uncertainty* and liquidity preference theory set out in Keynes' writings to explain why money is held by agents for transactional, precautionary and speculative purposes. From this perspective, international money is considered primarily a store of value, inherently demanded by agents for its attractiveness, safety and liquidity. The unit of account and medium of exchange roles are then said to devolve from the store of value function.

Applying this functional approach provides greater theoretical clarity to the international money literature and positions of the various authors. Nonetheless, the shortcomings and issues associated with the underlying theories of money are also inevitably transposed to the international level. In applying the functional approach to the sterling-dollar transition, this paper has sought to demonstrate that although both conventional and Post Keynesian approaches yield interesting and important insights, neither can adequately explain the drivers behind the dollar overtaking the sterling as an international reserve currency in the 1920s. As set out by Eichengreen & Flandreau (2010), it was the choice of *unit of account* by the US' booming trade sector - the desire to invoice, price and be paid in US dollar – along with policy support from the Federal Reserve, that ultimately determined the shift in international medium of exchange, with the emergence of the dollar as an international store of value coming subsequently. This suggests that there is still some distance to go before a more complete theory of currency internationalization can be developed.

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