Defining Money

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Walking down calle Villajimena on a beautiful early October evening in 2007, my arms were laden with books, too many to carry in any other situation. I just had my first meeting with Jesús Huerta de Soto. On his encouragement, I had moved to Madrid to study under him, an event that would drastically alter the course of my life. At this meeting Jesús gave to me in an almost haphazard way the books I carried, stressing that "you'll need to read this, and that, and this one for good measure." Those books formed the backbone of my own intellectual journey, as they did for countless other similar disciples of Don Jesús. They were also, as I discovered quickly, the foundation of his own intellectual tradition. Rothbard, Böhm-Bawerk, Hayek, Kirzner, and of course, Mises, all took central stage. (So too did his own books.) But he steered me towards other eclectic works that I would only appreciate much later as offering a rich complement to the normal list: Lachmann and Polanyi, to give two more well-known examples, but other names and "must read" books cropped up at every meeting. The result was a central pillar, a canon curated by Huerta de Soto, augmented and enriched in unusual and nonobvious but ultimately fulfilling ways. Jesús provided a complete education in economics, plus an emphasis on why one cannot view economics in isolation of law or the moral sciences. Don Jesús, for the continental ideas you inspired within this *anglosajon*, gracias.

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Reception of Jesús Huerta de Soto's *Money, Bank Credit, and Economy Cycles* was nearly universally positive. Criticisms pertained mostly to the analysis of bank credit and its role in propagating economic cycles. Only one reviewer commented on the treatment of money in the book. Writing on the perils of base money, Leland Yeager (2001, p. 255) laments that Huerta de Soto takes "the concept of money for granted, as a primitive concept too obvious to require definition, especially before the emergence of banks." The omission of a satisfying definition of money has not gone completely unnoticed in broader circles. As I have discussed the book with others who use it as a text in money and banking courses there is a general feeling that the topics of "credit" and "economic cycles" are explored at great depth, at the expense of attention to the more fundamental concept of "money."

This chapter concerns the thorny issue of what money *is*. Money is most commonly defined today as "anything that is generally accepted as payment for goods or services or in the repayment of debts" (Mishkin, 2019, p. 57). There is not much for the Austrian economist to quibble with on this point. In various places of his tome, Huerta de Soto defines money as the generally accepted medium of exchange (2006, p. 739, p. 745n, p. 770n, and *passim*). Elsewhere he refers to money as the "only perfectly liquid asset" (*ibid.*, 186). Other authors also share the definition of money as the "generally accepted medium of exchange." The definition is, however, not without its drawbacks. As Rothbard (1962, pp. 192–93) notes:

> whereas the concept of a "medium of exchange" is a precise one, and indirect exchange can be distinctly separated from direct exchange, the concept of "money" is a less precise one. The point at which a medium of exchange comes into "common" or "general" use is not strictly definable, and whether or not a medium is a money can be decided only by historical inquiry and the judgment of the historian. However, for purposes of simplification, and since we have seen that there is a great impetus on the market for a medium of exchange to become money, we shall henceforth refer to all media of exchange as moneys.

Oftentimes, one gets the impression that authors put the cart before the horse when it comes to money. Defining money as the commonly accepted medium of exchange might be helpful, but it also begs a question. The economist takes a leap of faith by overlooking the important question of why a specific good is given this role. Glossing over the question of why a good serves as money leaves a hole in his theoretical corpus.[1] (And a serious

[1] Menger (1909, p. 5) also expresses similar objections to defining money as the generally accepted medium of exchange as a starting point in monetary analysis.

hole at that—there is broad agreement that money is the good with the most wide-reaching effects in the economy.)

Some approaches to money do try to rectify this problem by putting the horse firmly before the cart. Famously, Jevons's (1875, p. 3) focus on eliminating the problem of the double coincidence of wants started with the complicated economic problem of direct exchanges. Money emerges to solve this problem. Menger's (1871, ch. 8; 1892) emphasis on the evolution of money put empirical meat on the bones of Jevons's theory. By showing that commodity money evolved from specific goods valued for certain qualities and attributes, Menger takes the reader through a historical journey from the moneyless to the moneyed world. Mises's (1953, part II, ch. 1) regression theorem incorporates money into a general theory of pricing and allows the economist to understand where the value of modern fiat monies, which seem to lack any direct use value in the sense that gold or shells had, stems from.

This three-step process stemming from the Jevonsian ➜ Mengerian ➜ Misesian approaches to money correspond to the process of identifying the initial problem ➜ finding a solution to this problem by a good which we call money ➜ integrating and understanding the value of money within the scope of the broader economy. The process also forms the theoretical bedrock for the claim that money is the commonly accepted medium of exchange.

While not obviously incorrect, this process trivializes some important questions about the emergence of money. Some of these problems have been alluded to already, for example, does the double coincidence of wants problem require money in its solution? Credit transactions, at least in the modern economy with a well-functioning financial sector, seem to do the job just as well. (My credit card allows me to time the final payment of nearly all my consumption expenditures with the pay day of the fruits of my labor—could not my university pay for my consumption expenditures directly instead of offering me a salary in terms of money?)

Most troubling, one gets the feeling that money is just one good on the end of the liquidity spectrum, as in Keynesian liquidity preference theory, and now the most common view. Here money is demanded according to its liquidity relative to other financial assets, with the prevailing interest rate representing the opportunity cost of holding a money balance. While this view has been criticized handedly as getting the causality wrong in interest-rate determination (see Rothbard, 1962, pp. 786–87), the idea that money differs from other goods only according to its liquidity has survived with relative impunity.

In this liquidity-based view on money, we can reduce search costs and eliminate the double coincidence of wants problem by using money. But we can also do that by using any sufficiently liquid asset. Whether money is different from these other assets is just a question of liquidity. There is no objective way to differentiate money from other assets. In other words, the uniqueness of money is a question of degree and not of kind.

Although Huerta de Soto does not address this point directly, definitions of money as the generally accepted medium of exchange implicitly accept this liquidity view on money.[2] The Pandora's box that results from viewing money as the most liquid good has created the most difficulties for Huerta de Soto's core argument concerning the necessity of full bank reserves against the deposit base. Why must the full reserve be in terms of money if money is not fundamentally different from other assets? In other words, why cannot the bank substitute another good for money to complete its objectives (and even to satisfy its legal requirements), in the same way the consumer and producer substitute between various goods to do the same?[3]

One difficulty in the traditional view on money lies in identifying its particular role. On the one hand, money is held to facilitate transactions. On the other hand, it is held to hedge against felt uncertainty. In the first case, money has value from its ability to be exchanged for other goods and

[2] Two examples on this point, chosen only because of their clarity of exposition and representative view of the prevailing doctrine, claim that money is both the generally accepted medium of exchange and the most liquid asset. Huerta de Soto (2006, p. 186 fn. 9, p. 696 fn. 141, and p. 770 fn. 72) repeatedly stresses that money is the only perfectly liquid asset in the economy. Rothbard (1962, p. 375) does not refer to money as a perfectly liquid asset, instead focusing on its related feature as being the "present good *par excellence*." To the extent that a present good has a readily available market, the "best" present good becomes the most liquid asset. Both Huerta de Soto and Rothbard illustrate theories of money that amount to two sides of the same coin.

[3] In personal correspondence, one well-known member of the "free banking" school asked why I wanted to force the corner solution. In price theory, a corner solution is a common result of a consumption bundle containing a good with no substitutes. His question alluded to my own claim that the bank must hold full reserves in the form of money against its deposit base, and that this money cannot be substituted by other assets (even highly liquid bonds). The corner-solution rebuttal to full-reserve banking proposals has merit. The argument is the logical conclusion of a monetary theory which does not correctly identify the origin of money. The rebuttal also rests on the belief that money's specific role is not completely different in matters of kind but only in magnitude from that of other goods. This chapter rectifies these shortcomings.

services in the present. In the latter case, money has value because it protects the holder against the threat of a future expenditure arising and disrupting the individual's plans. The monetary tradition stemming from the double coincidence of wants problem views the demand for money as stemming from a demand to facilitate trades by minimizing transaction costs. Mises's (1949, pp. 245–51) use of the "evenly rotating economy" introduces a new tradition that views the demand to hold money as a demand to alleviate felt uncertainty. Under this chain of reasoning, money is not held for transactions in general. It is held to facilitate only those transactions that are unexpected, and thus could disrupt the individual's plans.

One way to deal with the tension these two traditions have with respect to the demand to hold money is to return to first principles. First, I will define what makes money unique compared with other financial assets. Building from Mises's use of the evenly rotating economy, I then define what types of uncertainties are relevant to the individual's plan coordination. From this understanding we can look at the specific functions of money to see which functions solve which coordination problems. Finally, we can look at what makes money unique as a financial asset. In this way, we will come full circle. Instead of defining money as the commonly accepted medium of exchange, we will see that this definition is the outcome of a good performing specific roles that solve concrete economic problems which would otherwise disrupt the coordination of the economic agent's plans.

Money in a World of Finance

All financial assets—stocks, bonds, money, and their derivatives—are means to transmit purchasing power intertemporally. Given this purchasing power transmission, the relevant questions that arise in their valuation are "what value do you get in the future" and "when in the future do you get it?" What type of value you get refers to an asset's ability to endow you with a fixed, or predetermined amount (i.e., par value), or a value determined by market conditions at the time of sale (i.e., market value).[4] When you get the value is either in the present (i.e., on demand by the owner of

[4] In almost all cases, the future value is defined in nominal terms. Although inflation-adjusted bonds exist, the market is small. In this chapter, I deal exclusively with financial assets with nominal claims in the future.

		Value of Asset	
		Par	Market
Availability	Present	Money	Equity
	Future	Bond	Future/Forward

Fig. 1 A categorization of financial assets. Source: Howden (2015a, p. 46)

the asset) or after some set amount of time (i.e., in the future). This amount of time can be predefined as a date in the future when the value must be realized, or a date after which the owner can realize the value (Bagus & Howden, 2012, p. 296).

Taken together these two attributes of the type of value and when it can be realized create a schema to categorize financial assets. The four financial assets commonly traded are the result, as outlined in Fig. 1.

Equity holders can access the value of their asset on demand (i.e., in the present). The specific value realized is contingent on the market conditions prevailing at that moment. Bond holders, in contrast, gain the ability to predefine how much value the sale of their asset will bring to them. But this benefit of guaranteeing the value ahead of time comes at a cost: they must wait a predefined (or at least minimum) period.[5] Futures and forwards give their owner a value dependent on future market conditions, and they also oblige their holder to wait for some time before realizing this value.

Money is unique in this categorization of financial assets because it is the only financial asset that endows its holder with a predefined value that is available on demand. One dollar of money will always settle an obligation of one dollar. (In contrast the number of shares needed to settle a debt of one dollar depends on the stock market's valuation at that moment.) Starting from this realization as to the nature of money, we find significant differences with other approaches that center on the use of money as the commonly accepted medium of exchange. One primary difference is that money is here not just an asset on the liquidity spectrum or

[5] A bond holder may, of course, sell their bond before maturity. But in that case, the value is governed by supply-demand conditions prevailing at the time. In effect, the bond is valued as if it were an equity. Futures similarly can be sold at any time, though not necessarily at their predefined value.

value scale. Instead it is an asset with definite qualities that differentiate it categorically from other assets.

Approaches that focus on money's use as an exchange medium commonly treat it as either (1) the most liquid of assets or (2) the most stable financial asset in terms of its nominal purchasing power. In this "medium of exchange" tradition, the only difference between money and bonds is that money is more liquid (i.e., its value can be realized without waiting), and that money normally exposes the holder to less credit risk.[6] Alternatively, the only difference between money and equities in this tradition is that money's value is more stable (i.e., that its bid-ask spread is minimal relative to other saleable goods). But in both cases, money is just seen as an asset on a scale from more to less liquid, and more to less stable in value terms. To give a concrete example, some authors in the "money as a medium of exchange" approach point to the fact that there is little difference between money and a bond with only a few minutes until its maturity. They alternatively point to the fact that money market mutual funds, or a blue-chip stock of stable value, is closer to money than a highly volatile technology share.

If some Austrian economists have found themselves down this path leading to monetary mayhem, they have been led by some well-respected peers. Machlup (1970, p. 225) writes not of money but of "moneyness." Hayek (1976, p. 56) echoes this view, lamenting that money is referred to as a noun (a thing that exists) and not as "an adjective describing a property which different things could possess to varying *degrees*." These economists, and those following them, have only taken the "money as a medium of exchange" logic to its full conclusion. Unfortunately, this conclusion—that money is not a distinct thing but rather a property that some goods have more of than others—leads the economist astray and beckons mistakes.[7]

[6] Whether money has less credit risk than bonds depends critically on the stability of the banking system. During the European debt crisis starting in 2009, the unstable banking system in Cyprus was resolved with a bail in. Under this scheme, depositors with more than €100,000 deposited in a Cypriot bank were forced to take a haircut. Even under less severe banking collapses, deposit insurance schemes pay out on deposits only up to a maximum amount to combat moral hazard. In contrast, US Treasury bonds have never defaulted, and fewer than 5% of high-risk bonds have defaulted over the past twenty years.

[7] Hayek (1976, p. 56) tries to solve the ambiguity problem of defining what money is by shifting the discussion to currency. This is particularly dangerous territory. Hayek prefers discussion of currency to money since the former is clearly defined. To the extent that currency is clearly defined through legal tender laws, such an argument seems to bring the economist back to the chartalism theory of the German Historical School.

By recognizing that money is the asset that is exchanged at par value on demand, we start the analysis by realizing that money is categorically different than other financial assets. It is not just one extreme of a liquidity or value spectrum, but actually defines the spectrums.

Money is not just a more liquid asset than bonds. If it were just this factor—the time before its value can be realized—there would be no significant difference between money and bonds. (In this respect note that money and bonds are column mates in Fig. 1.) It is only by referring to the continual availability of money that we can state that a bond has a greater or lesser degree of liquidity. We must also recognize that money is not just an asset that trades at a stable value relative to equities. If this were the only factor concerning us—the stability of the value that can be realized by the asset's sale—there would no significant difference between money and equities. (Here we see that money and equities are row mates in Fig. 1.) Instead, we now realize that the stability of money's nominal value is what allows us to refer to different equity classes as being more or less volatile in terms of their value dimension. It is only when we discuss money in terms of its two attributes simultaneously—the on demand and par value nature of its value—that we can pinpoint exactly how and in what ways money differs from other assets.

The difference between money and other assets is one of kind, and not only of degree. This helps shed light on the demand for money. It is only in a superficial sense that money is demanded because it is a highly liquid asset. This liquidity feature cannot be the sole reason money is demanded because it is a quality shared with other financial assets (e.g., equities). Money also cannot be demanded only because its purchasing power is predefined in nominal terms. Bonds also share this feature (abstracting from default risk). Money is demanded for its uniqueness. Money is the only asset that combines both value attributes—on demand availability at par value—in one package.

The second advantage of viewing money as not just the "commonly accepted medium of exchange" but the asset that sells at par value on demand is that it points to an analysis of its specific functions. This approach is the opposite to other approaches, which start by identifying money's functions and then uses those functions to define money.

In times past, a common mnemonic aided the student in remembering the functions of money. "Money is a matter of functions four: a medium, a unit, a standard, a store." This list of functions is not accidental. It is the

result of looking at two fundamental roles of money both a- and inter-temporally.

If there is widespread agreement that money emerged and exists today to facilitate transactions, there is considerable disagreement as to how it performs this role. On the one hand are the economists who view money as fundamentally a medium to exchange to facilitate trade. This line of economists stems from Jevons. On the other hand, and less commonly, are those economists who view money's fundamental role as being the good that other goods are priced in. (A common denominator of sorts.) Walras was the first economist to broach the idea of a good serving as a numéraire to express the prices other goods within a general equilibrium setting. More recently, the idea that money serves only as a pricing unit has been revived under non-equilibrium conditions by Kocherlakota (1998), Kiyotaki and Moore (2002), and Yeager (2010). In this tradition, money serves only as a pricing unit to keep a track record of our past transactions. Taken together, the roles of pricing unit and exchange medium are in fact the defining characteristics that the previous mnemonic alludes to.

The four functions of money commonly listed in economics textbooks are the outcome of viewing money's two roles—pricing unit and exchange medium—in both the present and over time. The four resultant monetary roles are illustrated in Fig. 2.

First consider money's role as a pricing unit. When the economist thinks of money as being used to define prices, he typically has in mind the "unit" in the mnemonic: the unit of account. All goods are priced in terms of some other good. The comparison of relative prices, and the assessment of opportunity costs, is eased by giving all prices a common denominator to express them in.[8] This pricing unit can either define prices in the present (the unit of account) or in the future (the standard of deferred payments).

The previously mentioned mnemonic is not frequently encountered by modern students of economics. The standard of deferred payments is the use of a good to define prices payable in the future. With the advent of legal tender laws, this role was largely subsumed by the same good that serves as the unit of account. As debtors now have the option to repay future obligations in terms of the legal tender, the distinction between a good denominated in terms of another good in the present and a different

[8] The computational advantage using one good to determine all prices is obvious. An economy with n goods will have $n(n-1)/2$ prices under conditions of direct exchange but only $n-1$ prices if one good is used to express all prices.

		Monetary Role	
		Pricing Unit	Exchange Unit
Availability	Present	Unit of Account	Medium of Exchange
	Future	Standard of Deferred Payments	Store of Value

Fig. 2 Money's four roles revisited. Source: Howden (2015a, p. 49)

good in the future became unnecessary. Legal tender laws give the debtor an unfair advantage. He can select the less valued good to repay the debt and impose the cost on the lender. As a consequence, all future-dated contracts are denominated in terms of the current pricing unit (the unit of account) to put the debtor and creditor on even terms.

Likewise, the functions of the medium of exchange and store of value are two sides of the intertemporal coin. When the economist discusses the medium of exchange, he does so to refer to the exchange of one good for another in the present. When he discusses the store of value, the discussion centers on holding a good until some future date when it will be exchanged to settle an obligation.

While in the modern world the economist is accustomed to a unique good satisfying both monetary roles of the pricing and exchange units, there are many historical cases of the roles being fulfilled by separate goods.

Goods that have served as a pricing unit, both as a unit of account and a standard of deferred payments, have been numerous and varied over history. Gold and the other precious metals have served this role, but so too have less conventional goods. Of these unlikely goods are the commonly cited examples of cigarettes in POW camps (Radford, 1945), large circular Rai stones on the south Pacific islands of Palau and Yap (Bryan, 2004), and even slave women (kumal) in Early Medieval Ireland (Nolan, 1926).

Goods that have served as exchange units, both as the medium of exchange and the store of value, have been mostly confined to the precious metals. The qualities of commodity money, typically listed when the student of economics first learns the story of money's historical emergence, center on attributes such as divisibility, durability, rarity, ease of identification and transportation, and widespread demand. The precious metals have fulfilled these roles best among the goods serving the exchange role of money until now. These qualities do not, however, seem to describe the goods that have served as a monetary pricing unit. Cigarettes, large

stones, and women, just to name a few, are indivisible, not easily transported, and of questionable durability. They are also not necessarily widely demanded or available.

The fact that the goods that have been used as pricing units that do not embody the common qualities of money is not problematic. For a pricing unit, the only qualities that matter are that the value of the good is widely recognized and that this value can be expressed in terms of some other good functioning as the exchange medium. In this way, opportunity costs and relative prices can still be established. It is a historical question whether it is easier to use one good for both monetary roles. Relatively recent examples of a different good being used to define prices than the one being exchanged to settle an obligation are also available (e.g., the use of US dollars to price goods in high inflation countries while the local currency is still exchanged at the prevailing exchange rate). There is no record that slave girls were ever exchanged in Early Medieval Ireland. There is widespread evidence that a standard list of "exchange rates" existed that allowed for prices denominated in kumals to be paid for by some other goods.[9]

While it is common to define money today as the "commonly accepted medium of exchange" we see that, theoretically and historically, this is only one half of the roles money performed. Consider what happens when the same good serves as a medium of exchange and unit of account, for example, gold during the gold standard. The outcome is that the exchange rate between gold as the unit of account and gold as the medium of exchange is 1:1. It is this outcome—the twinning of the monetary roles in one good—that creates the conditions under which the par value nature of money emerges.

When two goods serve separately as each of the monetary functions, an exchange rate must exist between them. Slave women may have been used as the pricing unit in Early Medieval Ireland, but they were never used to settle the obligations. Under the bimetallic standard in the United States, priced were defined in terms of gold, but silver could be exchanged in payment at the prevailing gold-to-silver exchange rate. The present discussion is not about whether the separation of the unit of account from the medium of exchange is beneficial or destabilizing. The answer to this

[9] Two legal texts, *Senchus Mor* and the *Book of Aicill* both contain tables outlining the prevailing "exchange rates" for a kumal. They also make clear that ultimate payment was to be made in either land or silver.

question is historical. It depends on the particulars of the time and place. (On this point, the interested reader can revisit the literature on New Monetary Economics, helpfully summarized in Cowen and Kroszner (1994)). With respect to the bimetallic period, evidence shows that the fixed gold-to-silver exchange rate proved destabilizing for the US economy relative to the gold standard period.

The discussion of what roles money performs is useful because it now allows us to shed light on the revised definition of money provided herein. We have previously seen that money is not necessarily the commonly accepted medium of exchange (although serving as a "medium of exchange" is one of the monetary roles). Money is unique because it is that asset that trades on demand and at par value. The twinning of these two attributes can only arise when one good serves as both the exchange unit and pricing unit. In this case, the exchange rate between the pricing unit and exchange unit becomes 1:1.

By way of example, consider what happens when you withdraw $100 from your checking account. If your checking account is defined in terms of US dollars, then you know that the transaction will be performed at an exchange rate of 1:1. The withdrawal changes the composition of your money balance but not the overall level. There is no risk that you will get less than $100 in currency because the units that define the checking account are the same as those being issued as medium of exchange. In a similar example, consider what happens when you buy a shirt priced at $20. In this case, you exchange $20 from your money balance to satisfy the obligation of $20 to buy the shirt. The 1:1 exchange rate between the exchange medium and unit of account leaves you with no risk that you will lose nominal purchasing power between the point where you accumulate (or earn) your medium of exchange and that point at which you exchange (or spend) it.

In a similar way, pricing goods in terms of the same good used in settlement allows for no wait time before you can realize the value in your money balance. If a good is priced in terms of the same good you hold as the exchange medium, there will always be a ready market available to sell (or exchange) it into. It is with this point in mind that Rothbard (1962, p. 375) referred to money as the "present good *par excellence*." This is not necessarily the case when two different goods perform the two monetary roles. In this case, an exchange between at least two goods must occur before the transaction is complete. The time between when the transaction is started and finalized exposes both sides of the exchange to risk.

This risk is analogous to the exchange-rate risk that occurs when someone uses their local currency to settle an obligation denominated in foreign currency.

It is not to be inferred from the discussion to this point that there is anything obviously wrong with defining money as the "commonly accepted medium of exchange." Instead, the preceding discussion serves to illustrate that doing so obscures important monetary roles that must be fulfilled before money earns this position. We also now have a framework to analyze historical cases where separate goods have been used simultaneously in different monetary roles.

Starting from the proposition that money is the unique financial asset that trades at par value on demand, we can then move to a discussion of what conditions are necessary for this to occur. The necessary and sufficient conditions for a good to trade at par value on demand are that it serves as both the exchange good and pricing unit simultaneously. Only when these two roles are fulfilled by the same good will that good be endowed with the properties necessary to be called money. By focusing on only one of money's roles (use in exchange or use in pricing) the good will not complete the conditions that make money unique relative to other goods.

The analysis thus far has answered one question—what is money?—by pointing to the ways that money is unique in a schema of financial assets. It has also shed light on the necessary and sufficient conditions for money to take on this definition. The question of why money would be valued and demanded for this uniqueness have been left unanswered. In the next section, we turn our attention to these questions.

Uncertainty, the Root of All Money

Mises (1949, pp. 244–51) uses the "evenly rotating economy" is a thought experiment that allows the economist to understand the conditions under which money would not be necessary. From this it is possible to infer the conditions under which money is necessary.

Consider a world in which each day repeats in terms of its income and expenditure streams. With full certainty of the cashflows, Mises shows that the demand for money falls to zero.[10] The reason is that if the individual

[10] Actually, Mises shows that the demand to hold money as a medium of exchange falls to zero. Money still exists as a numéraire to establish the prices of goods (Howden, 2009).

knew in what ways his expenditures would differ from his income he would either (1) buy a bond that matures in the relevant period to fund a future expense, or (2) settle the transaction in the present on the futures market at a discount (Howden, 2015b, p. 15).

When Mises writes of uncertainty as the guiding force behind the demand to hold money, he is actually speaking of a specific type of uncertainty. He extends[11] Knight's (1921) treatment of uncertainty by way of case and class probabilities. Building from these probabilities, we can categorize the origins of uncertainty and how they pertain to the demand for financial assets in general, and money in particular.

Financial assets are valued according to what income stream they endow their holder with, and when that income stream will be realized. This "what you get and when you get it" approach is most obvious in valuation models that discount future cash flows to determine an asset's present value. Rarely is a discussion broached as to why a given financial asset is demanded in lieu of another, for example, why invest in an equity and not a bond? Answers to this question have until now been answered only unsatisfactorily. An example of the confusion around this problem is found in the equity premium puzzle (Mehra & Prescott, 1985). Alternatively, the problem is skirted with any differences in demands between different financial assets distilled to nonmarket differences, for example, the differing tax treatments found in the Modigliani–Miller theorem.

Consider the typology of risks and uncertainty provided in Fig. 3. Here I differentiate the outcomes depending on whether the individual has knowledge of the timing or of the magnitude of a future expenditure. These attributes are chosen because in valuing financial assets, including money, the holder cares only of the form and the timing of the future payment.

Mises's (1949, ch. VI) introduction of case probabilities is best understood as elaborating on and making specific the conditions that Knight alluded to in his discussion of uncertainty. I offer a further refinement here, by specifying that case probabilities (or Knightian uncertainty) require a simultaneous lack of two specific types of knowledge. First, the individual must not know when (or if) a future event will happen. Second, he must not know the extent of the event. Since we are here dealing with financial assets, the future event in question will always be one of cashflow. A complete lack of knowledge with respect to both the timing and

[11] Unwittingly, as the case may be (see Herbener et al., 1998, p. xvi).

		Timing of Expenditure	
		Known	Unknown
Magnitude of Expenditure	Known	Certainty	Structural Risk
	Unknown	Class Probability, Systemic Risk	Case Probability, Knightian Uncertainty

Fig. 3 Risk and uncertainty types. Source: Howden (2015b, p. 15)

magnitude of an expenditure will leave one with a true case of Knightian uncertainty. The recent turmoil related to COVID-19 falls into this category. No one knew that the event would occur in the magnitude that it did, and there was no way to estimate the timing (or duration) of the event.

The less constrained case that Mises analyzes, class probability, requires that the individual lacks knowledge of only the magnitude of an event. The individual does know, however, when the event will occur. I refer to these types of risks as systemic. The term refers to the fact that the individual knows not how the specific parts of the state of the world will turn out, but he can take comfort in knowing that some future event will occur. Here we can point to the standard textbook risks such as casino games or recurring expenses, such as car insurance, which must be purchased by law but the amount of which is subject to change.

Mises does not analyze the north-east quadrant of Fig. 3. I refer to this specific risk as structural. Here the structure of the event is known (in this case, in terms of its magnitude) though the individual cannot say when or if the event will happen. As an example of this risk, we know that the roll of the die will yield a certain value one-sixth of the time, but not when or if that value will prevail.

This look at types of risks and uncertainty matters with respect to how the individual deals with the future events. In cases where the timing and magnitude of a future expenditure are known (the north-west quadrant of Fig. 3), the individual has two options to match the expense against his income. The first is to settle it early at a discount (i.e., prepay). The second is to buy a bond of appropriate duration that matures at the moment the expense arises. Note that both of these alternatives amount to the same operation in economic terms (the only difference is who the counterparty ultimately financing the expense is).

Structural and systemic risks can be hedged for, if only approximately, by buying a stock or bond. In the case of structural risk, an equity holding

can be sold at any moment to provide the income necessary for the expense whose timing was unknown in advance.[12] Alternatively, if the timing of the expense was known in advance, then a bond could be purchased with a maturity consistent with the funding need. In both cases, the individual hedges his future risks in an efficient manner to reduce his opportunity costs.

Case probabilities, or Knightian uncertainty, create more difficult scenarios to hedge. Here the individual knows neither the magnitude nor timing of a future event.[13] Traditional financial products are not helpful in hedging since their owner will remain exposed to either timing risk or funding risk should the eventuality arise. Still, there is one option available to the individual. Money is the financial asset that is available on demand and at par value. Holding money endows him with the funds to meet a future nominal expense, regardless of when or whether it occurs. It is in this case that we see what Mises proved through his evenly rotating economy thought experiment. The "rotation" that must be "even" in his theoretical economy is across both the timing and magnitude of future cash flows. If either one of those streams is unknown while the other is known, the individual can hedge the risk by holding an alternative financial product (either a stock or a bond) instead of money. It is only in the constrained case of a complete lack of knowledge concerning the timing and magnitude of a future expense that the individual must resort to money to alleviate his felt uncertainty. The use of any other financial asset will forever leave him with some degree of residual risk which will not be able to be hedged away. This residual risk endangers the perceived coordination of his plans and, when taken to the extreme, imperils his ability to accomplish his goals.

[12] A bond could also be sold before maturity to the same effect. Recall that the value received from the sale of a bond sold before maturity will be the market value prevailing. This fact makes the early redemption of a bond an economically identical event to the sale of an equity.

[13] One strand of literature deals with Knightian uncertainty as an epistemological problem. Knowledge of certain future events is completely absent. While these cases are interesting from a theoretical perspective, they have no bearing on acting man. Man acts on what he perceives. Forces outside of the realm of his consciousness cannot shape the demand to hold an asset. In contrast, some degree of knowledge of the existence of a future state of the world is necessary to influence the demand for money. Such knowledge does not need to refer, however, to the exact temporal or value dimensions of the future state of the world.

Conclusion

We can now combine the insights of this chapter to understand why money exists and where its demand originates from. Since a lack of knowledge is unavoidable, individuals will always be exposed to certain risks and uncertainties. Sometimes the lack of knowledge will only concern the timing of a future event. Other times it will concern the magnitude of a future event. But sometimes a lack of both of these types of knowledge will be at hand, creating case probabilities or Knightian uncertainty.

These uncertainties are detrimental to the individual's plan coordination. The economist commonly realizes the reasons behind the demand to buy property insurance (alleviate a structural risk) or life insurance (alleviate a systemic risk) but has until now overlooked the way the individual combats Knightian uncertainty.[14] Uncertainty differs from structural and systemic risks because the individual lacks complete knowledge of both the timing and magnitude of the future expenditure. The only way to hedge against such unknowledge is to hold an asset that pays out (can be exchanged) at any time and at a predefined value. Money is the unique financial asset that enables such an exchange.

If money is unique among financial assets owing to its ability to be exchanged on demand and at par value, it is important to realize what attributes endow it with such features. It is only when a good is used to define prices and is also exchanged to settle those expenses that it can circulate on demand and at par value. This allows us to understand the items that must be included in the money supply much better. Instead of adjudicating what money "is" based on various liquidity concerns, as is common with the "M" measures, one can instead point to those goods circulating on demand and at par value and are denominated in the same terms as are prices.

As a simple first application, note that this quickly resolves the question of whether various cryptocurrencies should be considered as money. To the extent that they facilitate payment of various goods they are definitely media of exchange. But since they are not used to define prices, they cannot be considered money in the broad sense.[15]

[14] The reader may object to my characterization of death as a systemic risk. The purpose of pooling insurable lives by a life insurance company is to pinpoint, in probabilistic terms for a class of individuals, when a death will occur.

[15] I say "broad" sense here because in some narrow markets a price could be established in terms of, for example, bitcoin, and bitcoin could be exchanged to pay for this good. In practice, prices are established in terms of some other money, for example, US dollars, and then a cryptocurrency is exchanged for dollars at the prevailing market exchange rate. The transaction is no different than an individual selling his equity investment at the prevailing price to buy US dollars to complete a transaction. Given this fact, it is most correct to think of a cryptocurrency as a non-dividend paying stock.

As a second application of the theory contained in this chapter, consider the implications for bank reserves. Under one popular train of thought, money is just the most liquid asset on a liquidity spectrum. It is not differentiated from a house due to its nature, but instead is only considered to be a more liquid and readily saleable asset. Proponents of such reasoning see no reason why bank deposits must be on demand, par value assets. As a consequence, banks must make a best-efforts basis to create these qualities in order to attract customers, but they are under no legal obligation to do so. On the other hand, if one realizes that money is categorically different from other assets, he also realizes that the obligations governing its transactions are distinct. The purpose of money is to hedge uncertainties. This ability can only occur by way of a par value demandable asset. As such, money and money substitutes must retain these qualities, with implications for the obligation the bank faces when it converts a specific form of money (currency) into another (a demand deposit).

Finally, consider a third application. Efforts or restrictions that impact the "moneyness" of an asset do not just impair its monetary use quantitatively. They qualitatively change the nature of the asset into something else. The withdrawal clause, common in the nineteenth century British free-banking episode, was used to impose a waiting period between when a customer requested his deposit and when the bank was obliged to remit it to him. The withdrawal clause did not just cause money to lose its moneyness (i.e., lower its liquidity)—it converted depositors into creditors, bond holders to be specific. In a similar way, various movements in the wake of the Great Recession to give depositors a haircut on their deposits not only made the deposit a less liquid asset. They had the effect of converting the depositor into an equity investor in the bank. In both cases, the individual's plans would be disrupted as the outcome that motivated his original demand to hold money—to hedge an uncertainty—was frustrated by converting the means to alleviate this outcome (money) into an asset unsuited and unable to fulfill the task (an equity or a bond).

The economists of the Austrian School paved the way for monetary economics by showing that money emerged to solve specific problems, and that it can be valued in a general theory of pricing. These economists have also done much work in analyzing the effects of near monies, such as various credit instruments. This chapter has built on that tradition and augmented our understanding of the definition of money and the factors that affect its demand.

Money is not first and foremost the generally accepted medium of exchange, even though that statement is not entirely wrong. Money is a special financial asset that emerges to alleviate the definite economic problems of 1) plan disruption caused by uncertainty and 2) to facilitate the completion of previously conceived plans. The only way for a financial asset to perform these roles is to sell at par value and on demand. In order for a good to sell at par value and on demand this financial asset must be the good that is exchanged to settle transactions that are priced in terms of itself. Money is the specific good that embodies both of these monetary roles—as both the pricing unit and exchange medium. It is for this reason that money happens to be the generally accepted medium of exchange.

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