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F.18 The Recording of Fungible Crypto Assets in Macroeconomic Statistics

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INTERNATIONAL MONETARY FUND

F.18 The Recording of Fungible Crypto Assets in Macroeconomic Statistics[1]

This guidance note (GN) discusses the recording of fungible crypto assets in macroeconomic statistics. It presents a classification of this type of crypto assets into three broad categories, explaining that all of these meet the asset boundary. Regarding their classification, there is consensus that those with a corresponding liability should be recorded as financial assets, but no consensus has yet been reached on the recording of crypto assets without a corresponding liability designed to act as a general medium of exchange and those designed to act as medium of exchange within a platform only. The GN presents three recording options for these specific types of crypto assets with their pros and cons. The GN recommends that countries start collecting and sharing the necessary data to measure the transactions and stocks of these assets and to compile related statistics.

SECTION I: THE ISSUE

BACKGROUND

1. **Recent years have seen a significant proliferation in the number and types of crypto assets.** There is no universal or consistent taxonomy yet, and guidance on how to record them in macroeconomic statistics is still largely absent. For that reason, the IMF and the OECD started to explore the statistical measurement of crypto assets in 2018. Discussions took place at the meetings of the IMF's Committee on Balance of Payments Statistics (Committee),[2] the OECD Working Party on Financial Statistics (WPFS),[3] and the Advisory Expert Group (AEG) on National Accounts, feeding into interim guidance on the recording of crypto assets in macroeconomic statistics. This has been reflected in an IMF paper that was published in 2019 [4] in consultation with the AEG.[5] To address some pending questions and in response to the constant emergence of new types of crypto assets, the OECD further explored the issue and came up with updated proposals in 2020.[6]

[1] Prepared by Jorrit Zwijnenburg (OECD), Allison Derrick (BEA), Celestino Giron (ECB) and Artak Harutyunyan (IMF), with important contributions from Venkat Josyula, Marcelo Dinenzon, Emmanuel Manolikakis, Jose Carlos Moreno-Ramirez, and Shirono Kazuko (all from IMF).

[2] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_IMF.pdf.

[3] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_OECD.pdf.

[4] https://www.imf.org/external/pubs/ft/bop/2019/pdf/Clarification0422.pdf.

[5] The majority of AEG members agreed that crypto assets without corresponding liability should be classified as produced nonfinancial assets in a separate category under valuables. It was also noted that this guidance for dealing with crypto assets might not be future proof but uses the best possible classification options for the current use of crypto assets.

[6] https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.20/2020/mtg1/3.3_Working_paper_on_recording_of_crypto_assets_-_June_2020.pdf.

2. **Crypto assets are digital representations of value that rely on cryptography[7] and decentralized peer-to-peer architecture based on distributed ledger technology (DLT),[8] which enables two parties to directly transact with each other without the need for a trusted intermediary.** Crypto assets can be broken down into fungible and non-fungible. The former, refers to assets which are divisible and not unique (e.g., one bitcoin is equal to any other bitcoin and can be divided into equal pieces of similar value). Conversely, non-fungible crypto assets (NFA) are unique and non-divisible (e.g., an NFA giving rights with regard to a digital piece of art is different from an NFA related to another digital artwork). This guidance note focuses on fungible crypto assets. The recording of non-fungible crypto assets (more commonly known as non-fungible tokens (NFTs)) will be discussed in a separate guidance note, given their different characteristics.

3. **Whereas there is largely an agreement on the recording of most types of fungible crypto assets, discussion remains on the recording of (fungible) crypto assets without a corresponding liability designed to act as a general medium of exchange (CAWLM) and those designed to act as a medium of exchange within a platform only (i.e., payment tokens without a corresponding liability (CAWLP))**.[9] The discussion mainly revolves around whether these types of crypto assets are financial or nonfinancial and how to account for their creation. This GN presents the current consensus on the recording of most types of crypto assets and discusses three recording options (with their pros and cons) for CAWLM and CAWLP. For each recording option, the GN provides additional information in comparison with earlier papers, such as numerical examples and new conceptual and practical considerations. As CAWLM and CAWLP are both designed to act as medium of exchange, only differing in scope (i.e., generic versus specific), the basic classification options and corresponding arguments will be the same. For that reason, the paper focuses on CAWLM, bearing in mind that the same line of reasoning will apply to CAWLP. In that regard, both crypto asset types will be classified similarly in terms of financial versus nonfinancial and produced versus non-produced. They will only be included in separate (sub)categories to clearly separate them, given their difference in scope.

4. **Although the classification of CAWLM should be primarily based on macroeconomic statistics principles, it is also relevant to carefully assess arguments by policy/regulatory/legal users for advocating a specific treatment of these types of assets, as well as latest guidance from the international accounting standards.**[10] Ideally, the proposed classification should avoid possible

[7] Cryptography is the conversion of data into a secret code for transmission over a public network.

[8] A distributed ledger is a database that is consensually shared and synchronized by a network spread across multiple sites, institutions, or geographies. The participant at each node of the network can access the database records and can own an identical copy of it. Any changes or additions made to the ledger are reflected and copied to all participants in a short lapse of time. Transactions are verified and confirmed by some network participants. This system is facilitated by the so-called distributed ledger technology (DLT). Blockchain, the technology that underlies Bitcoin, is an example of DLT.

[9] The note currently refers to CAWLM and CAWLP, but more suitable terms will be needed for inclusion in the new macroeconomic statistical standards. This will be explored together with the editors of the new System of National Accounts and the Balance of Payments Manual.

[10] In this regard, the IFRS Interpretation Committee Agenda Decision of June 2019 noted that a holding of cryptocurrency is not a financial asset. This is because a cryptocurrency is neither cash nor an equity instrument of another entity. It does not give rise to a contractual right for the holder, and it is not a contract that will or may be

conflict with the current thinking of monetary authorities, financial regulators, and international financial institutions such as the BIS[11] and the IMF (Annex I provides a summary of IMF user perspectives based on a recent consultation). In this regard, their main argumentations for proposing a specific treatment of CAWLM should be considered.

ISSUES FOR DISCUSSION

Issue 1: Typology of Fungible Crypto Assets

5. **As there are several types of fungible crypto assets, which may require a different recording in macroeconomic statistics and for which users would like to obtain separate information, developing a sufficiently granular classification is important.** Both the IMF (2019) and the OECD (2020) papers include a proposal for this purpose, which are broadly in line.

6. **Currently, fungible crypto assets can be grouped into three broad categories:**

- Crypto assets designed to act as a general medium of exchange[12, 13]
    - with a corresponding liability:
        - issued by a monetary authority (e.g., central bank digital currencies (CBDCs) that qualify as crypto assets)[14]
        - not issued by a monetary authority (e.g., stablecoins with a claim on the issuer)

settled in the holder's own equity instruments. IAS 38 Intangible Assets or IAS 2 Inventories are the applicable standards for cryptocurrencies with no claim on the issuer.

At the same time, the IASB has identified the treatment of cryptocurrencies as a potential reporting issue for inclusion in its work plan for 2022 to 2025 in the context of the corresponding Agenda Consultation. The inclusion would be justified inter alia by concerns raised by stakeholders that "the accounting required by IAS 38 Intangible Assets for cryptocurrencies may not provide useful information, because the economic characteristics of cryptocurrencies are similar to cash or other financial instruments, rather than to intangible assets" (Request for information: Third Agenda Consultation, paragraphs B14 to B16).

[11] See BIS Consultative Document Prudential treatment of crypto asset exposures.

[12] Medium of exchange is defined as a means for acquiring nonfinancial assets (goods, merchandise equipment, etc.), services, and financial assets without resorting to barter. Acting as a medium of exchange is one of the basic functions of money, which takes the form of various types of financial instruments. Money is mainly held for its usability as medium of exchange, store of value, or both (see *Monetary and Financial Statistics Manual and Compilation Guide (MFSMCG)* (IMF, 2016) paragraphs 6.7 and 6.10). Means of payment, on the other hand, refers to the instrument used to make the payment, such as a check, debit, or credit card.

[13] Many crypto assets that are designed to act as general medium of exchange may not (yet) act as such. However, it is the main characteristic that differentiates them from other types of crypto assets and that presumably provides their basic underlying value. As for any other kind of assets, their value may be affected by other factors (e.g., speculative activity) which may sometimes cause relatively high volatility at times and thereby hamper their ability to act as a medium of exchange. Nonetheless, they ultimately derive their value from the expectation that they may be used (now or in the future) as a medium of exchange.

[14] Based on the information available on various CBDCs, it is confirmed that some CBDCs use cryptography (permissioned blockchain). For example, the Eastern Caribbean Central Bank (ECCB) uses a blockchain protocol called IBM Hyper-ledger Fabric for its digital currency DCash. However, this is not the case for all CBDCs. So, whereas all CBDCs would qualify as digital assets, only those that rely on cryptography will qualify as crypto assets.

    - without a corresponding liability (CAWLM)[15] (e.g., crypto assets such as Bitcoin and stablecoins without a claim on the issuer such as Terra)
- Crypto assets that only act as a medium of exchange within a platform or network (i.e., payment tokens)[16]
    - with a corresponding liability
    - without a corresponding liability (CAWLP)[17]
- Security tokens (which always have a counterpart liability)[18]
    - Debt security crypto assets (e.g., Bond-i[19] issued by the World Bank); this also includes utility tokens that provide the holders future access to goods or services[20]
    - Equity crypto assets (such as Meridio)
    - Derivative crypto assets (i.e., derivative contracts that rely on cryptography and that can be exchanged peer-to-peer even if the underlying asset is not a crypto asset).

7. **In this classification, no separate category has been included for hybrid tokens.** In line with how statistical manuals deal with instruments that serve multiple roles, hybrid assets should be classified into one of the other categories according to their main characteristics.

Issue 2: Classification of Fungible Crypto Assets

8. **It is agreed that all fungible crypto assets meet the asset boundary** because the institutional units holding them have ownership rights, they act as a store of value[21] (albeit being volatile at times), can be exchanged for goods and services, and provide economic benefits and risks to the holder.

9. **There is also consensus that crypto assets with a corresponding liability should be recorded as financial assets.** Debt security crypto assets should be recorded as *debt securities*, equity

[15] In the IMF (2019) paper, these are referred to as Bitcoin-like Crypto Assets (BCLAs). However, this term may not provide a clear overview of what is covered in this class, particularly with the recent emergence of new types of crypto assets that may also have Bitcoin-like characteristics but may still warrant a different classification (e.g., stablecoins or non-mineable crypto assets). A more generic term that better describes the specific characteristics of these types of crypto assets is therefore preferable.

[16] The IMF (2019) paper uses a slightly different definition, defining payment tokens as digital tokens intended to become BCLAs and to be used universally (i.e., not restricted to a specific platform) as units of account, stores of value, and mediums of exchange. In the classification presented here, these specific types of crypto assets may be recorded as crypto assets designed to act as a general medium of exchange, payments tokens or security crypto assets, depending on their main characteristics.

[17] The drafting team has not yet found a good example of this specific category, but still decided to include it to arrive at a comprehensive classification from a conceptual perspective.

[18] These are referred to as asset tokens in the IMF (2019) paper. The classification presented here uses a slightly different term.

[19] First bond created, allocated, transferred and managed through its life-cycle using distributed ledger (blockchain) technology (see https://www.worldbank.org/en/news/press-release/2018/08/23/world-bank-prices-first-global-blockchain-bond-raising-a110-million).

[20] In the IMF (2019) paper, these are a separate category, but as they imply a financial claim on the issuer (or another third party) and are negotiable by definition (as they are crypto assets), they meet the characteristics of debt security crypto assets. Given their specific role, dependent on user demands, it may be relevant to separately distinguish them from other types of debt security crypto assets.

[21] Store of value is a means of holding wealth.

crypto assets as *equity*, and derivative crypto assets as *financial derivatives*. Furthermore, payment tokens with a corresponding liability are negotiable instruments serving as evidence of debt, which may qualify them as a form of *debt securities*. However, because they are quite different from traditional debt securities (particularly in that they are non-interest bearing), it would make sense to create a separate subcategory for these payment tokens with a corresponding liability. For crypto assets with a corresponding liability designed to act as a general medium of exchange, the exact classification depends on the issuer. If they are issued by a monetary authority, they should be classified as *currency*.[22] If they are issued by a non-monetary authority, they are best recorded under a new, distinct financial asset category to separate them from traditional currency and deposits. An example of such crypto assets with corresponding liability issued by a non-monetary authority are stablecoins pegged to and convertible into a fiat currency upon request designed to act as a medium of exchange. Algorithmic stablecoins without a corresponding liability, on the other hand, aim at maintaining a stable value via protocols that provide for the increase or decrease of the supply of the stablecoins in response to changes in demand, and are a type of CAWLM.

10. **The remainder of this section discusses the recording of crypto assets without corresponding liability designed to act as a general medium of exchange (CAWLM).**[23] The first subsection addresses whether they concern financial or nonfinancial assets and, if they are nonfinancial, whether they are produced or non-produced; the second subsection addresses how the activities related to their creation could be accounted for.

Issue 2a: Are CAWLM Financial or Nonfinancial Assets?

11. **An asset is generally regarded as financial when there is a corresponding claim on another institutional unit:** "Financial assets consist of all financial claims […], shares or other equity in corporations plus gold bullion held by monetary authorities as a reserve asset" (paragraph 11.8 of *the System of National Accounts 2008 (2008 SNA)*). "A financial claim is the payment or series of payments due to the creditor by the debtor under the terms of a liability" (*2008 SNA,* paragraph 11.7). Similarly, paragraphs 4.5–4.6 of the *Monetary and Financial Statistics Manual and Compilation Guide (MFSMCG)* (IMF, 2016) generally consider an asset financial when there is a corresponding claim on another institutional unit. As indicated in *2008 SNA* paragraph 11.8, financial assets also cover equity, which "is regarded as a claim as it represents a claim of the owner on the residual value of the entity" (paragraph 5.7 of the sixth edition of the *Balance of Payments and International Investment Position Manual (BPM6)*), "even though the financial claim their holders have on the corporation is not a fixed or predetermined monetary amount" (*2008 SNA* paragraph 11.8). *2008 SNA* paragraph 11.8 also includes monetary gold (gold bullion held by monetary authorities), which is currently the only financial asset for which no corresponding liability is recorded in the accounts.[24]

[22] In this regard, paragraph 11.52 of the *2008 SNA* explains that "currency consists of notes and coins that are of fixed nominal values and are issued or authorized by the central bank or government".

[23] As mentioned in paragraph 2, the same line of reasoning will apply to crypto assets designed to act as medium of exchange within a network or platform (CAWLP).

[24] Fiat currencies issued by monetary authorities constitute financial assets as they represent claims on the issuer and are recorded in their balance sheets as liabilities. They are legal tender in the domestic economy and are recognized and may be accepted as a medium of exchange in other jurisdictions. Those making an argument that fiat

12. **Nonfinancial assets derive their value from benefits that can be obtained from their (direct or indirect) use in production activities, with the exception of valuables.** Valuables are "produced goods of considerable value that […] are held as stores of value" (*2008 SNA* paragraph 10.13) "in the expectation that their prices, relative to those of other goods and services, will tend to increase over time, or at least not decline" (*2008 SNA,* paragraph 9.57). This value is derived from artistic and/or sentimental reasons, not from the ability to contribute to production.

13. **CAWLM appear to have characteristics of a hybrid, undefined asset, which is related to the fact that it is a relatively immature asset class that is still in constant evolution** (see Bank for International Settlements, 2019). CAWLM have features of both financial (designed to act as a medium of exchange) and nonfinancial assets (no corresponding liability), but do not fully meet the statistical definition of any of them. In light of this hybrid nature, the statistical treatment of CAWLM can be approached in two different ways.[25]

Approach 1: Treatment of CAWLM as New Type of Nonfinancial Asset

14. **Following the current general framework of financial assets discussed in paragraph 11, it can be argued that CAWLM should not be classified as financial but should instead be classified as nonfinancial assets.** As noted earlier, financial assets are characterized by the counterpart liability criterion with the only exception being monetary gold due to the historic role of gold in the international financial system. All precious metals (other than monetary gold), including nonmonetary gold and silver, are considered nonfinancial assets. Treating CAWLM as another exception may open the door for other commodities frequently traded in financial markets for their store of value properties, such as silver and nonmonetary gold, to become financial assets.[26] Furthermore, as there is no direct counterpart liability for CAWLM, recording them as financial assets may create further inconsistencies between the sum of financial assets and the sum of liabilities worldwide.

15. **Considering the main role that CAWLM currently seem to play in financial markets (i.e., as a store of value with high volatility instead of as a medium of exchange), it can be argued that there is not a strong enough basis to create another exception to the counterpart liability criterion (similar to monetary gold) at this point to classify CAWLM as a financial asset.** Monetary gold exception is there from the very beginning (i.e., from the time of the first edition of the *Balance of Payments Manual,* which was published in 1948). This is mainly linked to the role it played in international payments and reserves management. In terms of its use for international payments, when the IMF was founded in 1944, it was decided that (i) 25 percent of initial quota subscriptions and subsequent quota increases were to be paid in gold; (ii) all payments of charges (interest on member countries' use of IMF

currencies could be considered as another exception to the counterpart liability rule, argue that the claim on monetary authorities is often more a matter of convention.

[25] The drafting team also considered a third option, i.e., the creation of a new Hybrid Asset Class, but this was rejected by the Balance of Payments Committee and the Advisory Expert Group on National Accounts at their joint meeting in March 2022. For that reason, this specific option has been removed from the note and is only presented in Annex III for information purpose.

[26] Furthermore, at the consolidated level, national net worth is equal to the sum of nonfinancial assets, monetary gold, and the net claim on non-residents. As such, financial assets do not add to the wealth of a nation. However, this would change if CAWLM would be considered as another exception. In that case, net worth would become equal to the sum of nonfinancial assets, monetary gold, net claims on non-residents, and CAWLM.

credit) were normally made in gold; (iii) a member wishing to acquire the currency of another member could do so by selling gold to the IMF; and (iv) member countries could also use gold to repay the IMF for credit previously extended. With regards to its role in the international reserves, monetary gold compares favorably with other traditional reserve assets in terms of liquidity, return, and safety. These characteristics justify treating monetary gold as a financial asset without counterpart liability. In addition, treating monetary gold as a financial asset is well grounded and time tested with backing of the international financial institutions and central banks, and therefore such exception can't be extended to CAWLM, unless there are very strong reasons to do so. This would be the case when CAWLM would start acting as money (see below), which is definitely not the case at the moment.

16. **The demand for CAWLM as a new investment asset seems relatively high at the moment (stemming from—either real or perceived—drawbacks from the traditional financial system) in comparison to their use to purchase goods and services.** Some retailers are starting to allow the purchase of goods and services with CAWLM, but actual uptake seems limited.[27] In this regard, some financial policy makers and prominent financial sector experts believe that the future of digital money is in stablecoins with counterpart liability (private digital money) and CBDCs (public digital money).[28] Therefore, it could be argued that CAWLM should be treated as a type of valuable (a new subclass called "digital valuables" that are intangible), until there is evidence that they act as a general medium of exchange, a function that may not materialize due to competition from stablecoins and CBDCs. The distinctive feature of such digital valuables is the limited number of units of these assets that can be mined (i.e., they are exhaustible after a certain period), similar to precious metals and stones. Furthermore, from the perspective of monetary statistics, money-like instruments meeting the definition of broad money, a key monetary statistics aggregate, share the common characteristic of low volatility, which is also absent in CAWLM, and in most cases even not embedded in their design, such as when they are created with a fixed supply (e.g., Bitcoin).

17. **When there is evidence of a CAWLM with a stable value that acts as a widely accepted medium of exchange, the treatment of CAWLM as financial assets may become relevant,** in that CAWLM would meet the definition of broad money in the *MFSMCG* (paragraph 6.11) and should therefore be considered as a financial asset in that context.

18. **For CAWCLM to qualify as money and, consequently, to be accepted as financial asset under this approach, it should meet the following criteria:** it must be issued or authorized by the government,[29] be a generally accepted means of payment, a reliable or stable store of value (in the

[27] Furthermore, in case of retailers accepting CAWLM for purchases of goods and services, this is often in the form of accepting CAWLM as a means of payment (i.e., immediately converting the CAWLM into traditional financial assets upon receipt so that they do not bear any risk of holding the CAWLM).

[28] See for example the speech by Lael Brainard Member of the Board of Governors of the Federal Reserve System and the report by the Group of Thirty's Steering Committee and Working Group on Digital Currencies *Digital Currencies and Stablecoins: Risks, Opportunities, and Challenges Ahead*.

[29] In view of the trends around CAWCL, this criterion may need to be revisited in the future. It could be considered that, if a specific CAWLM would meet all the other criteria (except this one), it could, in the future, still be considered money for inclusion in broad money and money aggregates.

short-term),[30] a unit of account,[31] and a widely used medium of exchange. These criteria are summarized in Table 1, which can be used to assess whether a specific type of CAWCLM would qualify as money (and hence as financial asset) in a specific country. As Table 1 illustrates, even in the case of a country that adopted a CAWLM such as Bitcoin as a legal tender and required its acceptance as a means of payment, it still cannot be considered money in macroeconomic statistics as it does not meet the other criteria.

19. **As CAWLM do not have a counterpart liability and currently presumably act mostly as a means of payment[32, 33] (and not as a medium of exchange), it makes sense to classify them as nonfinancial assets at this point in time.[34]** Under this approach, in the future, if and when any type of CAWLM would satisfy the criteria in Table 1, meeting the definition of broad money, consideration should be given to the treatment of CAWLM as financial assets by making an exception to the counterpart liability criterion.[35]

[30] All economic assets are store of value, but only financial assets that are reliable stores of value may qualify as money. These financial assets include currency (physical or digital, such as CBDCs), bank deposits, and other close substitutes for bank deposits, such as money-market fund shares and short-term securities.

[31] A standard for denominating the prices of goods and services, and the values of financial instruments and nonfinancial assets, thereby providing a means for comparisons of values and for preparation of national accounts.

[32] CAWLM such as Bitcoin act as a means of payment when buyer and seller of goods and services converts the Bitcoin used in the transaction into fiat currency immediately after the transaction takes place (i.e., avoiding the risk of price fluctuations).

[33] A recent NBER paper concluded that Bitcoin is not widely used as a medium of exchange in the case of El Salvador, which adopted Bitcoin as legal tender in September 2021 (see Alvarez et al. (2022)).

[34] A recent article published in the IMF's Finance & Development (prepared by the Monetary Authority of Singapore) noted that private currencies—of which Bitcoin probably is the best known—fail as money. They perform poorly as a medium of exchange, as a store of value, and as a unit of account.

[35] Criteria listed in Table 1 are in principle meant for applying in the context of a single economy. It is possible that a particular CAWLM may fulfill these criteria in a specific country and not in the others. To avoid asymmetric recording across countries, it would be feasible to consider treating a specific CAWLM as a financial asset in macroeconomic statistics internationally starting at certain point in time, when it meets the criteria in a broader number of countries. In the meantime, for countries where a CAWLM meets the criteria for being considered money, CAWLM holdings by residents should be included in money aggregates to ensure an accurate estimate of money supply.

Table 1. Criteria for assessing whether a type of CAWLM can be considered money in a country: example of Bitcoin

Criteria	Response (for Bitcoin)	Explanation
Authorized by the government	TRUE	Bitcoin could be legal tender by law.
Accepted as means of payment	TRUE	A government can require by law the acceptance of Bitcoin by merchants as a means of payment, including the possibility of paying taxes with Bitcoin.
Reliable store of value	FALSE	Bitcoin is very volatile to be considered a reliable or stable store of value.
Unit of account	FALSE	Bitcoin is not used to price goods or services offered in any country yet.
Widely used as a medium of exchange	FALSE	Due to its limited supply, expected appreciation, and high volatility, Bitcoin is mostly held as a long-term store of value investment rather than a medium of exchange (acquisition of goods and services in exchange for Bitcoin).
Conclusion	**FALSE**	**Bitcoin is not money for macroeconomic statistics**

20. **As CAWLM do not meet the current definition of valuables, either the definition needs to be adjusted or a new subclass of digital valuables reflecting the properties of CAWLM (including their price volatility, intangibility, and limited availability) needs to be created under nonfinancial assets.**

Approach 2: CAWLM as a New Exception to the Counterpart Liability Criterion for financial assets

21. **Another approach is to consider including an additional exception for CAWLM to the counterpart liability criterion and treating them as financial assets.** The monetary gold exception derives from their role as a component of reserve assets within a central bank's balance sheet. As such, monetary gold plays an important role in "meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy and serving as a basis for foreign borrowing)" (*BPM6,* paragraph 6.64). The *Public Sector Debt Statistics (PSDS) Guide* (IMF, 2011) explains that monetary gold in the form of bullion is by convention treated as a financial asset, as it "provide[s] economic benefits by serving as a store of value and can be used as a means of payment to settle financial claims and finance other types of transactions" (*PSDS,* paragraph 3.12).[36] Furthermore, it may be argued that fiat currency could be considered as another exception to the counterpart liability rule (see also footnote 25). Although it constitutes a contractual obligation for monetary authorities, the claim is often more a matter of convention (hence the name "fiat" currency) but still regarded as financial as it plays a vital role in facilitating economic transactions. Of course, unlike CAWLM, fiat currencies are issued by monetary authorities and endorsed and accepted by governments, but most also rely on the

[36] For example, as per the IMF's Articles of Agreement, the Fund may accept payments from a member in monetary gold instead of special drawing rights or currency in any operations or transactions.

trust that the general public puts in them to act as a general medium of exchange. This trust usually stems from the economic strength of the underlying economy (e.g., its ability to produce goods and services, the inflation rate or the government deficit) and/or its role in the global financial system. Conversely, public trust in CAWLM presumably derives from the strength of its underlying technology and its network of miners/validators, as well as its degree of integration with the financial system.[37]

22. **On the contrary, most nonfinancial assets derive their value from benefits that can be obtained from their (direct or indirect) use in production activities.** This is not the case for CAWLM. Valuables are an exception to this rule (see paragraph 12), but CAWLM do not seem to match their definition either. CAWLM do not derive their intrinsic value from artistic and/or sentimental reasons like valuables,[38] but instead from the expectation that they may (now or in the future) be used as a medium of exchange. For that reason, it is not likely that the treatment of CAWLM as financial asset would open the door for other commodities frequently traded in financial markets (such as silver and nonmonetary gold) to be treated as financial, as their value is not derived from the expectation that they will be used as medium of exchange in the future. Furthermore, unlike valuables, it is not clear whether CAWLM should be regarded as a result of production (see Issue 2b below).[39]

23. **It may make sense to recognize CAWLM as financial assets, because they do not meet the characteristics of nonfinancial assets and rather derive their value from acting as an alternative to traditional financial instruments and systems.** This may be as an alternative to traditional fiat currency (when the CAWLM is already widely accepted as a general medium of exchange and meets the criteria specified in Table 1) or as an alternative to financial investments (anticipating the CAWLM will become a medium of exchange, but not yet meeting the criteria as specified in Table 1). So even though they do not have a counterpart liability, the value of CAWLM presumably relies on the trust that users put in them to act (or start acting) as medium of exchange, as with traditional fiat currency. In that regard, CAWLM are different from valuables that derive their value from the value attached to the underlying (tangible) good.

24. **Finally, not treating CAWLM as financial assets would lead to the recording of barter trade[40] if they are recorded as produced nonfinancial assets and used as a medium of exchange to purchase goods and services,** with corresponding implications (in comparison with the traditional recording of a purchase involving a financial asset) for the current account balance and net lending/net borrowing,[41] although this impact is expected to be relatively small at the moment, given the current role of CAWLM as new investment asset.

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[37] Although some users may argue that there is not enough evidence of the public trust in CAWLM yet to act as a general medium of exchange.

[38] In this regard, CAWLM do not concern goods and their price is too volatile to ensure that it can reasonably be expected that their price will not decline.

[39] Here, a parallel could be drawn with traditional coins and notes. Even though the paper of a banknote is produced, that paper is not the financial asset itself, but the technological support of the financial asset. The equivalent in CAWLM to the paper of a banknote would be the distributed ledger technology network, which is certainly produced, but does not constitute the financial asset itself.

[40] A barter transaction is one where one basket of goods and services is exchanged for another basket of different goods and services without any accompanying monetary payment (see *2008 SNA,* paragraph 9.49).

[41] See example 1 in Annex IV, which shows the example of the use of CAWLM in a cross-border purchase of goods. The annex includes two other examples in relation to CAWLM (i.e., example 2 describes the use of CAWLM as an

25. **In case of recording CAWLM as financial assets, it is proposed to record them in a separate asset class, to clearly distinguish them from other types of financial assets.** In that regard, it is acknowledged that in terms of trustworthiness CAWLM cannot be put on a par with fiat currencies (even if they start acting as general medium of exchange), given the fact that the latter have the formal backing of central banks, whereas CAWLM have no formal backing. Furthermore, looking at their specific characteristics, they are also quite different from other traditional financial asset types, indeed arguing for a separate asset class.

26. **As CAWLM do not meet the definition of financial assets in the current statistical standards, in case of recording them as financial assets, the coverage of financial assets should be broadened to also include CAWLM, and a new subclass would need to be created reflecting the properties of CAWLM.**

Issue 2b: How Should the Activities Related to the Creation of CAWLM be Accounted for?

27. **Another important question in the recording of CAWLM is how to account for the production activities related to their creation.** Most mineable CAWLM come into circulation via the work of miners that use software to solve cryptographic puzzles (proof-of-work) and validate transactions on the blockchain. The work of these "miners" in most cases requires the use of solutions developed using intellectual property in developing algorithmic solutions to the cryptographic puzzles, the use of specialized computing equipment, considerable amounts of energy to run and cool these machines, and a lot of time to solve the puzzles. Non-mineable CAWLM enter into circulation in two different ways. They may be released via an explicit sale (e.g., the way that Ether was launched) and/or as payment to validators that validate transactions in different ways than via proof-of-work (e.g., via proof of stake or proof of authority). In the end, the designer of the overall framework choses the method in which new CAWLM enter into circulation (e.g., via explicit sales, proof-of-stake, proof-of-work, etc.).

28. **The activities related to the emergence of new CAWLM coins are regarded as production activities, as the operation of miners and validators require the input of intermediate goods and services, labor, and capital.** The key difference between CAWLM generated through mining (proof-of-work) and other validation (e.g., proof-of-stake) processes is that the intermediate inputs associated with the validation process of non-mineable CAWLM are significantly less than those which are required by mineable CAWLM. The validation process does not always require specialized computing equipment and the level of energy required is generally less than in mining. The narrative below presents two alternatives for the recording of such production activities.

Approach 1: Regard CAWLM as Produced Assets

29. **It can be argued that CAWLM should be regarded as produced assets, as they come into existence as a result of the work of miners that solve cryptographic puzzles or are created and brought into circulation by their designer.** As some CAWLM appear for the first time in the wallets of miners, it can be argued that miners are responsible for the production of these assets. Along the same lines, issuers of non-mineable coins can be considered as responsible for their production. With regard to

alternative investment vehicle and example 3 the emergence of a new CAWLM coin, for both mineable and non-mineable coins).

mineable CAWLM (e.g., Bitcoin), the miner who solves the cryptographic puzzle first receives a CAWLM (although there could be other miners that verify the required size of transactions).[42] Normally, the miners using highly efficient and powerful mining machines (e.g., Bitmain AntMiner S9)[43] have higher chances of producing most of the new CAWLM. Although the total number of CAWLM that is released may be limited (similar to precious metals and stones) and determined by the underlying protocol, miners can increase their own share of these CAWLM by improving their mining capabilities. Therefore, it is sensible to consider the new CAWLM as produced assets of the mining entities. The output of miners is considered to be consisting of two components (i.e., an explicit validation fee) where the counterpart can easily be identified (although this information may be concealed by the underlying cryptography) and which would be treated as consuming services, and newly mined CAWLM, which would constitute capital formation in the national accounts.

30. **This would be a straightforward and easily implementable approach.** In contrast to this approach, treating CAWLM as non-produced assets may require specific assumptions, particularly on treating the appearance and assigning initial ownership of new coins, and, in case the initial owners are considered to be different from the miners, on how the CAWLM end up in the wallets of the miners. There may be two answers to the question on the initial allocation of coins when they are not considered as produced: (i) either the new CAWLM could be considered as brought into circulation by miners but not seen as a result of production[44] (see Annex 5 of the 2019 IMF paper), or (ii) their initial ownership could be attributed to the designer of coins or holders of existing coins as considered under Approach 2 (see paragraphs 35 and 36). Both alternatives may be difficult to implement in practice. Implementation of the first alternative implies that the value added of entities involved in mining would become negative. On the other hand, the second alternative is less intuitive when compared to the solution of regarding CAWLM as being produced by miners. Designers of coins would be considered as initial owners for coins brought into circulation through explicit sales. In the case when they are mined, owners of existing CAWLM (those already in circulation) would be considered as initial owners. However, this may be difficult to implement as the owners of existing CAWLM may be difficult to identify in practice, and it may be difficult to understand as the initial owners may not be recognized as consuming the validation services. Overall, the assumptions may give rise to bilateral asymmetries if not implemented consistently across countries.

Approach 2: Regard CAWLM as Non-Produced Assets

31. **It can also be argued that CAWLM should be regarded as non-produced assets, taking the view that mining or validating activities do not constitute the production of the asset itself.** In this regard, the recognition that miners and validators[45] are engaged in productive activities does not automatically imply that these crypto assets must be treated as produced assets (i.e., it does not

[42] A miner shall meet two conditions to receive bitcoins: (i) verify around 1MB worth of transactions; and (ii) be the first miner to arrive at the right answer, or closest answer, to a numeric problem (see How does Bitcoin Mining Work?).

[43] Based on its technical specifications, the S9 offers miners a highly impressive hash rate of 14 TH/s at a surprisingly low power draw and have the capacity to mine 0.03600399 Bitcoin per month.

[44] It may for example be accounted for as an other change in the volume of assets.

[45] Under proof-of-stake and proof-of-authority, block creators are known as validators, whereas they are called miners under proof-of-work.

automatically imply that the miners and validators are actually engaged in the production of the assets themselves).[46] Instead, miners and validators are providing validation services, for which they are rewarded in the form of both an explicit fee and a new coin (acting as an implicit fee).[47]

32. **Regarding mining and validating activities as the production of validation services, ensures consistency between the recording of output of validators of transactions that only receive an explicit fee and validators of transactions that are rewarded by both an explicit fee and a new coin, as they are basically engaged in similar activities.** In the latter case, the new coin is an additional means to attract institutional units to validate transactions (i.e., lowering the transaction costs for users when the number of coins and transactions is still relatively low), and of a way to bring new coins into circulation. In that regard, proof-of-work, proof-of-authority, and proof-of-stake are just different validation protocols with slightly different ways of remunerating the validators.

33. **Seeing the mining and validating activities as different from the creation of the CAWLM themselves also ensures consistency in the recording of CAWLM regardless of the way in which they are brought into circulation.** As said, how new coins are brought into circulation is a decision that is fully up to the designer of the CAWLM and should not influence its classification.[48] Moreover, this protocol can change over time through consensus of miners or validators on the blockchain network.[49] CAWLM would be "created off production" and then brought into circulation in a way that depends on the designer's specific setup for the crypto asset. This is consistent with the fact that validators that are involved in the validation of transactions in the form of proof-of-stake[50] or proof-of-authority[51] may also be rewarded in the form of a new coin, whereas they do not engage in mining.

34. **Also, the fact that most mineable CAWLM come into circulation at a pace that is determined by the developer implies that the underlying protocol is controlling the release and that this rate cannot be increased by the miners.** A miner may claim a larger share of the predetermined number of new coins by improving their mining process (through better algorithms or

[46] Underwater treasure seekers also engage in significant production activities but do not of course produce the goods they find, even if the value of their remuneration matches the value of the goods they find.

[47] It could also be reasoned that miners and validators are enhancing the crypto asset payment and settlement framework, and that the activities should be recorded as either gross capital formation or regular maintenance of an IPP underlying the CAWLM, but different from the CAWLM themselves. This would be analogous to the treatment of mineral exploration and evaluation and recognize the fact that the mining activities do not always end up with coin rewards. However, as the IPP itself would not appear on the balance sheet, as—according to the SNA—no ownership right could be exercised on it, this does not seem a viable option.

[48] Please note that a specific CAWLM may also be brought into circulation in multiple ways, (e.g., part via initial coin offering (ICOs) and part via mining), which also stresses the point that the way in which CAWLM are brought into circulation should not influence their classification.

[49] For example, the Ethereum blockchain, home to ether, the second largest CAWLM by market capitalization, recently converted from a proof-of-work protocol to a proof-of-stake protocol. The main motivation was to make the network more environmentally friendly by eliminating energy-intensive proof-of-work mining. See https://ethereum.org/en/upgrades/merge/ for more information.

[50] In proof-of-stake, validators "stake" a certain number of coins on the network to be given the opportunity to validate a block. They lose their coins if they attempt to act dishonestly.

[51] In proof-of-authority, validation takes place via approved accounts, established on the basis of the reputation of the validators. Validation occurs automatically, by the validators running software allowing them to put transactions on the blockchain.

equipment) but cannot increase production beyond that limit. Moreover, the total number of coins for each mineable CAWLM is also predetermined (i.e., at some point in the future, all coins will be mined) and miners will only be rewarded with transaction fees. In that sense, it may indeed make more sense to regard the activity of miners as providing validation services for which they are remunerated in the form of fees and new coins, rather than looking upon them as producing the coins.

35. **The main challenge with this approach is how to account for this "off production" creation and for the way in which CAWLM are brought into circulation, particularly in the case where coins are exchanged for explicit production activities** (e.g., proof-of-work, proof-of-stake, etc.). This question basically comes down to assessing who benefits from the activities in relation to the release of new coins. One approach could be to regard the designer as receiving the new coins, as he/she can determine the way in which coins are brought into circulation. However, whereas this makes sense when new coins are brought into circulation via explicit sales, this makes less sense if this is done via remuneration for "proof-of-work" or in the form of rewarding specific entities via "proof-of stake" or "proof-of-authority".

36. **When CAWLM is brought into circulation in exchange for production activities (e.g., proof-of-work, proof-of-stake, etc.), it makes sense to regard the owners of existing CAWLM coins (i.e., coins that have already been brought into circulation) as being consuming the products provided** (the crypto asset community in Annex IV). These concern multiple institutional units that may be spread across a wide range of countries.[52] They are the ones benefiting from the new coins being brought into circulation and from the associated validation services. It ensures the increased use of the CAWLM and the chances of it being accepted as general medium of exchange, both adding to the serviceability of the existing coins. The associated financial payment would correspond to the dilution in the value of existing coins, which would be recorded as a financial transaction between the producers and the community.[53]

37. **Implementation of the above approaches requires detailed information on transactions of CAWLM by counterparty, stocks, and activities of miners (e.g., explicit fees and block reward through new coins, etc.).** At this stage, it is not clear whether sufficient information will be available to compile various macroeconomic aggregates pertaining to CAWLM.

[52] From a practical perspective, it may be opted to create a notional unit instead, representing all the existing owners of CAWLM (for simplicity, this could then be allocated to the rest of the world), but this would not be preferable from a conceptual perspective and may give rise to large cross-border flows not easily interpretable in terms of the economic substance and to global asymmetries.t

[53] This is akin to when a company issues additional stock and the existing shareholders do not partake in the offering. As such, the initial holders knowingly are diluting the value of their existing CAWLM to benefit in the future. Note that under this approach the issuance of new CAWLM does not give rise to other changes in the volume of assets, but just to a financial transaction corresponding to the dilution in the value of the portfolio of the owners of existing CAWLM and the increase in the portfolio of the producers of validation/mining output. Note as well that the dilution effect would not be visible in the stock held by owners of existing CWLM if the accounts are denominated in CAWLM as opposed to domestic currency; this corresponds to an "exchange rate" effect that should be recorded as revaluations in the accounts denominated in CAWLM.

SECTION II: OUTCOMES

Issue 1: Typology of Fungible Crypto Assets

38. **There is broad agreement to distinguish the types of fungible crypto assets as described in paragraph 6.**

Issue 2: Classification of Fungible Crypto Assets

39. **It is agreed that all fungible crypto assets meet the asset boundary on the basis of the arguments put forward in paragraph 8.**

40. **There is also consensus that fungible crypto assets *with a corresponding liability* should be recorded as financial assets (paragraph 9),** in the following way, as presented in the earlier papers of the IMF and the OECD:[54]

- Crypto assets designed to act as a general medium of exchange, with a corresponding liability:
  - issued by a monetary authority—To be classified as currency under "currency and deposits" (AF.2).
  - not issued by a monetary authority—To be classified under a separate new asset class.
- Crypto assets that only act as a medium of exchange within a platform or network (i.e., payment tokens):
  - with a corresponding liability—To be classified under a separate subcategory under "debt securities" (AF.3).
- Security crypto assets (which always have a counterpart liability)
  - Debt security crypto assets (and utility tokens)—To be classified under "debt securities", with a separate subcategory for utility tokens (AF.3).
  - Equity crypto assets—To be classified under "equity and investment fund shares and units" (AF.5).
  - Derivative crypto assets—To be classified under "derivatives and employee stock options" (AF.7).

41. **The recording of CAWLM designed to act as a general medium of exchange is discussed in more detail under sub-issues 2a and 2b.** Payment tokens without a corresponding liability (CAWLP) would be recommended to be classified in line with CAWLM, in a separate (sub)class.

Issue 2a: Are CAWLM Designed to Act as a General Medium of Exchange Financial or Nonfinancial Assets? & Issue 2b: How Should the Activities Related to the Creation of CAWLM be Accounted for?

42. **Given the interlinkages between Issue 2a and 2b, three options have been considered for treating CAWLM, which deal with the two questions (produced nonfinancial, non-produced nonfinancial, and financial).** The drafting team recognizes that these assets may not fit exactly under

[54] Annex II.1 presents a decision tree that assists in classifying fungible crypto assets according to this typology, including a correspondence to their recording in macroeconomic statistics. Further, Annex II.2 provides the proposed typology of fungible crypto assets.

existing categories in the statistical standards and that any decision on their treatment should be based on internationally accepted statistical principles without any ambiguity with regard to practical considerations. In addition, the potential impact of the proposed treatment on different macroeconomic aggregates should also guide the recommended treatment.

43. **The drafting team presents below the pros and cons of the proposed options covering both issues.**

Option I: Produced Nonfinancial Assets

CAWLM are nonfinancial assets and the outcome of a production process undertaken by miners in the case of mineable coins and creators/issuers for non-mineable coins; the expenditure counterpart is capital formation by the producers.

- Consistent with the counterpart liability criterion as applicable to all financial assets except monetary gold;
- Consistent with the view that only CAWLM which qualify as money following the criteria in Table 1 should be treated as financial assets;
- Consistent with current international accounting standards and views of some regulators (including the IMF);
- Requires an expansion of, or change to, one of the categories of produced nonfinancial assets to include this specific type of digital valuables (possibly an update to the current definition of valuables);
- Consistent with the view that CAWLM appear for the first time in the wallet of miners;
- Consistent with the view that the initial owners of the coins may not be recognized as consuming the validation services provided by miners;
- Adds to capital formation;
- Leads to barter trade in case CAWLM is used as medium of exchange; however, given the main current role of CAWLM as store of value similar to valuables and not as a medium of exchange, this is currently not a major problem.

Option II: Non-Produced Nonfinancial Assets

CAWLM are nonfinancial assets that are "released" to the owners of existing coins via other changes in the volume of assets; they then distribute them to the new owners (e.g., the miners in case of mineable coins) in exchange for validation services.

- Consistent with the counterpart liability criterion as applicable to all financial assets except monetary gold;
- Consistent with the view that only CAWLM which qualify as money following the criteria in Table 1 should be treated as financial assets;
- Consistent with the view that miners do not actually produce coins but receive them in exchange for validation services, ensuring a consistent recording of the different types of validation (i.e., in exchange for an explicit and/or implicit fee), as well as of CAWLM regardless of the way in which they are brought into circulation (i.e., mineable versus non-mineable CAWLM);

- Requires an expansion of one of the categories of non-produced nonfinancial assets to include this specific type of non-produced nonfinancial assets (e.g., contracts, leases and licenses);
- Adds to production of and consumption/trade in services;
- Leads to a transaction akin to barter trade in case CAWLM is used as medium of exchange; however, given the main current role of CAWLM as store of value similar to valuables and not as a medium of exchange this is currently not a major problem;
- Practical implementation of this treatment may require some assumptions on the counterpart of the implicit validation fee, which may pose challenges and consequently may affect bilateral asymmetries.

Option III: Financial Assets

CAWLM are financial assets that are "released" to the owners of existing coins via other changes in the volume of assets; they then distribute them to the new owners (e.g., the miners in case of mineable coins) in exchange for validation services.

- Consistent with the definition of nonfinancial assets;
- Inconsistent with the counterpart liability criterion that is applicable to all financial assets except monetary gold; requires an update to the definition of financial assets through an additional exception to the principle of counterpart liability. Such an additional exception may open the door for other commodities to be regarded as financial assets;
- Consistent with the view that miners do not actually produce coins but receive them in exchange for validation services, ensuring a consistent recording of the different types of validation (i.e., in exchange for an explicit and/or implicit fee) as well as of CAWLM regardless of the way in which they are brought into circulation (i.e., mineable versus non-mineable CAWLM);
- Adds to production of and consumption/trade in services;
- Holdings of CAWLM may increase the country's net financial position with the rest of the world, without any counterparty, creating an additional inconsistency between total financial assets and liabilities world-wide;
- Practical implementation of this treatment may require some assumptions on the counterpart of the implicit validation fee, which may pose challenges and consequently may affect bilateral asymmetries.

Summary of the Consultation with the GFS Community[55, 56]

44. **The outcomes of the consultation within the GFS community showed a slight preference for classifying CAWLM as nonfinancial assets, although the responses were scarce (11 responses in total).** Forty five percent of respondents (five respondents) expressed preference for classifying CAWLM as nonfinancial assets, 27 percent (three respondents) for classifying as financial assets, and

[55] The consultation was conducted during July-September 2022 by posting the relevant papers on GFSAC webpage dedicated to the update of international statistical standards, and then all GFS contacts were requested to respond to the consultation.

[56] A global consultation took place during January 28—February 25, 2022, collecting input from 42 respondents representing 35 economies. The results were presented at the joint meeting of the Committee and the AEG in March 2022.

18 percent (2 respondents) did not express any preference. One respondent preferred the hybrid option, even though it was not presented as an option in the GN and in the GFS consultation questions.

45. **The slight majority of respondents with preference for classifying CAWLM as nonfinancial assets supported the proposal to treat them as produced nonfinancial assets (three respondents).** Two respondents supported the classification of CAWLM as non-produced nonfinancial assets. All the details of the responses are provided in the attached table. One of the respondents who expressed preference for financial asset classification, also expressed some preference for treatment of CAWLM as a hybrid asset.

46. **Most respondents did not focus on the issue from the GFS perspective and did not provide GFS-specific arguments**. One of the respondents expressed concern on the potential impact of the classification on government net lending / net borrowing for governments transacting in crypto assets, under the scenario where CAWLM are classified as nonfinancial assets; and raised the issue of government seizures of crypto assets and highlighted the need to consider how such seizures should be recorded in the government accounts.

Next Steps

47. **The arguments and recommendations made in this GN are based on the drafting team's current understanding of the creation and use of the most common CAWLM at the time of writing.** However, the crypto asset landscape is rapidly changing, which means any argument or recommendation made in this GN may become out of date.

48. **Regardless of the agreement/decision on classifying CAWLM in the short term, statistical experts and compilers should continue monitoring any significant developments in the crypto space that may necessitate changing of the recommendations going forward.** In that regard, new types of crypto assets may continue to emerge and characteristics of existing ones may change over time. This may require updates of any guidance that will be taken at this stage.

49. **Though this GN does not provide a definitive recommendation for how to classify CAWLM in national and international macroeconomic accounts, the drafting team recommends that countries begin collecting the necessary data to measure the transactions and stocks of these assets and to compile related statistics.** The set of volunteer countries/entities should preferably include (a) countries with significant mining activity related to Bitcoins and other crypto assets (e.g., Georgia, Iran, Kazakhstan, Malaysia, Malta, Canada, and the US);[57] (b) countries with many crypto exchanges/wallet providers (e.g., US, UK, and Singapore); (c) countries that are intensive users of crypto assets (e.g., Nigeria, Philippines, El Salvador, Argentina, South Africa, Thailand, Turkey, and Vietnam); and (d) large enterprises that accept bitcoin or other crypto assets as payment. Information about the acceptance by large enterprises is particularly important to assess the use of CAWLM as a medium of exchange. Moreover, the drafting team agrees that a testing phase will provide information about the practical challenges of measuring CAWLM in general, and will provide more insight on how specific macroeconomic aggregates are affected under each recording option discussed in the GN.

[57] Based on estimates of these countries' global bitcoin hashrate shares in August 2021 by the Digital Assets Programme at the Cambridge Centre for Alternative Finance, an independent research institute based at The University of Cambridge, Judge Business School (https://ccaf.io/cbeci/mining_map).

50. **The three approaches discussed in the GN require about the same information to compile accurate and detailed statistics.** Testing countries should collect data on CAWLM ownership and transactions from households, corporations, government, and non-profit entities. Please see Annex VI for recommendations on the data items required and the entities to target in data collection efforts, as well as a sample questionnaire for CAWLM mining entities.

51. **The drafting team also recommends that countries share through international organizations crypto assets' data that they collect.** This data exchange will help resolve asymmetries that are expected to arise, due to the decentralized nature of the CAWLM economy, and fill in missing information.

Questions for Discussion:

1) *Do you agree that the main questions on the classification of CAWLM and CAWLP discussed in the GN are (i) whether they concern financial or nonfinancial assets, and (ii) how to account for their creation?*

2) *Do you agree with considering the three classification options for CAWLM and CAWLP as well as related pros and cons presented in the GN? Are there any other options and pros and cons that should be considered, if so please specify?*

3) *Do you have any views on the classification options for CAWLM and CAWLP? If so, please explain your preference.*

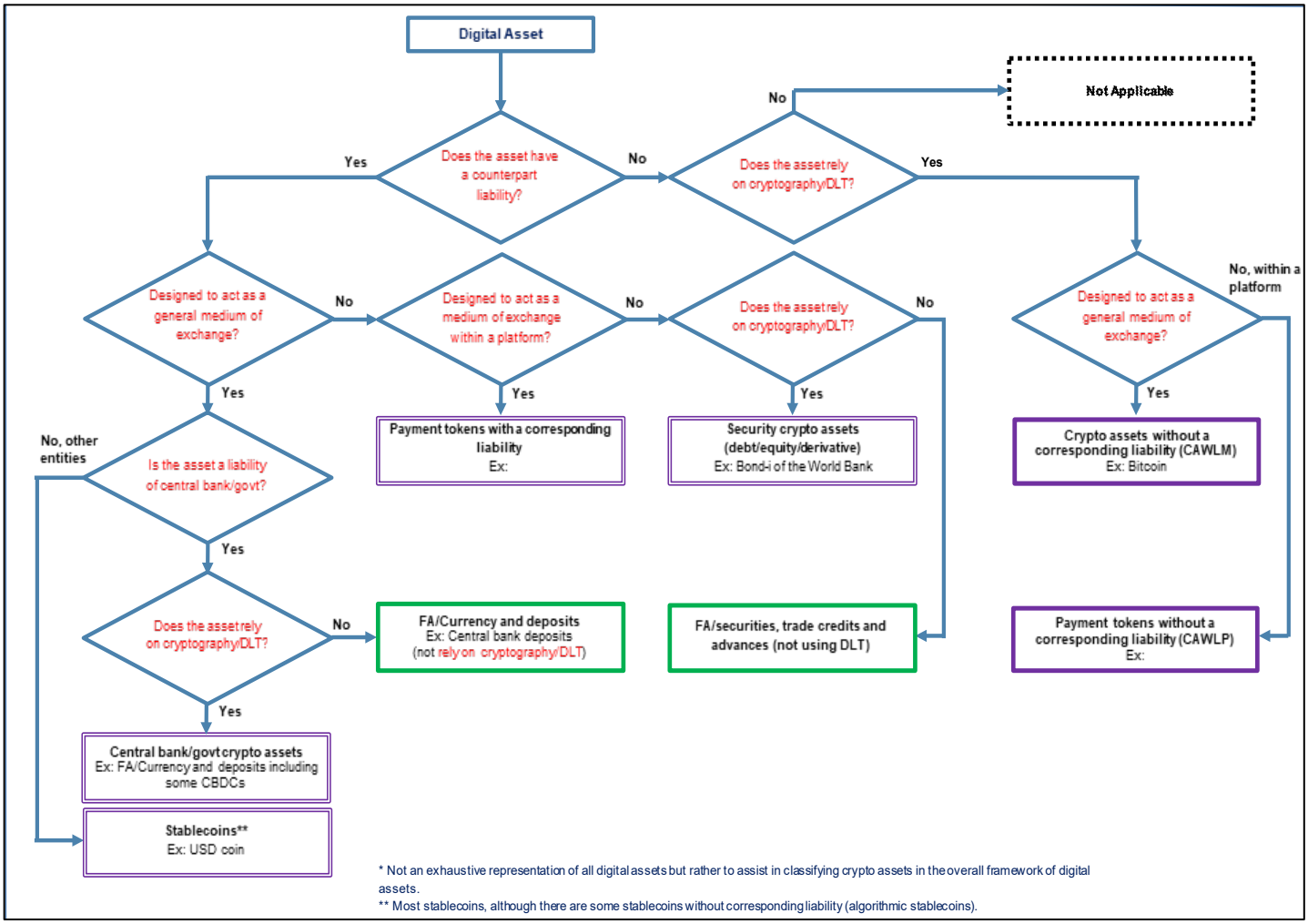
4) *Do you agree that the countries should start collecting data on ownership, transactions, and stocks of fungible crypto assets following the high-level guidance provided in Annex VI?*

Annex I. IMF User Perspectives on Crypto Assets Without a Corresponding Liability

An internal consultation was held within the IMF in December 2020 on whether the current statistical treatment of CAWLM (i.e., treating them as produced nonfinancial assets) required any modifications. A summary of the main takeaways is presented below:

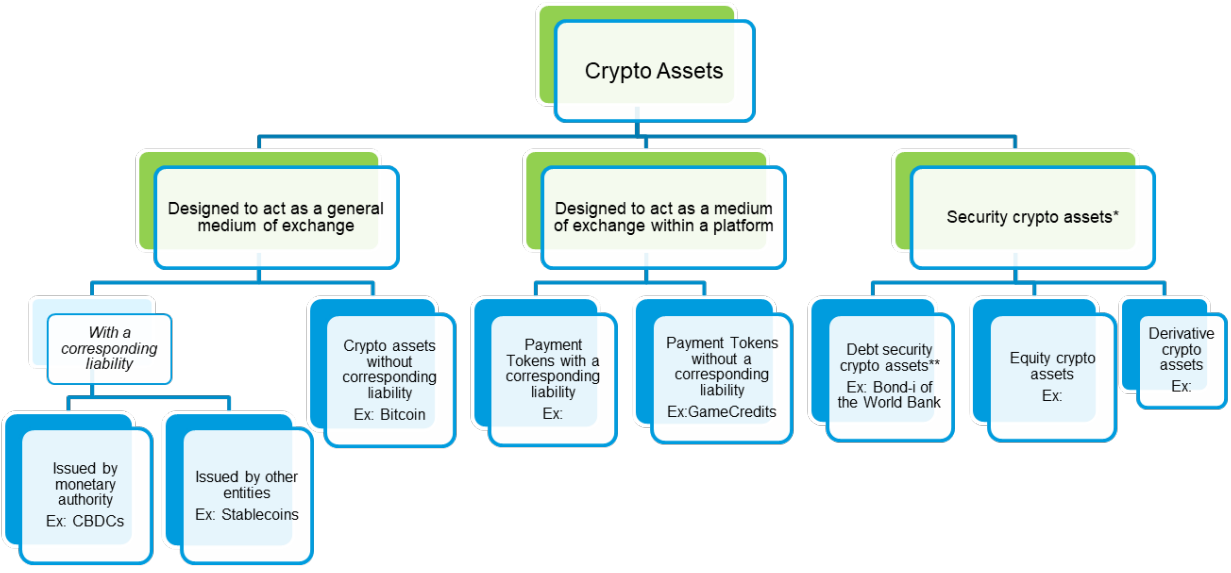
- There is a strong preference for maintaining, for now, the current statistical treatment of CAWLM and digital tokens without counterpart liabilities as nonfinancial assets.
- However, it is important to continue to monitor developments, including market trends, CAWLM adoption and usage, and the use of CAWLM as a means of international payment, as they can evolve fast in various directions.
- If CAWLM were to be classified as financial assets, there will be concerns and conflicts with the current thinking of central banks, regulators, and International Financial Reporting Standards (IFRS). Concerns are also raised about giving legitimacy to these highly speculative investments by classifying them as financial assets and potential financial integrity and consumer protection issues.
- All in all, it is widely viewed, at least for now, that the CAWLM are not anticipated to become a significant medium of exchange, especially considering the growth of stablecoins and the high possibility that central banks will issue CBDCs. The possibility of creating a separate statistical category for “hybrid assets” such as CAWLM could be explored.
- Some are sympathetic to the view that cryptos represent a type of “hybrid assets”, with features pertaining to both financial and nonfinancial assets (although CAWLM have no counterpart liability, they are also more liquid than typical nonfinancial assets and can be used as means of payment) and view it may be worth considering creating a separate statistical category for such assets.
- Legally and from a user perspective, the considerations that weigh in the classification of financial assets is the nature of the legal relationship between the holder and the providers in the ecosystem, and also the private law implications based on the legal nature of the products that has implications on the rights and obligations of parties.
- It is important to consider whether CAWLM would achieve significant market depth (capitalization) and liquidity (ease of convertibility into other instruments) to pose systemic financial stability risks.

Annex II.1. Digital Assets: Decision Tree*



Note: Nonfungible crypto assets are not covered in this decision tree.

Annex II.2. Typology of Fungible Crypto Assets



* Always have a counterpart liability

** Includes hybrid and utility tokens that provide holders future access to goods or services

Annex III. The Option of Classifying CAWLM as Hybrid Assets

1. **An alternative for classifying CAWLM that was discussed by the drafting team but rejected by BOPCOM and AEG, is to create a new type of asset class, in addition to financial assets and nonfinancial assets, reflecting the hybrid nature of CAWLM.** As they are an immature asset class with features of both financial (designed to act as a medium of exchange) and most nonfinancial assets (no corresponding liability), but do not fully meet the statistical definition of either, one could argue for classifying them in a new hybrid asset class, perhaps as intermediate solution. Even though this option was rejected by the BOPCOM and AEG at their joint meeting in March 2022, it is presented in this annex for information.

2. **Under this approach, the acquisition of goods and services with existing CAWLM would not be treated as barter transactions but would be tantamount to an acquisition against financial assets.** Similarly, net acquisitions of existing CAWLM against other assets would not be seen as contributing to capital formation. At the same time, CAWLM would be seen as coming into existence as the result of a production activity contributing to capital formation, similar to produced nonfinancial assets.[58]

3. **Transactions in CAWLM would then be treated differently depending on whether they correspond to the creation of new assets or to the exchange of existing assets.**[59] An important question with this approach is how to reflect this split treatment in the sequence of accounts. One possibility is to introduce a new account between the capital account and the financial account reflecting transactions in existing CAWLM (but not the creation of new CAWLM that would still be considered capital formation in the capital account).[60] The tables below show two alternative models for this solution depending on whether net lending/net borrowing in the institutional accounts is seen as the balancing item of the capital account or of the newly proposed account covering transactions in existing CAWLM (and of the financial account).

4. **The inclusion of a new account would lead to the introduction of a new balancing item and to changes in the definition and/or interpretation of net lending/net borrowing (*2008 SNA,* paragraph 10.28 and *BPM6,* paragraph 2.18).** Thus, if net lending/net borrowing is maintained as the balancing item of the financial account (Model 2), the newly introduced balancing item for the new account would then reflect "the difference between changes in net worth due to saving and capital

[58] Hybrid assets could also be considered as non-produced (see discussion for Issue 2b). However, this guidance note does not entertain that option as the main advantage of considering CALWM as hybrid assets, which is mitigating the problems associated to both the pure financial and nonfinancial options, are better, more easily met by considering the hybrid assets as produced assets.

[59] For the produced nonfinancial assets defined in the *2008 SNA/BPM6*, new and existing (secondhand) assets can be easily distinguished. However, it could be challenging to separately identify and keep track of the newly created and existing CAWLM in practice. Conceptually, all the transactions in CAWLM originating from a mining entity could be seen as a close approximation of the transactions in new CAWLM (although some miners may transact in CAWLM produced in earlier periods).

[60] As the hybrid assets have features of both nonfinancial and financial, some users may argue that the change in characteristic (or functionality) between accounts needs to be reflected through other changes in volume of assets (OCVA) account (in a manner similar to that suggested below for CAWLM being considered as non-produced; see paragraph 31). However, by having a new asset category reflecting both characteristics, articulation through OCVA account may not be necessary.

transfers and net acquisitions of non-financial assets (acquisitions less disposals of nonfinancial assets, less consumption of fixed capital)" (*2008 SNA,* paragraph 10.28), and net lending/net borrowing would have to be re-defined as the acquisition of financial assets net of incurrence in liabilities. If on the contrary, net lending/net borrowing is maintained as the balancing item of the capital account (Model 1), its definition in *2008 SNA,* paragraph 10.28, would remain roughly unchanged and the newly introduced balancing item would then cover the net acquisition of financial assets net of incurrence in liabilities. No equality would exist between the balancing item of the capital account and the financial account.

5. This approach reconciles the demand for, on the one hand, not treating these assets as financial (and perhaps distorting financial statistics like the International Investment Position (IIP)) and, on the other, avoiding statistical artefacts arising from considering any payments with CAWLM as barter transactions. In particular, international trade would have the same effect on the current account irrespective of whether the payments are made with financial assets or CAWLM,[61] and capital formation would be unaffected by payments with CAWLM as it is by payments with financial assets. Moreover, transactions involving either financial assets or existing CAWCM would be reflected in the same way in net lending/net borrowing if this balancing item is maintained in the capital account (Model 1).[62] The recording of the relevant flows and stocks when CAWLM is treated as a hybrid asset is shown below (focusing on Model 1).

[61] Once the CAWLM is produced by a mining entity, it is considered as existing. Therefore, all transactions afterwards are considered as those involving existing assets. For this reason, transactions in hybrid assets will not appear in the current account of balance of payments.

[62] In general, the balancing item of the capital account is invariant to the use of financial assets or CAWLM. If this balancing item is not net lending/net borrowing—because that designation is reserved for the financial accounts (Model 2 in Annex III)—then it would be the new balancing item of the capital account that is not affected by the use of either financial assets or CAWLM (see Annex III).

Model 1: B9 Net lending (+)/net borrowing (-) is retained as the name of the balancing item of the capital account (capital and current account in Balance of Payments)

Institutional Sector Accounts

Capital Account	
Changes in assets	Changes in liabilities and net worth
P51n Net fixed capital formation	*B8n Savings, net*
AN1X nonfinancial assets	D9r Capital transfers, receivable
AH hybrid assets	
P52 Changes in inventories	
P53 Acquisitions less disposals of valuables	
NP Acquisitions less disposals of non-produced nonfinancial assets	
D9p Capital transfers, payable	
B9 Net lending (+)/net borrowing (-)	

Newly created hybrid assets

… of existing hybrid assets

Acquisition of hybrid assets account	
Changes in assets	Changes in liabilities and net worth
H Acquisitions less disposals of hybrid assets	*B9 Net lending (+)/net borrowing (-)*
B9F Transactions in net financial assets	

Financial Account	
Changes in assets	Changes in liabilities and net worth
FX net transactions in assets	*B9F Transactions in net financial assets*
	FX net transactions in liabilities

B9 remains in the capital account

International Accounts

Current account
Goods and services
Goods
….
Current account balance
Capital account
Acquisitions/disposals of non-produced nonfinancial assets
Capital transfers
Capital account balance
Net lending/net borrowing (from current and capital accounts)(*)
Acquisition of hybrid assets account
Acquisitions/ disposals of hybrid assets
Financial account
Functional categories
Total changes in assets and liabilities
Net lending/net borrowing (from hybrid assets and financial account)(*)

(*) with errors and omissions calculated on net lending/ net borrowing

Credits	Debits	Balance

Not including transactions in hybrid assets

The calculation from current and capital account remains

… of existing hybrid assets

Model 2: B9 Net lending (+)/net borrowing (-) is retained as the name of the balancing item of the financial account.

Institutional Sector Accounts

Capital Account	
Changes in assets	Changes in liabilities and net worth
P51n Net fixed capital formation	*B8n Savings, net*
AN1X nonfinancial assets	D9r Capital transfers, receivable
AH hybrid assets	
P52 Changes in inventories	
P53 Acquisitions less disposals of valuables	
NP Acquisitions less disposals of non-produced nonfinancial assets	
D9p Capital transfers, payable	
B9C Net change in holdings	

Newly created hybrid assets

… of existing hybrid assets

Acquisition of hybrid assets account	
Changes in assets	Changes in liabilities and net worth
H Acquisitions less disposals of hybrid assets	*B9C Net change in holdings*
B9 Net lending (+)/net borrowing (-)	

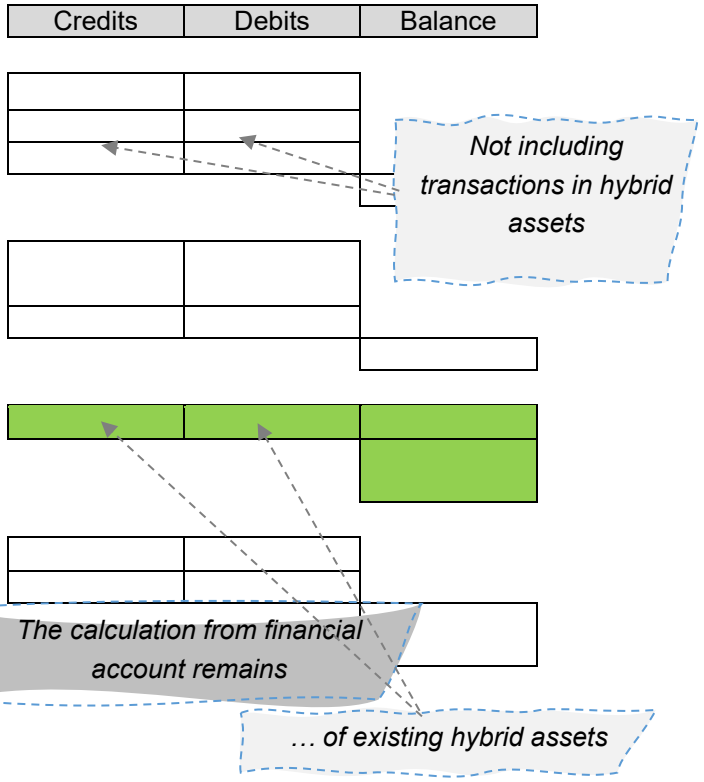
B9 remains in the financial account

Financial Account	
Changes in assets	Changes in liabilities and net worth
FX net transactions in assets	*B9 Net lending (+)/net borrowing (-)*
	FX net transactions in liabilities

International Accounts

Current account
Goods and services
Goods
….
Current account balance
Capital account
Acquisitions/disposals of non-produced nonfinancial assets
Capital transfers
Capital account balance
Acquisition of hybrid assets account
Acquisitions/disposals of hybrid assets
Net lending/net borrowing (from current, capital and hybrid assets accounts)(*)
Financial account
Functional categories
Total changes in assets and liabilities
Net lending/net borrowing (from financial account)(*)

(*) with errors and omissions calculated on net lending/net borrowing.



Annex IV. Numerical Examples

Example 1: The Use of CAWLM in the Cross-Border Purchase of Goods

Country B purchases units of CAWLM from Country C for US$100. Next, Country B imports current goods of US$80 from Country A and pays with CAWLM.

Main Differences in Recording for Goods Exporter (Country A)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Net saving	+80	+80	+80	+80
Net lending/borrowing	0	0	+80	+80
Change in stock of nonfinancial assets	+80	+80	-	-
Change in stock of financial assets	-	-	+80	-
Change in stock of hybrid assets	-	-	-	+80
Current account balance	0	+80	+80	+80
Net lending/borrowing	0	0	+80	+80
Change in net international investment position[63]	-	-	+80	-

Main Differences in Recording for Goods Importer (Country B)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Net saving	-80	-80	-80	-80
Net lending/borrowing	-100	-100	-80	-80
Change in stock of nonfinancial assets	+20	+20	-	-
Change in stock of financial assets	-100	-100	-80	-100
Change in stock of hybrid assets	-	-	-	+20
Current account balance	-100	-80	-80	-80
Net lending/borrowing	-100	-100	-80	-80
Change in net international investment position	-100	-100	-80	-100

Main Differences in Recording for CAWLM Seller (Country C)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Net saving	0	0	0	0
Net lending/borrowing	+100	+100	0	0
Change in stock of nonfinancial assets	-100	-100	0	0
Change in stock of financial assets	+100	+100	0	+100
Change in stock of hybrid assets	-	-	-	-100
Current account balance	+100	0	0	0
Net lending/borrowing	+100	+100	0	0
Change in net international investment position	+100	+100	0	+100

[63] In these examples, CAWLM is considered as an external asset for all the economies, when it is classified as a financial asset.

Conclusion:

In the national accounts, the main differences between the four treatment options emerge in net lending/borrowing and the stock of assets. In the two cases where CAWLM are treated as nonfinancial assets, net lending/borrowing (calculated as net saving minus gross domestic investment and capital-account transactions) is the same because the acquisition less disposal of valuables and of permits are recorded in the capital account. The change in the stock of financial and of nonfinancial assets are also the same between the two options for all three countries. In the case of CAWLM as financial or hybrid assets, net lending/borrowing only reflects the part of the transaction that involves the current and capital accounts. So, for Country A, net lending is positive due to the export of goods; for Country B net lending is negative due to the import of goods. Country C records net lending/borrowing as zero because a financial asset is exchanged for another financial asset (or hybrid assets as a secondary transaction), and no capital or current account transactions occur. A similar explanation applies to the stock of different kinds of assets. Country A records an increase in nonfinancial assets when CAWLM are valuables or permits, increase in financial assets when CAWLM are financial assets, and increase in hybrid assets if CAWLM are recorded as such. Country B always records a decrease in financial assets because currency is used to purchase the CAWLM; in the case where CAWLM are financial assets, the decrease is slightly offset by retaining US$20 worth of CAWLM after the purchase of goods. Country C records no change in the stock of financial or nonfinancial assets when CAWLM are financial assets, as the exchange of CAWLM for currency cancels out. When CAWLM are permits, valuables or hybrid assets, the increase in currency in the financial account is balanced by a decrease in assets other than financial.

For the international accounts, a different recording of CAWLM will differently affect the International Investment Position (IIP). When a CAWLM is classified as a financial asset, the net effect on the IIP is zero when the CAWLM is purchased with or sold for currency (or another crypto asset). When a CAWLM is classified otherwise, the net effect on the IIP is negative when it is purchased with currency and positive if sold for currency (if a CAWLM is exchanged for another crypto asset, the IIP is not affected). Furthermore, the different recording options may also lead to different results for the current account balance. When the CAWLM is recorded as nonfinancial asset, any purchases show up as barter trade, in the case of the recording as valuable not affecting the current account balance and in the case of recording as a non-produced nonfinancial asset (permits) not affecting net lending/borrowing (see Country A).

Example 2: The Use of CAWLM as an Alternative Investment Vehicle

Country B purchases units of CAWLM from Country A for US$100. Country B holds the CAWLM, and the value increases to US$120.

Main Differences in Recording for CAWLM Seller (Country A)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Net saving	0	0	0	0
Net lending/borrowing	+100	+100	0	0
Change in stock of nonfinancial assets	-100	-100	-	0
Change in stock of financial assets	+100	+100	0	+100
Change in stock of hybrid assets	-	-	-	-100
Change in net worth	0	0	0	0
Current account balance	+100	0	0	0
Net lending/borrowing	+100	+100	0	0
Change in net international investment position	+100	+100	0	+100

Main Differences in Recording for CAWLM Holder (Country B)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Net saving	0	0	0	0
Net lending/borrowing	-100	-100	0	0
Change in stock of nonfinancial assets	+120	+120	-	0
Change in stock of financial assets	-100	-100	+20	-100
Change in stock of hybrid assets	-	-	-	+120
Change in net worth	+20	+20	+20	+20
Current account balance	-100	0	0	0
Net lending/borrowing	-100	-100	0	0
Change in net international investment position	-100	-100	+20	-100

Conclusion:

For the first part of this transaction, please see the explanation under Example 2 for Country B's purchase of CAWLM from Country C with U.S. dollars.

The main difference between treating CAWLM as a financial or otherwise is how its revaluation affects the International Investment Position (IIP) (see Example 2). When CAWLM change in value from one period to another, the IIP is only affected when they are classified as financial assets.

Example 3: The Emergence of a New CAWLM Coin

A. Mineable Coin:

A miner in Country A provides CAWLM verification services for a transaction originated in Country B (please note that the transaction itself is not reflected in the example). The Country B final consumer pays a transaction fee of US$10 in existing CAWLM. In addition, Country A miner receives US$90 in new CAWLM as a Block reward. It is also assumed that the miner needs US$80 of electricity to solve the cryptographic puzzle and validate the transaction.

Main Differences for Miner in Country A

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Output of validation services	+10	+100	+100	+10
Output of CAWLM	+90	-	-	+90
Net Value Added	+20	+20	+20	+20
Net Saving	+20	+20	+20	+20
Net lending/borrowing	-80	-80	+20	-70
Change in stock of nonfinancial assets	+100	+100	-	0
Change in stock of financial assets	-80	-80	+20	-80
Change in stock of hybrid assets	-	-	-	+100
Change in net worth	+20	+20	+20	+20
Current account balance	0	+100	+100	+10
Net lending/borrowing	0	0	+100	+10
Change in international investment position	0	0	+100	0

Main Differences for Transactor in Country B

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Consumption of validation services	+10	+10	+10	+10
Net Saving	-10	-10	-10	-10
Net lending/borrowing	0	0	-10	-10
Change in stock of nonfinancial assets	-10	-10	-	0
Change in stock of financial assets	-	-	-10	0
Change in stock of hybrid assets	-	-	-	-10
Change in net worth	-10	-10	-10	-10
Current account balance	0	-10	-10	-10
Net lending/borrowing	0	0	-10	-10
Change in international investment position	0	0	-10	0

Main Differences for Owners of Existing CAWLM (or alternatively the crypto asset community)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Consumption of validation services	-	+90	+90	-
Net Saving	-	-90	-90	-
Net lending/borrowing	-	0	-90	-
Change in stock of nonfinancial assets	-	-90	-	-
Change in stock of financial assets	-	-	-90	-
Change in stock of hybrid assets	-	-	-	-
Change in net worth	-	-90	-90	-
Current account balance	-	-90	-90	-
Net lending/borrowing	-	0	-90	-
Change in international investment position	-	0	-90	-

Conclusion:

The different recording options do not lead to differences in value added but lead to differences in type of output. In the case of a permit and a financial asset, the full output is recorded as validation service, whereas in the case of a valuable or hybrid asset, part of the output concerns the creation of a new coin. Furthermore, the recording as a nonfinancial or hybrid asset versus a financial asset leads to differences in net lending/borrowing reflecting the difference between changes in net worth due to saving and capital transfers and net acquisitions of nonfinancial assets; for the case of hybrid assets, only the creation of the asset and not the acquisition of existing ones for the payment of validation services contributes to net lending/ net borrowing. Consequently, these different recordings also lead to differences in stocks of the different asset categories, although they do not lead to differences in the overall net worth.

In the international accounts, the recording of a CAWLM as different kind of assets leads to different outcomes for net lending/borrowing as well as for the change in the international investment position (IIP). This is due to the fact that in the example (in line with the recording of monetary gold) crypto assets are included in the IIP if treated as financial assets. It still needs to be discussed if this is the preferred approach. The recording as produced or non-produced nonfinancial assets leads to the same net lending/borrowing, but to different current account results. In the case of recording as a valuable, the payment of CAWLM in exchange for validation services is fully recorded as barter trade and does not affect the current account. In case of recording as a non-produced nonfinancial asset, the delivery of the validation service is reflected in the current account, whereas the payment is reflected in the capital account. In case of recording hybrid asset, the current account reflects the provision of validation services and the capital account only the production of the new coins.

B. Non-Mineable Coin:

An entity in Country A is involved in CAWLM verification services (via proof-of-stake validation) for a transaction originated in Country B (again, the underlying transaction itself is not reflected). The Country B final consumer pays a transaction fee of US$10 in existing CAWLM. In addition, the Country A entity receives US$15 in new CAWLM as a Block reward. It is also assumed that the miner needs US$5 of electricity to validate the transaction.

Main Differences for Miner in Country A

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Output of validation services	25	25	25	25
Output of CAWLM	-	-	-	-
Net Value Added	20	20	20	20
Net Saving	20	20	20	20
Net lending/borrowing	-5	-5	20	+20
Change in stock of nonfinancial assets	25	25	-	0
Change in stock of financial assets	-5	-5	20	-5
Change in stock of hybrid assets	-	-	-	+25
Change in net worth	20	20	20	+20
Current account balance	0	25	25	+25
Net lending/borrowing	0	0	25	+25
Change in international investment position	0	0	25	0

Main Differences for Transactor in Country B

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Consumption of validation services	10	10	10	10
Net Saving	-10	-10	-10	-10
Net lending/borrowing	0	0	-10	-10
Change in stock of nonfinancial assets	-10	-10	-	0
Change in stock of financial assets	-	-	-10	0
Change in stock of hybrid assets	-	-	-	-10
Change in net worth	-10	-10	-10	-10
Current account balance	0	-10	-10	-10
Net lending/borrowing	0	0	-10	-10
Change in international investment position	0	0	-10	0

Main Differences for Owners of Existing CAWLM (or alternatively the crypto asset community) (in case of a permit or financial asset) or the issuer of the CAWLM (in case of valuable or hybrid asset)

	Valuable	Permits	Financial Asset	Hybrid Asset (Model 1)
Output of CAWLM	+15	-	-	+15
Consumption of validation services	+15	+15	+15	+15
Net Saving	0	-15	-15	0
Net lending/borrowing	0	0	-15	-15
Change in stock of nonfinancial assets	0	-15	-	-
Change in stock of financial assets	-	-	-15	-
Change in stock of hybrid assets	-	-	-	-
Change in net worth	0	0	0	-
Current account balance	0	-15	-15	-15
Net lending/borrowing	0	0	-15	0
Change in international investment position	0	0	0	0

Conclusion:

The different recording options lead to the same values for value added. The results for output are also largely the same. The only difference is that in the case of recording of CAWLM as produced assets (i.e., as a valuable or a hybrid asset), the creation of the new coin is treated as production by the issuer of the coin (see paragraph 29). This is different from the recording of a mineable coin (see Example 1a above), where the creation is recorded as production of the miner. In line with the example of the mineable CAWLM, the recording as a nonfinancial asset versus a financial asset or hybrid assets also leads to differences in net lending/borrowing—although here the net lending for the cases of financial and hybrid cases are the same—and consequently to differences in the stocks of different kind of assets.[64] However, overall net worth is the same in all options.

When looking at the international accounts, the same differences can be observed as for mineable coins (see Example 3a above), except for hybrid assets where the current account balance and net lending/ net borrowing reflect the secondary transaction in CAWLM.

[64] This is under the assumption that the total value of all outstanding CAWLM as denominated in domestic currency remained the same.

Annex V. Measurement Challenges

1. **Whereas this GN tackles the conceptual issues of recording fungible crypto assets, another issue concerns the practical feasibility of implementing the possible recording options.** This basically comes down to how to obtain the relevant information on the emergence, ownership, and use of crypto assets. This will need to be further explored as part of the testing of the guidance as included in this note.

2. The following concerns in this regard should be taken into account:

- The pseudo-anonymous nature of crypto asset transactions, even though every transaction is recorded in a digital ledger (usually public, as with bitcoin);
- The difficulty of assigning geography to transactions and positions, given the residency of senders and recipients is unknown when the owners of the corresponding digital addresses are unknown;
- The difficulty of valuing positions, and separating flows from valuation changes, given the high variance in the prices of most crypto assets;
- Current lack of comprehensive data on the economic use of crypto assets in the national and international economy.

3. To implement any classification recommendation, countries need to collect reliable data on the following:

- Mining activities, including where mining takes place, what inputs are used, block rewards, and the residency of the transactors whose transactions are validated;
- Stocks of crypto assets by various economic actors in the country, which could potentially be collected by tax authorities;
- Flows of crypto assets between countries and institutional sectors, which could potentially be collected by tax authorities or through cooperation with crypto asset exchanges or other crypto service providers;
- The use of crypto assets as medium of exchange—for example, by collecting information on the use by entities in purchasing specific goods and services (possibly broken down into domestic purchases and purchases abroad) and on the acceptance by entities selling specific goods and services.

4. **Because of the difficulty in obtaining good quality data on the ownership and use of CAWLM (and other crypto assets), it is important to also explore possibilities to share data from crypto asset exchanges and crypto asset service providers across countries.** This will also help in ensuring cross-country consistency of the data.

5. **Crypto assets are a global phenomenon for which timely data should be collected, particularly on those cases where the assets are acting as a general medium of exchange.** That information would be used for measuring money, liquidity aggregates, and international capital flows at a relatively high frequency to meet user needs. In contrast to traditional components of money and liquidity aggregates, which are sourced from domestic financial corporations, new forms of digital money, such as CBDCs and stablecoins are likely to be issued by nonresident financial intermediaries to which national compilers of macroeconomic statistics may have very limited access. To the extent that Bitcoin and other

CAWLM become significant instruments for payments and store of value, the same concerns of data availability to national compilers would apply to them.

6. **The successful implementation of CBDCs and crypto assets may seriously undermine the measurement of money, liquidity aggregates, and international capital flows in many countries.** This is so because relevant data will not be available to compilers of macroeconomic statistics to the extent that foreign CBDCs or crypto assets circulate in their territories. Available commercial data do not offer the key breakdowns (country of residence and institutional sector) of the parties involved in digital money transactions or positions. To overcome this limitation, collaboration among central banks issuing CBDC will be needed, as well as among regulators of countries with crypto asset issuers and/or hosting digital money exchanges and wallets.

7. **News forms of digital money (CBDCs and crypto assets) may be the most significant global threat to residency-based macroeconomic statistics of our time.** This is particularly worrisome for countries that may not have the capacity to implement restrictions in the use of foreign digital money, such as fragile and unstable countries with weak fiat currencies. In these countries, policy makers may not have the tools to control the use of foreign digital money in their territories. Most importantly, they will not have the data needed to compile reliable monetary and external sector statistics, as the population and corporations adopt the new digital money.

8. **Currency substitution in the presence of new CBDCs or crypto assets serving as a medium of exchange will challenge the compilation of monetary statistics and international capital flows.** Currency in circulation in the hands of money holding sectors is a key component of the measurements of liquidity in macroeconomic statistics, commonly called monetary aggregates. In countries with weak currencies, there may be co-circulation of national and foreign currencies. This phenomenon is not new, and it is often called “dollarization”. Contrary to dollarization, which is a relatively slow process, currency substitution in the presence of new CBDCs or crypto assets serving as a medium of exchange is likely to be fast, challenging the compilation of monetary statistics and the policy analysis derived from them. For example, an emerging country with strong trade ties to China may have residents opening accounts in China’s new CBDC (e-RMB), to be used for their imports trade from China. If this is the case, monetary statistics compilers in the emerging country would need to know how much and how fast currency substitution is taking place.

9. **Increased currency substitution would require enhanced collaboration among central banks issuing CBDC (or countries with crypto asset issuers), to exchange information about CBDC and crypt asset holdings by residents in other countries.** Central banks (CBs) would need to collect and provide data on holdings of their own CBDC by counterpart country and institutional sector—at least, splitting the data over three main components: money issuers, CB and Other Depository Corporations (ODC) holdings, central government, and money holding sectors.[65]

[65] Breakdown by institutional sector is difficult and not strictly needed for monetary analysis. This is so because national compilers can easily access foreign CBDC holdings by their money issuers (banks and other) and central government. Therefore, the CBDC holdings by money holding sectors are calculated residually. Example: China reports that 100 of e-RMB are held by Vietnamese residents. Vietnamese MFS compilers know that holdings by CB, ODC, and central government are 15, 10, and 5 respectively. The remaining 70 are held by other sectors (money holders). If e-RMB is co-circulating with the national currency in Vietnam, it is extremely important for policy makers to

10. **Data exchange among CBs can be facilitated by an international organization with global reach, such as the IMF.** A central database could be created for CBs issuing CBDCs to report CBDC holdings by nonresidents. All CBs, with CBDCs or not, in whose economic territories foreign CBDCs are used significantly could use the database to improve their Monetary and Financial Statistics.

11. **The absence of collaboration among CBDC issuers would negatively impact the compilation of monetary aggregates.** In countries with growing or strong currency substitution, the lack of timely, high-quality data on foreign CBDC used in the domestic economy will have a great impact in the quality of monetary analysis. The following scenarios can illustrate the issues:

- **Scenario 1:** Five countries issue CBDC by end of 2021. They agree to report holder's data to a central unit located in the IMF Statistics Department. These five CBDCs are used globally. Compilers of Monetary and Financial Statistics in other countries access the central database to identify the amounts of each CBDCs held by residents in their own country. These data are used in the calculation of their monetary aggregates.
- **Scenario 2:** No central database exists (i.e., bilateral arrangements are needed to collect relevant data). Compilers of MFS in each country in which foreign CBDCs are used make bilateral arrangements with the countries issuing the CBDC. Small, low-income countries are faced with the burden of contacting CBDC issuers, detracting from their limited resources to compile high quality MFS. This situation is even more complicated by the presence of crypto assets, to the extent that some jurisdictions in which the crypto assets are issued do not collect relevant data to be shared with central banks of countries in which these crypto assets have a significant presence among their residents.

know the amount of liquidity available by money holders in e-RMB. If Vietnamese residents can also use e-USD to make payments in Vietnam, the compilers would need to gather data from the FED as well.

Annex VI. Crypto Assets Data Collection: High-Level Guidance

1. The four approaches discussed in the GN require more or less the same information to compile accurate and detailed statistics. This GN recommends that countries begin collecting information on the ownership, creation, and use of crypto assets in domestic economy and cross-border transactions.

- **Stock of crypto assets** owned by resident institutional sectors and the changes in these stocks (in terms of financial transactions, revaluations, and other changes) throughout the year. This includes information on cross-border flows and positions, ideally broken down by counterpart country.
- **Data on the creation of crypto assets** (i.e., transaction fees—broken down into explicit fees and block rewards—paid to/received by miners and validators for clearing transactions on the blockchain and on other forms of bringing new coins into circulation). In addition, information should also be collected on the input costs (e.g., labor, machinery, electricity).
- **Data on the use of crypto assets** (i.e., on the use of these assets in purchasing goods and services by sector and the use of crypto assets as an alternative investment).

Possible Data Sources

2. It is required the development of a data set that collects crypto asset ownership and transaction information from households, corporations, government, and non-profit entities. Some of this information could potentially be collected via tax authorities, which have an interest in identifying the owners of these assets for tax purposes.[66] Alternatively, it could be collected via regulatory bodies, targeting the main players in the crypto asset market, such as crypto asset exchanges, wallets, and other trading platforms that are generally subject to anti-money laundering regulations that require them to "know" their customers, including identities and countries of residence. However, these entities may not be registered in the domestic economy, so this may not be a feasible option for many compilers. A lot of the required information may also be collected via surveys, targeting the main players in the crypto asset market (if resident in the country), but very likely also the various entities that may be involved in crypto asset activities and/or own crypto assets. International exchange of data may also be of help if the main players are indeed located in a different country.

3. The following is a list of specific data items about which members should collect information. The data items are broken out by the target entities:

- Tax authorities
    - Ownership of crypto assets by businesses and individuals at beginning and end of recording period
    - Gains/losses from holding and selling crypto assets
- Retailers that accept payments in crypto assets
    - Use of crypto assets to purchase of goods and services (domestic versus non-resident)

[66] A proposal was recently passed by the U.S. Senate to (i) collect more data on crypto assets, primarily from crypto asset exchanges, and (ii) raise tax revenues from the crypto industry. The proposal targets exchanges because they have data on who owns crypto assets and how much, and records of who sold what crypto to whom and for how much.

    - Receipt of crypto assets in sale of goods and services (domestic versus non-resident)
- Mining enterprise or validation provider:
    - Holding gains/losses on crypto assets
    - Input costs in relation to validation services and/or mining
        - Electricity
        - Equipment
        - Employment
        - Labor costs (or hours spent)
    - Receipt of transaction fees in crypto assets
        - Explicit fees (existing coins)
        - Block reward (new coins) in the case of CAWLM
        - Sale of crypto assets (in exchange for fiat currency or other assets)
- Crypto asset designer:
    - Value of coins held at beginning and end of recording period
    - Release of new coins during the recording period (mineable or non-mineable) by counterpart country
    - Input costs in relation to design and/or management of crypto asset
        - Electricity
        - Equipment
        - Employment
        - Labour costs (or hours spent)
- Crypto asset exchange/trading platform/wallet:
    - Information on use of crypto assets
    - Information on creation of new crypto assets
    - Information on revaluation of crypto assets
    - Purchase/sale of crypto assets (in exchange for fiat currency or other assets)
    - Stocks of crypto assets held by residents/non-residents and possibly sector at the beginning/end of a period

Specific Recommendations for Monetary and Financial Statistics and Balance of Payments/IIP Compilers

4. MFS compilers' interest in measuring monetary and liquidity aggregates, and cross-border financial transactions and positions by balance of payments/IIP compilers, are being challenged by the appearance of digital currencies or new means of payment using DLT networks, such as Bitcoin's blockchain. In countries with weak currencies or unbanked population (i.e., with limitations to access financial services), the emergence of digital money or new means of payment may have a significant impact on monetary (currency substitution) and external sector (new cross-border payment channels) statistics. To understand how the population is using the new crypto assets designed to act as a general medium of exchange, a simplified data collection exercise is recommended, with the following characteristics:

- **Targeted Fintech Companies:** resident wallet providers (for positions data, i.e., amount of crypto assets held by the different institutional sectors) and currency exchanges (for transactions data, especially to collect cross-border transactions data).
- **Nonresident Fintech Companies:** nonresident wallet providers and currency exchanges used by residents, with estimates on the share of the domestic market. Even if actual data are difficult to collect from nonresident fintech providers, a survey among resident holders of crypto assets may shed some light on how important these providers in the domestic economy are.
- **Data Collection (Positions):** aggregated data on resident institutional unit's holdings of crypto assets by type and broad sector classification (money issuers—CB and ODC—central government, and money holding sectors) and, for nonresident customers, by broad sector and country of residency.
- **Data Collection (Transactions):** aggregated data on resident institutional unit's cross-border transactions in crypto assets by type and by sector and country of residency of counterparty—covering purchase/sale of crypto assets by type (including CAWLM), purchase/sale of goods and services, remittances, and direct investment (e.g., real estate) using CAWLM.
- **CAWLM Data Tracking:** aggregated data on customer transactions and holdings of CAWLM, aiming at measuring to what extent CAWLM is used as a means of payment only (i.e., both buyers and sellers, or remittances senders and recipients immediately convert the CAWLM sent/received into fiat currency) or as medium of exchange (i.e., both buyers and sellers, or remittances senders and recipients maintain positions in CAWLM, bearing the risk of appreciation/depreciation).

Example of Possible Survey Questionnaire: Bitcoin Mining Company

Item		M1	M2	M3
1. Number of Bitcoins mined during the period	Units			
2. Value of Bitcoins mined (at price of the day of the transaction)	USD			
3. Explicit Fee received for validating the transactions (in Bitcoins) Value	Units USD			
4. Input costs related to mining/validation services	USD			
a) Electricity	USD			
b) Maintenance of equipment	USD			
c) Labor costs	USD			
d) Other input costs	USD			
5. Use of Bitcoins				
a) sold to resident exchanges Number (could be a fraction) Value	 Units USD			
b) sold to nonresident exchanges Number Value	 Units USD			
c) transferred to head office/others Number Value	Units USD			
d) payments for purchase of goods and services Number Value	 Units USD			
e) Other uses				

Annex VII. Supplementary Information

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