Stablecoin

Taxonomy and Key Considerations

Introduction

The term "stablecoin" covers a broad range of cryptoassets. Currently the common factor uniting them is the aim for price stability. The structures leveraged to achieve price stability differ extensively. This means that it is necessary to offer a broader discussion on the definition of stablecoin, as well as the associated key considerations which, it is acknowledged, vary significantly depending on structure.

This document is intended to be read in conjunction with the Code of Conduct for Stablecoin Issuers and offers a definition and taxonomy through which stablecoin products can be identified and understood, including a discussion of some key considerations around stablecoin products for issuers, users and other market participants. All market participants are reminded of the necessity of focusing on the substance of any cryptoasset, rather than labels, in order to properly understand its function.

Scope of this Document

This document covers:

1. Stablecoin Definition and Taxonomy
2. Review of Key Stablecoin Considerations (including discussion on risks)

The scope of this document does not cover: (i) code of conduct for stablecoin Issuers (which is contained in the separate document linked above) (ii) review of regulatory environment in which stablecoins may or may not operate depending on structure and jurisdiction, amongst other things, although we have highlighted this as a risk which needs to be considered; (iii) jurisdiction specific analysis, including of market or regulatory conditions in any particular location; (iv) stablecoin specific analysis, i.e. no reference is made to any specific current stablecoin in issue in the market on the date of this document; and (v) central bank issued digital currencies.

It is recognised that dependent on the underlying structure of a stablecoin offering, principles outlined in other GDF codes of conduct will also apply, including i) overarching principles, ii) security tokens, iii) custody, iv) token issuance, and potentially others – see here for current GDF codes. To avoid duplication, principles set out in these other codes are not covered here.

1. Definition and Taxonomy

A. Definition of stablecoins

A stablecoin is a cryptoasset that serves as a medium of exchange and a store of value and is structured to minimise price volatility. The initial purpose of stablecoins was to mitigate price volatility in the cryptoasset trading market, as international market participants encountered difficulties exiting their cryptoasset positions efficiently. With the creation of stablecoins came a price-stable means of exchanging value on-chain on a global scale, by taking the best attributes of fiat (i.e. store of value/means of exchange) and cryptoassets (i.e. global, programmable, efficient, open, etc.) and combining them in a tokenised form that can be considered to be a foundational layer to the "tokenisation of everything". Stablecoins can facilitate global payments, with near instant settlement, with low to zero transaction fees – a compelling offering for internet payment transactions. It is this price stability that makes stablecoins particularly well suited to serving as a medium of exchange and a store of value in the digital assets economy and, increasingly, in the real world as well.

The majority of stablecoins are designed to be equal in value to a fiat currency (e.g. the US Dollar). However, as set out below, there are a number of stablecoins in market that vary in their structure.

B. Taxonomy of Stablecoins

We can categorise stablecoins from three main perspectives:

- How they are collateralised or stabilised (e.g. collateralised with fiat monies or stabilised with an algorithm);
- The value that they reference (e.g. 1 USD or the value of 1 gram of gold); and
- Where they sit on the spectrum of decentralisation (more on that below).

Viewing stablecoins from these different angles can produce different perspectives on the "primacy" of their different characteristics which may cause potential tension in establishing agreed parameters within which stablecoins are defined. We would emphasise that we consider all of the above to be valid viewpoints on categorisation and in our taxonomy we have selected an ordering that we believe provides an easy starting point to enter into the subject matter (this is not a reflection on the relative importance or otherwise of the noted characteristics).

In our taxonomy, the first characteristic considers collateralisation, in particular whether or not a stablecoin is collateralised by any assets, the nature of such supporting arrangement, etc. This is referred to as its "backing". The second characteristic is value – whether the stablecoin maintains value parity with a fiat currency, e.g. 1 USD, or with a (non-volatile) asset or basket, e.g. gold. This is referred to as its "pricing". This should be distinguished from asset received on redemption which in many instances will be the same as the reference "pricing" asset but may differ. The final characteristic addresses decentralisation, specifically where a stablecoin sits on the decentralisation spectrum, as analysed through the lens of the different meanings of decentralisation.

Collateralisation ("Backing")

Collateral arrangements are an easy entry point for considering the characteristics that come to mind when categorising stablecoin. We see current stablecoin offerings falling into two main categories i) asset backed and ii) non-asset backed, with a number of sub-categories.

- Asset backed – We note that most stablecoins currently in issue are asset backed. In the simplest structures, asset backed stablecoins are backed 1:1 by their underlying reference asset (e.g. a dollar in a bank account). In other structures, the value might be linked to an asset other than that which is being used as collateral (see more on pricing below), however these are still backed by an asset held as collateral in the structure. Examples might include:
    - Fiat
    - Commodities
    - Real Estate
    - Other physical assets
    - Non-physical assets
        - Off-chain such as shares / debt / derivatives[1]
        - On-chain such as ether / other crypto
- Non-Asset backed – Not all stablecoins use collateral backing, or solely collateral backing, to maintain price Stabilisation. There are other stablecoin structures which use non-collateralised price Stabilisation structures, examples include:
    - Algorithmic
    - Hybrid (i.e. combining asset backed and non-asset backed arrangements)

Note on substance over form: As with many products in the cryptoassets space, the way in which a product is presented to market, including in offering materials, may differ even though underlying structures do not. As a result, there may be a disconnect between similarly structured stablecoins and the way that they are marketed, e.g. the same thing could be offered as an investment or as a store of value or as a payment tool. It is always important to drill down to the underlying basic structure for full understanding of an offering.

Value Reference ("Pricing")

The simplest stablecoin structures reference the value of the asset that is backing them (e.g. a stablecoin where pricing references USD and is backed 1:1 by dollars in a collateral account) and that is the asset received on redemption of the token. Other structures may reference USD but be backed by a different asset (e.g. a stablecoin where pricing references USD but is backed by a mixed basket of dollars and gold). Further structures price the token by reference to the value of another asset (e.g. a commonly traded commodity such as oil) but rather than being backed by oil, are backed by derivative contracts and pay out in dollars. As can be seen from this example, value reference / pricing in many cases is the same as the asset received upon redemption, but in some instances these differ.

Decentralisation

Another key characteristic of stablecoins is the extent to which a stablecoin can be said to be decentralised. As decentralisation is a rich term with multiple meanings, we have set out a few key measures below. Decentralisation should be viewed as existing on a spectrum spanning

[1] In the case of some stablecoin structures there may be special considerations around the regulatory treatment of the token, for example they may in themselves constitute "securities" / "regulated financial instruments". Further information on these structures can also be found in the GBBC Digital Finance Code of Conduct for Security Tokens

100% centralised on one end and 100% decentralised on the other, with most, if not all, stablecoins considered decentralised in some respects, but centralised in others.

...more detail on collateralisation

This section sets out some further detail and examples of the different sub-categories of asset backed stablecoins. As we have previously noted, in the case of some stablecoin asset backed structures there may be special considerations around the regulatory treatment of the token, for example they may in themselves constitute "securities" ! "regulated financial instruments".

Fiat-backed:

- Token backed 1:1 with fiat e.g. token represents right to redeem 1 USD in return for 1 token. Issued by a centralised entity and typically held in a centralised manner, which guarantees redeemability of the underlying fiat held in segregated reserve accounts.

Commodity-backed:

- Tokens backed by commodities, for example traditional trading assets, like gold or oil. Price stability can be maintained by a centralised entity holding assets physically in escrow ! custody or using derivative financial instruments linked to the applicable commodity.

Real Estate-backed:

- Tokens backed by real estate property, can be commercial or residential, specific buildings or land, geographies, property types.

Other physical assets:

- Tokens backed by e.g. whiskey ! wine – are there any examples, are these considered "stablecoins"? May be depending on the structure of the portfolio.

Non-physical assets:

- Tokens backed by;
    - Off-chain non-physical assets, e.g. shares, bonds, derivatives. In this case there may be special considerations around the regulatory treatment of the token, for example these may in themselves constitute "securities" / "regulated financial instruments". Further information on these structures can also be found in the GBBC Digital Finance Code of Conduct for Security Tokens .
    - On-chain non-physical assets, e.g. cryptocurrencies. In this case there may be special structural arrangements in order to stabilise price – generally crypto-backed stablecoins are over-collateralised and may also run automatic liquidation procedures if the over-collateralisation buffer falls too low.

Baskets:

- Tokens backed with baskets of assets, which may be taken from the same or different sub-categories (set out above). For example, a fiat-backed coin could be backed by a basket of multiple underlying currencies, or a stablecoin could be backed by a combination of fiat and gold. There are many different basket permutations possible. Further discussion on hybrid structures, which combine asset backed and non-asset backed features, can be found below under "Non-Asset Backed Stablecoins".

Note on synthetic structures:

As indicated in the descriptions provided, stablecoins can be structured directly or synthetically. In a synthetic structure, the financial obligation to pay out the specified redemption price to a holder is supported by underlying financial instruments which simulate the financial outcome of direct backing. Synthetic structures are inherently derivative. To give an example, in a direct (sometimes referred to as a "cash" structure but not to be confused with fiat-backed) structure, a gold-backed coin would be backed by physical gold in a vault whilst in a synthetic structure, a coin referencing the value of gold could be backed by a portfolio of bonds and a swap that is swapping the bond portfolio risk against gold.

...more detail on non-asset backed stablecoins

Algorithmically-backed:

- Tokens that maintain price stabilisation through a demand ! supply algorithm. The algorithm automatically decreases or increases the circulating supply of stablecoins in order to obtain a new equilibrium that approximates the target price. This is typically achieved through burning tokens (i.e. removing them from the supply) or minting new tokens (i.e. creating and introducing new tokens in to the supply), which has a similar effect to an issuer the executes "buying" or "selling" orders for the token in order to stabilise the price of the token against the reference asset or basket of assets. In short, algorithmically stabilised tokens are tokens which aim to be price-stable without any form of collateralisation.

- The most common form of algorithmic stabilisation involves some form of seigniorage. Seigniorage is a shares-for-coins and coins-for-shares system. Shares represent a claim on the future value of coins and are acquired if there is an expectation that this will increase; coins simply act as mediums of exchange.

Hybrid:

- Tokens that combine the features of collateralisation and non-collateralisation for the price stability of the token. The most common form of hybrid stablecoins follow a model whereby they are backed by an asset ! basket of assets (asset backed or crypto-collateralised) – although other forms of collateral, such as loans, can be used – whilst also using an algorithm to increase supply or demand in order to stabilise the price of the token.

...more detail on decentralisation

This characteristic further subdivides both the asset backed and non-asset backed categories. The main measures of decentralisation are:

- Operators – Is there a single entity or group of entities responsible for operating the stablecoin? In a centralised model, there is typically a central operator that runs the key functions to keep the system running. E.g. a sole issuer that creates new tokens (i.e. minting) and destroys tokens (i.e. burning) would be its central operator. More broadly, this could include any entity that runs a price oracle, manages any part of collateralisation or otherwise is an important dependency for the stablecoin to function. In most cases, the developer of the stablecoin takes on the role of issuer. However, this need not necessarily be the case, as the developer may engineer the stablecoin model and relevant smart contracts and leave it to other entities to issue and to operate the system. There may also be multiple issuers or operators who collectively run the system. A stablecoin can be said to operate in a decentralised manner if there is no such material dependency on operators.

- Collateral – If a stablecoin is backed by an asset, is that asset held or custodied in a centralised or decentralised manner? A stablecoin custodied by an issuer or other

central operator, e.g. in the issuer's bank account or physical vault, would be considered to be held in a centralised manner. In contrast, a stablecoin held in escrow in a smart contract without the intervention of any central operator, whether for purposes of collateralisation, redemption or liquidation, would be deemed to be held in a decentralised fashion.

- Governance – Is the stablecoin governed or managed in a centralised or decentralised manner? Governance relates to decisions and actions that affect the operation and value of the stablecoin. E.g. this could be a simple decision to increase fees associated with maintaining the stablecoin or a more complex decision to change the type of collateral backing the stablecoin. Governance is considered to be centralised if key decisions are made by the issuer or other central operator. On the decentralised end of the spectrum, any participant in the stablecoin ecosystem may proposed changes and all participants may vote on whether such changes are put into effect.

2. Key Considerations

Summary

As outlined above, stablecoin structures may differ significantly meaning the key considerations and risks associated may also vary. Set out below are some of the particular considerations and risks that we have identified as being applicable to one or more stablecoins.

A. Pricing and valuation

There are two types of risk referenced here which may or may not be connected depending on the structure of the stablecoin in issue – risk of errors in actual pricing of the coin, and risk of errors in valuation of the underlying collateral (which also may or may not lead to a pricing error depending on connection between backing and pricing). Pricing and valuation risks apply on multiple levels in structures which are backed by one asset but which use a different one for pricing reference purposes.

Simple structures which use 1:1 backing and pricing based on liquid assets (like the 1:1 fiat backed coins) are likely to have less pricing and valuation risk. Stablecoins which are priced using a fiat reference point but collateralised using a more structured approach, for example by reference to a basket of assets, incorporate more valuation risk within the model. Algorithmic stablecoins carry a higher degree of pricing and valuation risk. They rely on the confidence of users to help maintain their price / valuation. If enough of that confidence is undermined, the algorithm will not be able to maintain the stability of the token any longer, these events are sometimes referred to as "black swan events".

Pricing and valuation risks may be heightened in low liquidity scenarios, for more on liquidity risks, see below.

B. Liquidity

There are two aspects to liquidity risk as applicable to stablecoins:

- Secondary market liquidity risk – i.e. stablecoin trading below par on the secondary market.

- Collateralised assets liquidity risk - i.e. if the assets' value cannot readily be realised.

Generally there are two ways for users to realise stablecoin value i) on the secondary market and ii) redeeming stablecoin with the issuer. The availability of these alternatives lessen the importance of the above liquidity risks for users.

C. Redemption and settlement

Settlement risk occurs with respect to stablecoin because holders pay the upfront price for the token in advance but will receive the asset due on redemption only with a time delay. In a

structure where the collateral asset is not immediately deliverable to tokenholders, for example with a stablecoin backed by oil derivatives which have to be cashed out for purposes of a redemption in dollars, there is likely to be an additional settlement delay so the settlement risk in the structure is amplified.

There are also redemption risks associated with loss of underlying collateral, see "Fraud" below.

D. Fraud

As with all financial asset structures, stablecoins may be subject to fraud risk, including lack of underlying collateral otherwise represented to be available and over-valuation of stablecoin. Additionally, in algorithmically stabilised models, it is possible that the algorithm could continue to issue shares ! bonds to "maintain" the price of the stablecoin even after the stablecoin no longer has any intrinsic value.

E. Market risk

Market risks include the risk of general market-wide events which can have influence on values and liquidity for all assets. By reference to stablecoins, we identify market risks both within the cryptosphere and market risk across broader financial markets as being potentially relevant.

F. Counterparty

Some stablecoin structures may involve reliance on additional counterparties to the issuer, for example stablecoins with collateral assets requiring particular custody arrangements may consequently involve custodian corporate risk, or where the collateral uses contracts of some sort, e.g. debt, derivatives, these may be subject to contract counterparty risk.

G. Structural

As highlighted in the taxonomy, stablecoin structures can be layered (e.g. USD pricing collateralised by an alternative asset) and the more layered a stablecoin, the greater the scope for risk regarding structural errors. The more distance there is between the ultimate redemption asset and the tokenholder at any given time, the higher the risk of redemption failures, collateral asset leakage and that the other risks identified in this section will apply at multiple layers in the structure.

H. Technical

A number of technical risks are common across cryptoassets. However, given that stablecoins are often used as a store of value, technical risks on the security of that storage may be considered to be more pertinent in this cryptoasset class than in some others. We have identified some of the main ones that we see associated with this product below:

- Overall strength and resilience of underlying blockchain platform whether public or private
    - For public blockchains, particularly those based on proof of work consensus, the risk of a compromise ! attack of the underlying blockchain needs to be evaluated
    - For public blockchains, the risk of hard forks and resulting potential contention needs to be managed
    - For private blockchains, the fundamental consensus algorithm (proof-of-authority, proof-of-stake, etc) should be fully understood and the dynamics

and risk of the primary factors and their dependencies as well as the potential compromises and attack vectors

- Mismatch or misaudit of dynamic stablecoin supply against backing asset/mechanism
    - These elements are constantly moving and as a result there is a risk of errors and mismatch, presenting the ongoing requirement to certify and attest (preferably by parties with a degree of independence)
    - Dynamic, near real time monitoring and attestment of matching is likely to be required
    - Risk of stabilisation mismatch may be heightened with algorithmic structures, as well as technical errors with the algorithmic code, its ongoing validity to produce the stabilisation outcomes can change under different market conditions and needs to be continuously monitored
    - Mismatch and measurement risks for the stablecoin are heightened where that is in the form of a "proxy contract"
- Controls and structure surrounding update and control of any keys related to update / control of stablecoin smart contract – risks include:
    - Loss, destruction, or corruption of private keys
    - Inadequate separation of duties allowing one or limited number of individuals excess control over the underlying contract address private keys
- Security in Development
    - There is a risk of errors in smart contract code which arises during development
    - There are additional risks of code errors with code changes and patches
    - The interaction of the smart contract code with the underlying blockchain api and mechanism can change or fail in particular where the blockchain updates or modifies those mechanisms (e.g. particularly in a hard fork).