



Issues in measuring digital assets based on the 2025 SNA — Focusing on the discussions regarding crypto assets —

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Yoshiko Sato
Bank of Japan

The views expressed are those of the author and do not necessarily reflect those of the Bank of Japan.



Motivation

- At the IFC Biennial Conference in 2022, Sato (2023a) presented criteria for financial assets based on the SNA framework and proposed a digital assets classification. At the ISI WSC in 2023, Sato (2023b) discussed the asset classification of non-liability crypto assets used as a means of payment (NLCA).
- The 2025 SNA is currently being drafted for endorsement at the United Nations Statistical Commission on March 2025. Meanwhile, with regards to crypto assets, IMF has been preparing the Compilation Guidance on Crypto Assets to provide practical guidance on the recording of crypto assets.
- This paper reviews :
 - The definition and classification of [digital assets](#), [crypto assets including NLCA](#), and the [criteria for financial assets](#) in the 2025 SNA
 - A numerical example of [recording NLCA in the case of mining \(proof of work\)](#) based on the guidance note (F.18) and reveals statistical inconsistencies on a global basis
 - Considers [alternative three options](#)
 - Briefly presents [other remaining issues](#) of crypto assets

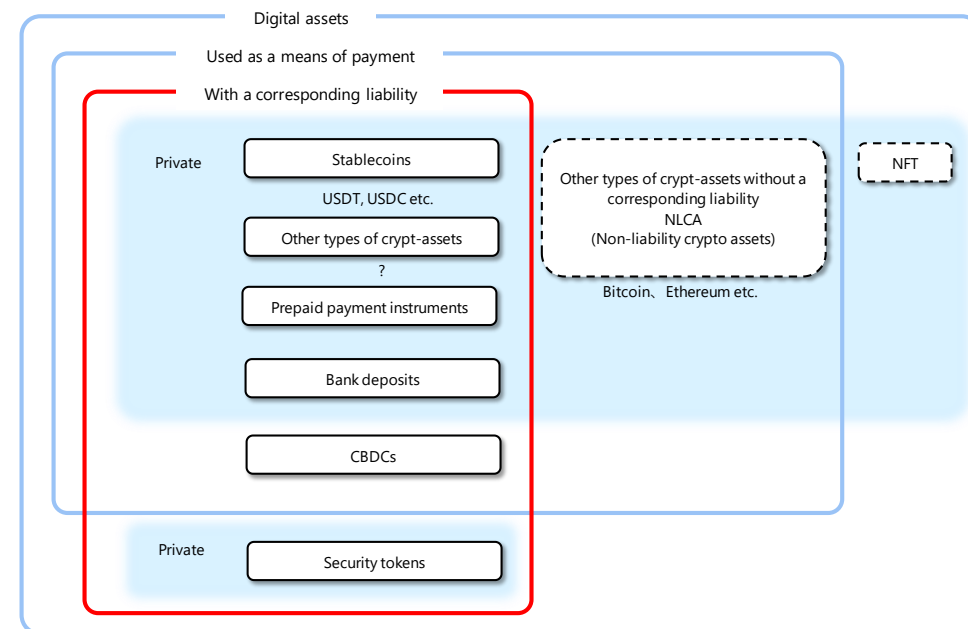
Digital assets in the 2025 SNA

- **Digital assets:** Assets that exist only in digital form such as crypto assets (¶22.2).
- **Crypto assets:** Digital representations of value that use cryptography and distributed ledger technology (DLT) such as blockchains to enable parties to transact directly with each other without the need for a trusted intermediary (¶22.84).
All types of crypto assets are within the SNA asset boundary (¶22.87).
- **Criteria for financial assets:** the same as in the 2008 SNA. All financial assets (the creditors) entail corresponding liabilities (the debtors), with the exception of monetary gold (¶4.109).

Crypto assets with a corresponding liability are classified as **financial assets**.

Crypto assets without a corresponding liability (NLCA) are classified as **non-produced, non-financial assets** (¶22.87).

Classification of digital assets





Digital assets in the 2025 SNA (Cont'd)

The typology of crypto assets:

- (1) Those designed to act as a general medium of exchange
- (2) Those designed to act as a medium of exchange within a platform or network
- (3) Security crypto assets

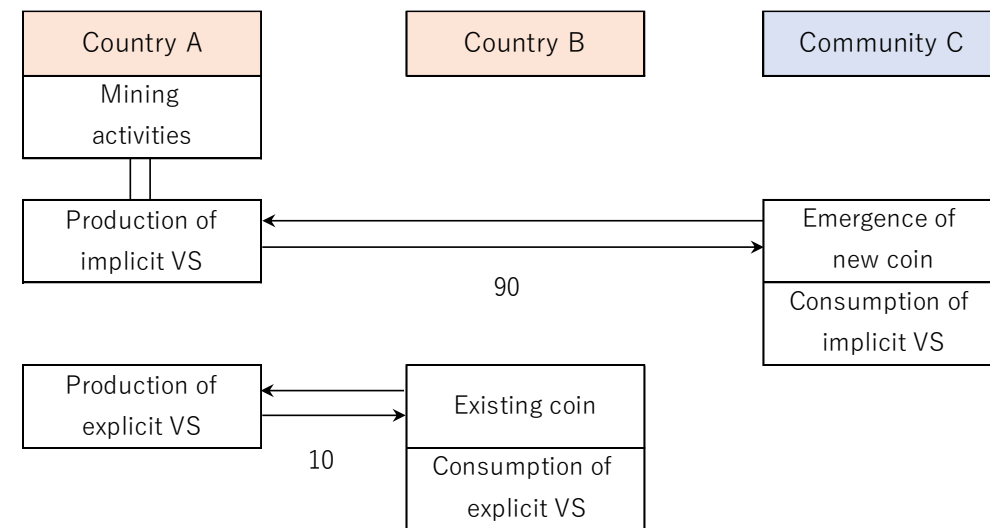
➡ The 2025 SNA poses a challenge to macroeconomic statistical classification in assessing generality and its coverage of the crypto assets as a medium of exchange.

The typology of fungible crypto assets in the 2025 SNA should be reconsidered. For statistical continuity and stability, statistical classifications based on generality or its coverage of the crypto asset as a medium of exchange should be avoided.

This is because future technologies may create new types of crypto assets which have a capacity of increased interoperability with different platforms.

Recording of NLCA based on the 2025 SNA

- The draft chapters of the 2025 SNA provide conceptual guidance for NLCA in the case of mining (proof of work).
 - The 2025 SNA clarifies:
 - Validation of crypto asset is a service; the implicit/explicit fee; the validation service is allocated to consumption.
 - The guidance note on crypto assets (F.18) assumes in the case of mining (proof of work):
The miner in Country A produces validation service rewarded in new coin (90 as an implicit fee) and produces validation service paid in existing coin (10 as an explicit fee) by Country B where the transactor is resident. The newly mined coin (90) emerges in the Community C.
- ➔
- The Community C as explained in the GN is only conceptual and does not exist in the real world.
 - The transactions to be recorded in the Community C are **not observable**. They are left as unbalanced values, such as in savings and in the current account balance.



VS : validation service

Recording of NLCA based on the 2025 SNA (Cont'd)

Based on the guidance note (F.18)

| | | Country A | | | Country B | A+B | Community C | World Total |
|---|--|-----------|----------|---------------|---------------|-----|-------------|-------------|
| | | | new coin | existing coin | existing coin | | new coin | A+B+C |
| Production account | Output | 100 | 90 | 10 | 0 | 100 | 0 | 100 |
| | output of services | 100 | 90 | 10 | 0 | 100 | 0 | 100 |
| | output of goods | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Intermediate consumption | 80 | 80 | 0 (*) | 0 | 80 | 0 | 80 |
| | Value added | 20 | 10 | 10 | 0 | 20 | 0 | 20 |
| Use of Income account | Final consumption | 0 | 0 | 0 | 10 | 10 | 90 | 100 |
| | Savings | 20 | 10 | 10 | -10 | 10 | -90 | -80 |
| Capital account | Gross capital formation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Acquisitions less disposals of non-produced assets | 100 | 90 | 10 | -10 | 90 | -90 | 0 |
| | Capital transfers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Net lending/borrowing | -80 | -80 | 0 | 0 | -80 | 0 | -80 |
| Financial account | Net lending/borrowing (financial account) | -80 | -80 | 0 | 0 | -80 | 0 | -80 |
| | Currency and deposits | -80 | -80 | 0 | 0 | -80 | 0 | -80 |
| Other changes in the volume of assets and liabilities account | Change in stock of financial assets | -80 | -80 | 0 | 0 | -80 | 0 | -80 |
| | Change in stock of non-financial assets | 100 | 90 | 10 | -10 | 90 | 0 | 90 |
| | Due to transactions | 100 | 90 | 10 | -10 | 90 | -90 | 0 |
| Revaluation account | Due to other changes in the volume of assets and liabilities | 0 | 0 | 0 | 0 | 0 | 90 | 90 |
| | Due to revaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Change in net worth | 20 | 10 | 10 | -10 | 10 | 0 | 10 |
| Balance sheets | Opening balance sheet | 100 | 100 | 0 | 100 | 200 | 0 | 200 |
| | Produced assets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Non-produced assets | 0 | 0 | 0 | 100 | 100 | 0 | 100 |
| | Financial assets | 100 | 100 | 0 | 0 | 100 | 0 | 100 |
| | Closing balance sheet | 120 | 110 | 10 | 90 | 210 | 0 | 210 |
| | Produced assets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Balance of payments | Non-produced assets | 100 | 90 | 10 | 90 | 190 | 0 | 190 |
| | Financial assets | 20 | 20 | 0 | 0 | 20 | 0 | 20 |
| | Current account | 100 | 90 | 10 | -10 | 90 | -90 | 0 |
| | Goods | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Services | 100 | 90 | 10 | -10 | 90 | -90 | 0 |
| | Capital account | -100 | -90 | -10 | 10 | -90 | 90 | 0 |
| International investment position | Financial account | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Opening value of IIP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Closing value of IIP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Alternative options

- Without assuming crypto asset community (Community C).
- The newly mined coin (90) emerges in Country A.
- The consumption of the validation service (90) is to be allocated
 - (1) across countries where the holders of existing coin are resident, or
 - (2) to either buyers or sellers, possibly sellers, for the total value (90), or
 - (3) to both buyers and sellers by half (45:45).
- In the balance of payments, the export of 90 is recorded and the same amount of current transfer as a corresponding entry.

- (1) Is the best option but highly challenging.
 (2) and (3) are the second best options.



Other issues requiring further elaboration

1. Staking of crypto assets

A way for non-minable crypto assets without a corresponding liability to enter into circulation via other means than proof of work. Explanations are limited in the current 2025 SNA.

2. Lending of crypto assets

Different types of lending transactions according to the combination of assets could be envisaged:

(i) cash vs NLCA, (ii) stablecoins vs NLCA and (iii) NLCA vs NLCA.

(i) cash vs NLCA lending is a financial transaction? How to treat (ii) and (iii) ?

3. ISIC classification of miners' activities

Is the validation and mining activity of NLCA to be classified in Section K: 6310 (computing infrastructure, data processing, hosting and related activities) or somewhere else?

4. Exchange traded funds (ETFs) of NLCA

Sector classification of spot (physically-backed) ETFs of NLCA should be clarified. They may not fall into the financial corporations sector, such as Non-MMF investment funds (S124).

5. Possibility of NLCA classification change from non-financial assets to financial assets

The 2025 SNA implies there is a possibility that the NLCA classification could change depending on its usage in the future.

- The role of crypto assets without a counterpart liability designed to act as a medium of exchange may change in the future, and such crypto assets may qualify as money, to be recorded as financial assets (¶11.173).
- If a crypto asset without a corresponding liability is ever able to gain widespread acceptance as a general medium of exchange, the guidance on its classification may be re-considered (¶12.87).



Conclusions

- The 2025 SNA takes an important step forward towards capturing digitalization.
- This paper reviews the definition for digital assets in the 2025 SNA including the distinction between financial and non-financial assets, and the typology of crypto assets, and it shows the classification of digital assets.
- It presents a numerical example of recording NLCA following the GN and reveals the statistical inconsistencies on a global basis. It proposes three alternative options in recording NLCA without assuming crypto asset community, and implies that further discussions on the possible methods is necessary to improve the recording of NLCA.
- There are still issues for further elaboration and further discussion. It is hoped that the remaining issues (e.g., staking, lending and ETFs) will also be clarified in the 2025 SNA or in its related compilation manuals.
- The technology related to crypto assets, in particular, are likely to give rise to various products. They impose challenges in delineating financial assets and non-financial assets and demonstrate the need for careful consideration in determining how to record them within the SNA framework. The Compilation Guidance on Crypto Assets prepared by the IMF needs to include detailed explanations of recording NLCA adopted in 2025 SNA. Ongoing discussions, research and the review on a global basis are necessary.