



BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

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cool breeze or tsunami in balance of payments statistics?

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THE RISE OF CRYPTO-ASSETS: COOL BREEZE OR TSUNAMI IN BALANCE OF PAYMENTS STATISTICS?

by Andrea Carboni*, Giuseppe Carone* and Giuseppina Marocchi*

Abstract

Recent years have shown a significant acceleration in the adoption and development of blockchains or Distributed Ledger Technologies, particularly in the financial sector. Alongside the well-known and widely used Bitcoin, other cryptocurrencies have been developed and have become popular (such as Ethereum, Binance and XRP). As a result, digital wallets and exchange platforms are becoming commonly used technologies. Meanwhile, different instruments are being developed rapidly, which could be launched and reach scale in the near future; this is the case of stablecoins, Central Bank Digital Currencies (CBDCs) and Non-Fungible Tokens (NFTs). Besides technical details and contingent regulatory requirements, the purpose of this paper is to evaluate and highlight the impacts of such instruments on the compilation of external statistics. After a brief digression on the features and classification of digital assets, the potential effects on some balance of payments items are discussed, both in the current and in the financial account.

JEL Classification: E4, F02, F24, F3.

Keywords: crypto-assets, crypto-currencies, stablecoins, balance of payments, remittances, payment services.

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1 Introduction¹

In June 2019, Facebook announced the forthcoming launch of a new digital currency named Libra. According to promoters, this new instrument for international payments and transactions should have hit the market in the first half of 2020.

Libra was conceived as a “stablecoin”, namely a digital coin backed by a basket of fiat currencies and other financial assets. Indeed, the promoter intended it to be (and operators expected it to become) a global stablecoin, that is an instrument potentially able to foster the development of faster, cheaper and more inclusive payment arrangements, also cross-border.

In early 2020, we tried to explore the implications of digital assets from the perspective of external statistics compilers, mainly focusing on methodological aspects, with a look also at their possible impacts on selected Balance of Payments (BoP) items². Our conclusions were rather cautious and included some hypotheses on possible compilation approaches. The concluding remark was above all the wish that the compilers reach a broad agreement on definitions, classifications and statistical treatments of such instruments in order to ensure harmonized practices and consistent results.

After the 2019 announcement, the Libra project seems to have been definitely abandoned³. On the opposite, crypto-assets and other instruments based on distributed ledger technology (DLT) have continued to spread with the extraordinary growth and development of the crypto-currencies market.

The debate on digital assets in macroeconomic statistics, and particularly in the external statistics, is ongoing, with new contributions, mainly in the field of classification.

However, many relevant questions remain open.

With this work, we wish to continue the analysis of the issues raised and the challenges posed by crypto-assets, from the balance of payment statistics compiler point of view. Our analysis does not cover the relevant concerns that such instruments raise in the fields of financial stability, combating money laundering and terrorism financing, oversight of the smooth operation of the payment system and consumer protection. Regulators and other authorities (such as the Bank of Italy⁴) are specifically (and strongly) engaged on all these issues, in the exercise of their institutional functions.

The paper is divided into four sections. Following the Introduction, Section 2 provides an overview of general definitions and main classification schemes of crypto-assets proposed for macroeconomic statistics purposes, with some considerations on a few relevant open questions. Section 3 discusses specific issues, both theoretical and practical, related to external statistics compilation. Concluding remarks are included in Section 4.

¹ The views expressed in this paper are those of the authors and do not involve the responsibility of the Bank of Italy and/or the Eurosystem. The authors would like to thank Riccardo Renzi for the fruitful discussions and suggestions.

² Croce, Langiulli, Marocchi (2020): “The weight of a “Libra”: are stablecoins a new challenge for external statistics compilers?”

³ During 2021 the Libra project was deeply revised, mainly in response to G7 Governments and Central Banks concerns about risks with respect to financial stability, terrorist financing, antitrust, etc. However, even in this new release, the stablecoin, renamed Diem, did not convince US regulators, who definitively blocked it in early 2022.

⁴ en-Comunicazioni-della-Banca-d-Italia-DLT-cripto.pdf (bancaditalia.it)

2 General definition and main classification schemes

A general definition of crypto-assets in the context of macroeconomic statistics was provided by the IMF, which qualifies them as follows:

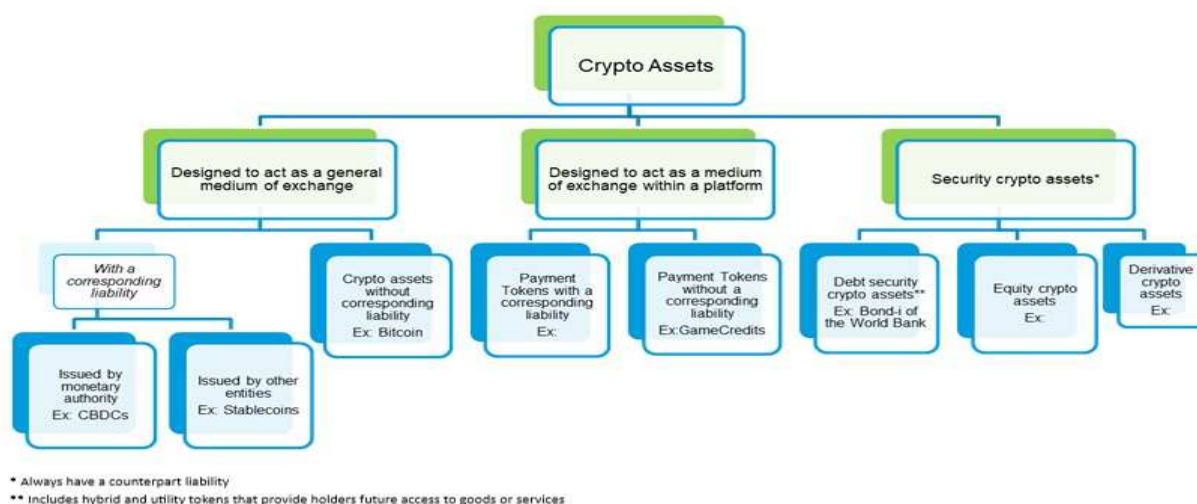
“Crypto assets are digital representations of value that rely on cryptography and that can be exchanged via a decentralized peer-to-peer architecture based on distributed ledger technology (DLT), which enables two parties to directly transact with each other without the need for trusted intermediaries”⁵

Though probably not exhaustive,⁶ the set of "objects" included in this definition is rather large, diversified and constantly evolving.

A simplified taxonomy stemming from Adrian and Griffoli (2019) was proposed in the 2020 paper on Libra, in order to classify digital assets on the basis of three attributes: the underlying technology (centralized/decentralized), the existence of an issuer (and, therefore, of a corresponding liability) and, if applicable, the redemption value.

More recently, a representation scheme⁷ taking into account two factors has been proposed by the IMF: (1) the purposes for which a crypto-asset is designed and can be held and (2) the presence of a liability (and therefore of an issuer) corresponding to the (crypto) asset (Figure 1).

Figure 1
The 2021 IMF representation scheme



Though conceived in different contexts and for different purposes, both schemes consider the existence of an issuer (and therefore of a corresponding liability) a crucial factor, because of its implications on classification and therefore on the compilation practice and the interpretation of phenomena.

Even though digital assets do not (currently) serve the basic functions of money, they have a monetary value and a price on the market where they are traded. Ipso facto, these instruments are to

⁵ IMF, Joint financial and payments system task teams, F.18 The Recording of Crypto Assets in Macroeconomic Statistics, 2021.

⁶ This definition may be excluding some specific categories, such as “permissioned” instruments, as opposed to “permissionless” ones. However, this could be considered a minor issue from the BoP compilation perspective.

⁷ See footnote 4.

be considered economic assets but, depending on their specific features, they might fit better in the category of either financial assets or non-financial assets.

In theory,⁸ a crypto-asset representing a claim on the issuer (with the issuer recognising a liability vis-à-vis the holders) should be considered a financial asset. Consequently, crypto-assets that are characterized by the presence of an issuer can rightly be assimilated to financial instruments,⁹ as agreed in all international consultations coordinated by international organizations (IMF, OECD and others)¹⁰ at different levels.

Conversely, there is still no consensual view on the real nature of crypto-assets without a corresponding liability (CAWL) whose distinctive feature is the lack of an underlying claim/matching liability: financial or non-financial assets? At the same time, they bear at the same time characteristics both of financial assets (e.g. they can act as a medium of exchange) and of non-financial assets, being somewhat similar, for example, to “valuables” (such as non-monetary gold, silver, diamonds). But in this case, it is not so obvious, however, in which category of non-financial assets they should be classified: produced or non-produced non-financial assets? There is still no official answer to these questions.

Undoubtedly, each solution has very different implications both in terms of compilation methodology for external statistics and of related results. Until a shared decision is made, the potential impact on external statistics cannot be assessed. Some considerations on the recording of CAWL as non-financial assets are discussed in section 3.1, whilst in section 3.2 issues related to recording crypto-assets (with or without corresponding liabilities) in the financial account and in the international investment position (IIP) are illustrated.

In addition to the classification issues described above, a key factor in the external statistics context is the concept of residence. Whether with or without corresponding liabilities, crypto-assets are relevant for the balance of payments to the extent that they involve transactions between residents in different economies. Thus, for example, the Italian BoP will have to include all transactions in CA/CAWL made by residents with non-resident counterparties, where the “non-resident counterpart” may be a holder, an issuer, a “miner” (or a “pool of miners”) or, perhaps, even a “platform” in which the transactions take place. Paradoxically, the counterpart could even be unknown: an “invisible operator” whose offer matches the resident’s demand.

On this topic two main questions arise.

From a strictly pragmatic point of view, is it always feasible to identify (or to attribute) the residence of a counterpart?

In addition, more theoretically, does it really make sense to do so, in a context existing only in the web and being, by definition, decentralized, distributed, held in virtual/digital wallets?

These questions are still unanswered questions and may be useful for further reflections.

⁸ In practice, classifying a single crypto-asset into the one or the other category (with or without liability) could be really difficult. This aspect is not considered in this work, but it is a further issue that the compiler must take into account.

⁹ In different frameworks, a generally accepted classification distinguishes between *backed* and *unbacked* crypto-assets. However, this distinction does not help to highlight the differences relevant for macroeconomic statistics purposes.

¹⁰ IMF (2019): “Treatment of Crypto Assets in Macroeconomic Statistics”; OECD (2022): “Crypto-Asset Reporting Framework and Amendments to the Common Reporting Standard”, Paris; Eurostat-OECD-Unece Group of Experts on National Accounts (2020): “The Recording of Crypto Assets in the System of National Accounts – Interim Guidance”.

3 Crypto-assets and the external statistics compilation

Some factors make the recording of CA/CAWL in the BoP/IIP particularly challenging.

First, CA/CAWL are typically retail phenomena, involving individuals (or, at least until now, this has been the case). As a consequence, they are supposed to be rather widespread, not much concentrated, with obvious repercussions on the possibility of collecting data.

The characteristics of the technology underlying this type of instruments does not ensure that data and other necessary information can be collected in a centralized or semi-centralized way (for example through surveys at custodians, platform managers or in general with connected service providers).

These kinds of problems, though general, may vary depending on the type of crypto-asset in question. In the next two sub-sections, specific issues referring to compilation practices are discussed. Paragraph 3.3 elaborates on BoP items potentially affected by crypto-assets when used as means of payment.

3.1 Recording CAWL in the current/capital account

As illustrated above, the issue surrounding the classification of CAWL is controversial because these products do not have a corresponding liability like traditional financial assets. At the time of writing, the IMF's Committee on Balance of Payments Statistics (BOPCOM) and the Advisory Expert Group on National Accounts (AEG) have not yet decided about the classification of crypto-assets in macroeconomic statistics¹¹ and, concerning the balance of payments, the decision to record them in the financial account or the current account remain two equally likely options.

In this paragraph, we would explore some possible consequences of the assimilation of CAWL, from an accounting perspective, to “goods” to be registered in the current account. In this case, most common crypto-currencies¹² are, in a certain way, assimilated to precious metals exchanged by private operators; but they assume great importance in external statistics because of the large volume of their cross-border transactions (see Box 1).

Box 1

Volume of crypto-currencies transactions

The rise of crypto-currencies in the last decade was significant: in 2013, there were around 60 crypto-currencies worldwide, while at the beginning of 2022 there were more than 10,000¹³ traded in international markets. The creation of a crypto-currency is seen as a market opportunity for many businesspeople, but alongside some success stories, there have also been many failures: around 10,000 crypto-currencies were created that are no longer traded today¹⁴. Nevertheless, the “survivors” attract investors.

In February 2022, the Chair of the European Securities and Markets Authority (ESMA),¹⁵ Verena Ross declared¹⁶ that the total market capitalisation of crypto-assets had increased eightfold over the the previous two years, with a peak in November 2021, when it was nearly USD 3 trillion. The market

¹¹ A decision was expected by Autumn 2022, in the occasion of the BOPCOM/AEG meeting of October 19-20 2022.

¹² In this paragraph, we are always considering the crypto-currencies without liabilities that are now the most common CAWL in the market. Same considerations apply to any CAWL asset.

¹³ See <https://www.statista.com/statistics/863917/number-crypto-coins-tokens/>

¹⁴ In November 2022, according to Coinmarketcup, a specialized provider of the sector, there were more than 21.000 crypto-currencies and more than 500 exchange in the world.

¹⁵ The European Securities and Markets Authority (ESMA) is an independent European Union (EU) Authority that contributes to safeguarding the stability of the EU's financial system.

¹⁶ See [esma50-164-5533_keynote_speech_-_verena_ross_-_keeping_on_track_in_an_evolutionary_digital_world.pdf](https://www.esma.europa.eu/press-material/press-conferences-and-events/verena-ross-keeping-on-track-in-an-evolving-digital-world) (europa.eu).

capitalization seems more recently has seen a sharp decline: estimates indicate a market cap in October 2022¹⁷ of USD 1 trillion (around 70 per cent less than the November 2021 peak).

Along with the growth in their number and capitalization, the volume of trade in cryptocurrencies has also increased. According to Coinmarketcap.com the daily exchange volume in November 2022 was around 170 billion of USD, which means an annual volume of around 60k billion per year: double the value of total goods exported by the G20 countries.¹⁸

The crypto-currencies market is characterized by high volatility and uncertainty and is therefore subject to large price fluctuations, rapid losses in value and sudden defaults (some of which occurred recently). It is no coincidence that the Bank of Italy has repeatedly warned about the risks associated with crypto-assets in general (and particularly with CAWL)¹⁹.

In this market a predominant role is played by crypto-currency trading platforms, which in many cases also offer other services, like storage. According to Arcane²⁰ and Coinmarketcap.com, Binance dominates the market, with an estimated share of around 50-60 per cent of total transactions in 2021 (The CEO of Binance²¹ confirmed this estimate, declaring volumes of around USD 34k billion for the year 2021).

When transactions in CAWL, and particularly in crypto-currencies, involve two economic entities resident in different countries, they need to be recorded in the balance of payments; in other words, in each country, BoP compilers should register crypto-assets transactions when residents buy (sell) them from (to) non-residents. It is likely that the large majority of these volumes are exchanged between residents of the same economy, but the potential population is extremely large, and the identification of BoP relevant operations is particularly challenging. Difficulties increase because of the nature and role of digital currencies exchanges (DCEs), which are the owners of the platforms where crypto-currencies transactions take place.

Crypto-currencies transactions may occur in two different ways: peer-to-peer, with a direct transaction between buyer and seller; or, more frequently, with the intermediation of a DCE: traders place orders in the exchange platform defining quantity and price of the crypto-currency they are willing to buy or sell. When two orders (buy and sell) match in price and quantity, the transaction is finalised.

When a DCE intermediates the transaction, a first issue for external statistics compilers is related to its status: the DCE could be considered as the counterpart of both the buyer and the seller and therefore involved in the transaction. Alternatively, it may be considered as a pure broker, thus excluding its direct “participation” in the transaction.

In the first case, each side completes its transactions only with the DCE (red solid lines in Figure 2) that is therefore counterpart for both of them; while in the second case, the buyer and the seller transact directly, so for both of them the counterpart is a DCE customer, not the DCE itself (blue dot line in Figure 2).

¹⁷ Like www.coinmarketcap.com and www.coingecko.com

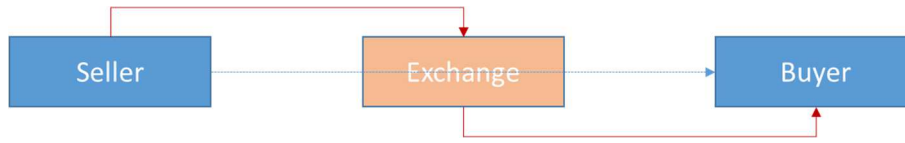
¹⁸ In 2021, the G20 exports were 27k billion. Source OECD database: International trade - Trade in goods and services - OECD Data

¹⁹ As a recent example, see Bank of Italy - Bank of Italy Communication on Distributed Ledger Technologies in Finance and Cryptoassets (bancaditalia.it) - June 2022

²⁰ <https://arcane.no/research>

²¹ <https://www.reuters.com/markets/us/cryptocurrency-exchange-binance-2022-volumes-so-far-similar-2021s-34-trillion-2022-06-16/>

Figure 2
The DCE role in a crypto transaction



If we consider the DCE as the counterpart in all transactions, the identification of its residence is an additional complex issue. In many cases the DCE choose its headquarters in tax heavens for fiscal reasons, establishing branches in countries where they operate; this is the case of Binance, the true leader in the exchange market (see Box 1), which is headquartered in Cayman Islands and has branches all over the world²².

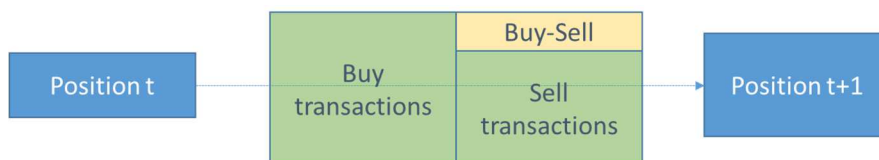
The second option seems more in line with the national account standards and the exchanges may be assimilated to intermediaries who only provide services to their customers. In this case, there is a practical issue in identifying transactions that involve operators resident in different countries (and therefore relevant for the BoP); for each finalized transaction, the DCE knows the buyer and the seller, but is this enough to say that it always knows also their country of residence? And, if so, is it feasible for it to select BoP relevant transactions and transmit the related information to national statistical authorities? As a matter of fact, collecting data from a DCE might be really complicated, especially if it is located abroad.

A second consideration is about the quantification of the volume of crypto-assets transactions. These are mainly linked to trading activities: economic operators try to take profit from the difference between buying and selling prices. This means that they may have a high frequency of transactions, and so high volumes, investing and disinvesting always the same amounts.

We can look at the trading activity from an accounting perspective in two ways: analysing all transactions occurred during a period or considering the change in the positions at the beginning and at the end of the period. With respect to the position, opposite transactions of the same amount are neutral: buying and selling the same quantity of crypto-currency does not change the stock in a portfolio. Therefore, flows can be calculated in two ways: on a gross basis or on a net one. In the first case, all the transactions are taken in account; in the second one, only the final effect on the position is relevant.

Looking to the Figure 3, the gross evaluation of transactions in a time interval (from t to $t+1$) considers the two green areas as total imports and total exports of crypto-currencies, respectively, while the net one considers only the difference (buy-sell) represented by the yellow area.

Figure 3
Evaluation of transactions in CAWL



²² In 2022, Binance has started to “decentralize” its activity, creating local branches in different countries, because of a progressive application of a strict regulation in the crypto-currencies market. In Italy a certified branch has been established at the end of May 2022. (See also https://www.organismo-am.it/elenchi-registri/operatori_valute_virtuali/).

Under the assumption that crypto-assets are “goods”, the evaluation on a gross basis should be the rule, because the item “goods” in the BoP includes any change of ownership (and so any single transaction)²³; however, unlike the transactions in goods that are executed for final or intermediate consumption, transactions (purchase and sale) in cryptoassets are carried out with an investment intention, more similar to buying and selling securities. From this point of view, the evaluation on a net basis seems to better represent the transactions in an economic perspective. Even now, a net evaluation is adopted in specific items in the current account and in goods estimation, for instance for merchanting operation, justified by the economic reason that merchanting import does not exist.²⁴

Thus, it is necessary to agree, at least in the balance of payments context, how cross-border transactions should be recorded: on a gross or on a net basis?

A third issue is about “fake” transactions related to exchange platforms. According to a Forbes analysis²⁵ the 51 per cent of Bitcoin transactions executed in 2022 were fake. Many exchanges are suspected of artificially increasing their volume (using bots and automatic transactions) to increase popularity and gain customers. Forbes, in an analysis of more than 150 exchanges, concluded that more than two thirds of them adopt such strategies inflating their volume by about one third.

In addition, in this case, new issues for BoP compilers arise: how to estimate true transactions, and what premium discount applying to exchanges volumes?

Lastly, crypto-assets market has another relevant reflex in the current account and international trade in services, because the intermediation services provided by the exchanges and other operators should be recorded in the balance of payments (as trade in services).

In the traditional EBOPS categories there are two main items for reporting the intermediation activities: “financial services”, where commissions on buying and selling of financial assets are recorded, and “trade-related services”, which include the intermediation revenue of the goods sellers.

Therefore, regardless CAWL classification, the exchange commissions should be reported as services transactions in balance of payments (if the trader and the exchange reside in different countries).

Some issues, already mentioned, reoccur. First, the question of the DCE residence that might be difficult to ascertain, especially when its geographical structure is complex and controversial (as in the case of Binance). Then the identification of “fake transactions”, that compilers should exclude in order to estimate commissions for official statistics.

Of course, traders pay commissions on any transaction, so there is not an issue about gross or net evaluation, but the need to know the overall volume (that is the total of the two green areas in Figure 3) exchanged by resident customers within a platform managed by a non-resident DCE.

Finally, it is important to underline that also implicit fees, like bid/ask spreads, should be recorded in balance of payments as financial intermediation. In mature markets, the difference is generally quite small, but some crypto-currencies have an opaque market with large differences between bid/ask prices.

If CAWL are considered goods, and thus exchanges produce trade-related services, it could be appropriate clarifying the inclusion of implicit fees in the intermediation evaluation.

²³ Balance of Payments and International Investment Position Manual - Sixth Edition (BPM6) (imf.org) paragraph 3.44

²⁴ <https://www.imf.org/en/Data/Statistics/BPM/CATT> (see Guidance Note C4)

²⁵ More Than Half Of All Bitcoin Trades Are Fake (forbes.com)

3.2 Recording CA (and possibly CAWL) in the financial account and in the IIP

In order to analyse the main issues related to the recording of CA in the financial account and in the IIP, we will consider the particular class of global stablecoin (GSC), namely an instrument issued by an issuer, that is backed by a reserve, composed by a basket of fiat currencies and other assets, that allows keeping its value stable.²⁶ These coins could be considered very similar to investment fund shares/units and could be recorded accordingly in the Balance of Payments.

Under this treatment, any transactions in GSCs would have a direct impact on the financial account as well as an indirect impact, the latter related to the transactions involving the financial assets included in the reserve, particularly in the functional categories of Portfolio Investment and Other Investment.

Portfolio investment is defined in BPM6²⁷ as cross-border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets.

Other investment is a residual category including, among others, currencies – which consists of notes and coins of fixed nominal values issued or authorized by central banks or governments - and deposits. Even though no private digital assets can be classified as a currency itself, the basket of instruments underpinning Global Stablecoins will arguably include currencies.

Stablecoins may be fully or partially backed by any kind of asset, from commodities to digital assets. However, for a global stablecoin to be used with trust by the public as a substitute of legal money or as a store of value, chances are that issuers will maintain 100% guaranteed reserves invested in a basket consisting of the most common currencies, at least at the initial stage.

To evaluate possible repercussions on the Financial Account, let us assume the following:

- The representative fund holding the assets purchased by the issuer as collateral (the Reserve) is headquartered in country A (e.g. Switzerland); for the sake of simplicity, collateral includes only bank deposits and/or short-term government securities in euros and US dollars (in fixed and equal quantities).
- The representative holder (Holder 1) of the GSC and his bank are resident in country B (Italy).
- The Reserve holds accounts with a geographically distributed network of depositary banks/custodians, which includes intermediaries from Country B.
- Holders of GSCs do not receive any remuneration.
- The issuer defines the investment strategy and commits to convert coins in fiat money, but the actual amount at redemption will vary according to the EUR/USD exchange rate.

Case 1: Reserve basket consisting of deposits

In the simplest possible case, the Reserve deposits all the funds it receives from Holder 1 in one or more accounts with Italian and non-Italian banks. Looking at the global banking system as a whole, account deposits would just change hands, with a liability vis-à-vis Households in Italy becoming a liability vis-à-vis Other financial corporations in Switzerland - assuming that the Reserve will be considered similar to an investment fund. Nevertheless, while the initial set-up is not relevant for external statistics, the purchase produces cross-border transactions and moves the financial account.

In general, if the pool of depositary banks is less geographically diversified than the pool of GSC users, there are some redistributive effects as deposits will concentrate in some countries. However, with regard to developed economies, it is likely that stablecoins will not substitute the current payment system (which revolves around banks) but will integrate it. This means that users are not

²⁶ Similar but more simple considerations apply to different kind of CA.

²⁷ IMF (2009): Balance of Payments and International Investment Position Manual, sixth edition.

expected to hold reserves of these assets but would rather purchase stablecoins right before a disbursement and would recollect fiat money right after a receipt.²⁸

Case 2: Reserve basket consisting of deposits and securities

In this (more realistic) instance, the Reserve invests part of the funds it received from Holder 1 in short-term government bonds, basically acting like a monetary fund. In addition to the effects sketched out in the previous section, compilers would record potential purchases and sales of domestic securities under Portfolio Investment. The complexity of registrations depends crucially on the investment strategy defined (up-front) by the GSC issuer: a portion of the deposits drained from the banking system may revert to domestic bank deposits and short-term government securities, provided that these assets can be part of the reserve.

As an example, let us illustrate the strategy summarized in Figure 4, where the issuer issues GSCs for a total amount of 250 euros (of which 130 purchased by Italian residents), recording it on the liability side of its balance sheet. On the asset side, the funds received are partly held in deposits (100, of which 40 with Italian banks), while the remaining part is invested in securities (150, of which 30 in short term debt securities issued by Italian Government).

Figure 4

Accounting records from the GSC issuer's balance sheet

GSC ISSUER			
Assets		Liabilities	
Bank deposits	100	Coins	250
<i>vis-a-vis IT</i>	40	<i>vis-a-vis IT</i>	130
<i>vis-a-vis CH</i>	60	<i>vis-a-vis CH</i>	120
Portfolio investments	150		
<i>IT debt securities</i>	30		
<i>CH debt securities</i>	20		
<i>US debt securities</i>	100		

Figure 5 shows the impact of these transactions on the Italian BoP. In detail: the purchase of 130 euros of GSCs increases assets vis-à-vis Switzerland, in the item named GSC. The purchase of Italian securities (30 euros) made by the Reserve augments Portfolio investment liabilities – debt securities. The opening of a deposit by the GSC issuer (for the Reserve) enlarges Italian banks' liabilities vis-à-vis other financial corporations (40 euros).

²⁸ On the contrary, if users hold GSCs in deposit-like accounts, retail deposits at banks may decline permanently, increasing bank dependence on more costly and volatile sources of funding (G7 WG on Stablecoins, 2019).

Figure 5
Simplified BoP/IIP recordings of GSCs from an Italian perspective

Italy (Country B)				
	Transactions		Closing position	
	Assets	Liabilities	Assets	Liabilities
Financial account	130	130	133	131
Portfolio investment		30		31
Other investment - Deposits MFIs		100		100
<i>Deposits vis-à-vis other financial corp.</i>		40		
<i>Deposits vis-à-vis banks</i>		60		
<i>OFC deposits settlements</i>		-40		
<i>GSCs settlement</i>		130		
<i>Debt securities settlement</i>		-30		
GSC	130		133	
Net IIP/ Net e&o	0		2	

Transactions involving MFIs deposits are considered by convention as increase/decrease in liabilities; they might have been considered as decrease/increase in assets, with the same final results.

These transactions do not impact on net IIP, because each transaction is balanced with/by a financial settlement. Changes in the net IIP are due to valuation changes due to securities' and GSC's prices and exchange rate fluctuations, since we supposed that coins are not guaranteed to maintain a fixed value.

In our example, Italian debt securities revaluated by 3% while GSCs revaluated by 1.5% (see "Closing Position" columns in Figure 5).

Practical considerations

For correct and exhaustive recording of GSCs in BoP/IIP, the information needed, at the end of each month, is: the sector of the (resident) holder, the country of residence (and the sector) of the issuer, the amount of GSCs held, the exchange rate of the GSC (e.g. with respect to the EURO), this in order to estimate market values and valuation adjustments,

If comprehensive data are available for all positions in any GSC, BoP/IIP statistics can be correctly compiled.

In practice, the task of external statistics' compilers will depend on:

1. future regulatory requirements
2. technical features of the blockchain and
3. the possibility that centralised database of CA could be designed in order to fulfil statistical needs.

The first two points impact on data collection, while the third one would help in the area of consistent classification and limiting asymmetries.

3.3 Monitoring phenomena potentially affected by crypto-assets

Current account could be indirectly influenced by crypto-assets which are likely to stimulate global trade in both goods and services. In particular, as a side effect, such instruments could foster extra-EU digital trade as long as payments with digital assets will prove cheaper and smoother than traditional foreign-currency operations. In this case, compilers may incur in different kind of problems and would need supplementary sources of information.

Below, two possible scenarios are described.

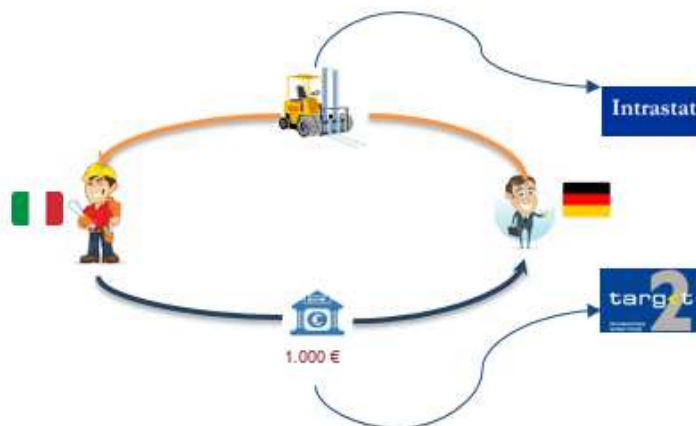
Case 1: Trade in goods

By convention, in the BoP, each cross-border transaction gives rise to two recordings: one related to the object of the transaction itself, the other referred to its settlement. Let us consider for example a company resident in Italy that purchases a machine from a company located in Germany and pays it by transferring 1000 Euros from its own bank account (in Italy) to the German company's account (at a German bank). In this case both legs (the machine and the money) have to be recorded, in "current account – goods" and "financial account – deposits" respectively.

If this does not happen (that is if one leg is missing or if the two legs are not recorded consistently), the result is an increase in the "errors and omissions" item, which represents an important quality indicator of the BoP, and that, ideally, should be zero.

In the current compilation system, each leg of each transaction has its proper data source. The transfer of the machine from Germany to Italy is recorded in Intrastat, which is a system, managed by national statistical institutes, for collecting information on the trade in goods between countries of the European Union. Similarly, the transfer of money from Italy to Germany is captured from TARGET2, the Eurosystem's real-time gross settlement system, through the change of the monthly position of the Bank of Italy (and of the Deutsche Bundesbank as well), toward the platform (Figure 6).

Figure 6
Trade in goods – data sources



What happens if the payment is, for example, in Bitcoin? Is there a data source to link this transaction to its settlement? If not, the amount recorded in the item "goods" in the current account will entirely reflect in "errors and omissions".

Case 2: Remittances

Workers' remittances are payments made by migrants employed in host economies to non-resident households and are included in the "personal transfers" item.

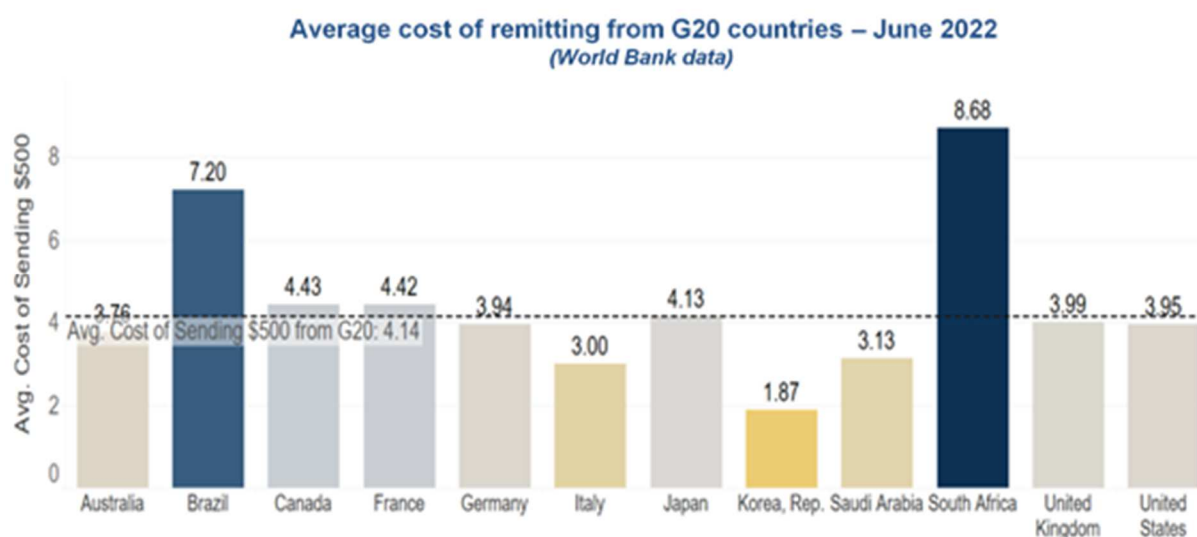
In the latest years, the growth of international mobility has led to a significant increase in value of the flows of remittances recorded worldwide,²⁹ even if these retail payments are slow, expensive and opaque, as operators charge significant transfers fees.

Besides that, there are 1.7 billion people globally who do not have access to banking or financial services, even though 1.1 billion of them have/has(?) a mobile phone (G7 Working Group on Stablecoins, 2019).

Digital assets are able to address most of these shortcomings, as they can be quickly transferred peer-to-peer and converted in any currency; so it is no surprise then that Big Tech and Fin Tech companies are looking at these assets as they try to make their way into financial markets.

The World Bank calculates and tracks costs for sending remittances worldwide; in June 2022 the average global fee for sending 500 dollars from Italy was about 3% and it was even higher for payments of 200 dollars (around 4.4%).³⁰ Global average has been declining over the years and has settled around 4% (see Figure 7), also thanks to a project promoted by G8/G20 in 2009.³¹ In any case, payments are not usually processed in real time: in 40% of the instances, remittances were not available to the receiver until the next day.

Figure 7
Average cost of remitting



In the Italian Balance of payments, both inward and outward remittances are estimated using supervisory reports transmitted by official intermediaries (money transfer operators and banks) on a quarterly basis. While incoming flows are almost negligible, the outward ones represent the largest type of transfer, accounting for more than 8 billion euros in 2021. This should be regarded as a lower

²⁹ According to the World Bank, global remittances are worth little less than 700 billion dollars per year. Even if the definition of remittances used by the institution is broader- including both personal transfers and compensation of employees – this figure is still impressive. For many developing countries, the amount of inbound remittances exceeds the value of foreign direct investments.

³⁰ These figures include any fees charged on both the sender and the receiver; on average, the exchange rate margin applied by service providers was calculated between 1.5% and 2%.

³¹ The project, called 5x5 Objective, was aimed at reducing remittances' average costs by 5 percentage points in 5 years (De Bonis and Vangelisti, 2019).

bound for the actual amount of remittances, as migrants could prefer using cheaper informal channels under certain circumstances (e.g. direct delivery of money when returning home).³²

All in all, if crypto-asset may represent an appealing alternative to “formal” (and “informal” too!) channels for remitting money, then the possibility of a shift from conventional money transfer operations to crypto-assets payment solutions is real. If that happened, and if we were unable to trace those movements for external statistics purposes, the impact on Italian BoP might be significant.

In this second case, unlike case one referred to trade in goods, there would be no increases in “errors and omissions”, as it is likely that both the transaction and its settlement would be missing. Therefore, the BoP would be formally correct and consistent but “workers remittances” would be underestimated. In turn, this would affect the estimate of other relevant macroeconomic aggregates (GDP, GNI).

³² In one of the few empirical works attempting to estimate the size of informal flows, Magnani et al. (2016) estimates informal outflows from Italy between 10 and 30%.

4 Conclusions

The paper focuses on the crypto-assets phenomenon with a twofold purpose: providing a general overview of such instruments in the context of external statistics and highlighting the expected effects that their adoption and use may have on BoP/IIP compilation.

Digital assets transactions and positions are not comprehensively captured within the current BoP/IIP framework. Even though some guidelines for classification exist, very few compilers include them in their statistical production.

Regardless of practical difficulties in their classification, crypto-assets representing a claim on the issuer are largely considered as financial assets, to be included in the financial account of the BoP and in the IIP. On the other side, CAWL may be treated as financial or non-financial assets, depending on the subjective perception of different compilers, since their classification is still unsolved. In this respect, a final decision needs to be taken by the relevant authorities for a solid agreement on all aspects that are still vague and ambiguous.

Recording CAWL in the current account poses several issues: the identification of BoP relevant transactions (involving residents and non-residents); the evaluation of transactions (gross vs net); the unclear role (and residence) of the exchange platform managers; the possible overestimation of the volumes exchanged; the measurement (and the impact) of the intermediation services connected with trading activity within a platform and, most of all, the possible lack of information.

When it comes to crypto-assets with corresponding liability (e.g. stablecoins), effects on the financial account are twofold, relating both to the assets used as reserve and to the coins themselves (held by users). The first can be estimated as long as they are kept by custodians providing data to the relevant National Competent Authorities (NCAs). Stablecoins' holdings, instead, are more difficult to ascertain without the involvement of service providers with ad-hoc reports.

We anticipate that a widespread use of digital assets could have relevant impacts on remittances and, in theory, on any kind of cross-border transactions - which may benefit from faster and cheaper conditions. Further assessments of this topic could be carried out in the future, when the regulatory and fiscal frameworks are set up.

Some other issues not treated in this paper are worth a more in-depth analysis. For example: the impact on BoP compilation systems of the spreading of "security crypto-assets"; the role of "non-fungible tokens"; the actual magnitude of this phenomenon in the BoP perspective.

To conclude, further analysis and information are needed to ascertain to what extent compilers and users of external statistics should really worry about these phenomena and to gauge whether they actually represent a potential "tsunami" or can be expected to be only a "cool breeze".

In the investigation of the potential impacts on compilation systems, it is crucial that statisticians monitor the developments of digital assets (e.g. the Digital Euro Project Investigation Phase goes on...) and follow the evolution of the regulatory framework (in Italy, a law for the establishment of a "crypto-currency registry" is coming into force). Indeed, a globally coordinated regulatory framework would significantly help the compilation of macroeconomic statistics. Moreover, it is of utmost importance that views and experiences are shared with other countries' compilers, also with the coordination (and the contribution) of International Organizations, and that administrative data-sources, if any, are explored (in Italy data collected by Italian Revenue agency on the holdings of "virtual currency" by households are already available).

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