

Technical Paper 02 Version 02
Design of Digital Central Bank as Issuer
Liquidity providing and the initial governance
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Abstract:

We have designed a special purpose vehicle 'SPV' issuer of EXC tokens. This SPV is intended to be the digital version of the IMF and the International Clearing Union, 'ICU', the central bank of central banks, which were to issue and clear super-national currency as initially proposed by the economist John Maynard Keynes. The 'ICU' concept was developed as an alternative to the gold standard and provides a useful blueprint to design a next generation digital currency platform.

The digital central bank proposed by EXC has three major features. First, it has a mechanism to store value by stockpiling reserve fiat currencies, unlike most other crypto currencies. Second, the issued tokens by this digital central bank are not pegged to any other fiat or crypto currencies, unlike Tether. Thirdly, by its being equipped with an automated buy back mechanism, the benefit of the store of value function can be evidenced. This third characteristic would work to provide 'liquidity' if and when the price of EXC falls sharply from the historically highest issued and market price.

Background:

As a supplement to the EXC White Paper, this technical paper explains the function of our SPV called GMF, a digital central bank. GMF is one of the key components of the EXC Platform which is equipped with a number of patentable concepts.²

To recap the top six major problems Bitcoin and its derivatives are accused of facing, (i) per second transaction is too small, (ii) no value storing function resulting in volatile price movements, (iii) per transaction cost is too large, especially energy costs, (iv) low level of security feature as evidenced by the loss of coins in the past, (v) no function of KYC/AML, (vi) potential for human intervention, including 51% attacks.

To recap the major aims of the EXC Platform:

1. Equipped with totally flexible exchange rate determination mechanism. EXC as a new digital currency has a mechanism allowing it to be flexible vis-à-vis any fiat currency,
2. Capable of storing value/ adding credit worthiness to EXC by stockpiling reserve fiat currency,

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² GVE's claim on a digital central bank was patented in Japan on 6th April 2018. GVE and GMF have entered into an exclusive agreement that GMF will benefit from the patentable technologies developed by GVE while GMF will lend up to 25,000 EXC to GVE for the technology support GMF enjoys.

3. To be able to achieve the lowest possible transaction costs for the foreseeable future,
4. To be able to achieve the very highest level of security – no double spending, no fraud, anti-money laundering mechanism and/or hacking proof,
5. To ensure 100% traceability³,
6. The EXC Platform aims to eliminate human intervention as much as possible, and
7. The EXC Platform needs to be flexible enough to be inclusive and needs to be able to evolve as the technology develops.

In order to achieve the store of value function, we have established an SPV, a legal entity which owns the assets. GMF has been incorporated as a Cayman Islands tax exempted company and declared as a foundation company under Cayman Islands law. Under Cayman Islands law, a foundation company is prohibited from making dividends or other distributions of profits or assets to members or shareholders (if any). There is no requirement under Cayman Islands law for a foundation company to have members or shareholders, provided that it has a supervisor. The director(s) are/is responsible for the management of a Cayman Islands foundation company in accordance with the foundation company's constitution and their duties are owed to the foundation company. The store of value function is one of the two main objectives a number of high profile groups are aiming to have as a next generation crypto currency. If major crypto currencies have the store of value function, their prices should not fall as sharply as they often do. The purpose of having a legal entity is to ensure that the EXC Platform has strong asset backing which could be used to stabilize the EXC price in the event that the EXC price collapses. The liquidity provision activities are not intended to reduce or limit price rises of the EXC token.

Those developing a store of value function for next generation crypto currencies, tend to peg their currencies to fiat currencies. In our view, however, pegging cryptos will lose the major value added feature of those cryptos. Our EXC was designed not to be pegged to any existing currencies, but rather the price would be determined purely by supply and demand.

How to safeguard tax neutrality:

One of the most important elements to create a major digital currency is the cost of transactions. The cost of transactions consists of (1) security level, (2) CPU time, (3) energy cost, and (4) tax. A digital central bank, or the issuer of EXC tokens, should ideally be incorporated in a tax neutral jurisdiction in order to reduce tax leakage. This means that while holders of EXC tokens may be subject to tax in their own jurisdictions, the tax neutral country where the issuer of EXC tokens is incorporated will not impose its own duplicative layer of taxes. GMF has been incorporated as an exempted company and declared as a foundation company in the Cayman Islands. The Cayman Islands are a leading international financial centre with a regulatory framework based on internationally recognised standards of anti-money laundering and anti-terrorism financing. The Cayman Islands have no direct taxes of any kind in respect of an exempted foundation company and there are no exchange controls in the Cayman Islands.

³ Eventually, it can be used for digital currency platform by various central banks

Governance:

We do not expect to change the first six principles mentioned above for the next 20 years (so not to jeopardise the 20 year tax exemption received from the Cayman Islands Government in May 2018). We believe the EXC Platform is close to what people call an artificial intelligence equipped system. The legal framework for many countries, however, may not keep up with the speed of the development of artificial intelligence equipped systems. This delay in the legal framework, makes human intervention required more than the modern technologies require. This makes the governance of GMF important especially in the current legal framework.

Two main issues arise in relation to this governance structure. One is conflict of interest, and the other how to maximize the long-term efficiency to become GMF as the 'bank' of last resort for the central banks around the world.

How to manage conflict of interest⁴

It is impossible to design a conflict-free operation at any global institution, especially in the case that EXC has the ambition to cover the world. The way we manage the conflict is as follows. Firstly, GMF as a Cayman Islands exempted foundation company, is prohibited under Cayman Islands law from paying dividends or other distributions of profits or assets to members or shareholders (to the extent there are any). Furthermore, GMF does not have any members or shareholders. **GMF can therefore focus on its function to be the issuing, selling and buying back operation of EXC, rather than on delivering returns to shareholders.**

Second, governors, or supervisors in legal terms, of the digital central bank, will not be paid out of GMF. This has two effects. We will make every effort to ensure GMF is the most cost effective automated machine with little human intervention. Under GMF's constitutional documents, no portion of the income or property of the foundation can be paid or transferred directly or indirectly by way of dividend, bonus or otherwise by way of profit to any members, directors or supervisors of the foundation, apart from authorised remuneration for services to GMF. Under GMF's constitution, governors are not incentivised to gain income gain or to take risks for GMF. In this way, GMF can focus on its function to supply a basic digital currency which can be used by anybody wishing to use EXC for their respective services.

Koji Fusa and Susumu Kusakabe are (as at the date hereof) the two supervisors of GMF. Under Cayman Islands law the powers granted to the supervisors may only be exercised in the interests of the foundation and its objects. These two supervisors will be responsible for opening bank accounts and deciding on the algorithm for buy backs. The supervisors may decide that changes to the algorithm for buy backs are necessary if they determine, in their sole discretion, that the original algorithm is not operating effectively to deliver the seven aims of the EXC platform (detailed above). As GMF's automated technology develops, buy

⁴ In our case, GMF entered into an agreement with GVE, the developer of the EXC Platform that GMF will lend up to 25,000 tokens in exchange for GVE's bearing the substantial part of the set-up cost of GMF and the running of the system to make GMF cost effective.

backs will be determined automatically based on a set of clearly predetermined prescribed principles. The initial buy back algorithm starts buying EXC when the price falls 50% from the peak market or issue price.⁵

The two supervisors will be supported by director(s) of GMF, who are responsible for the management of the business and affairs of the foundation company.⁶

Notwithstanding the above mechanisms for managing conflicts of interest, we note that conflicts of interest may arise in relation to the structure, functions and operations of GMF and the EXC platform. Such conflicts may arise between, amongst others, the interests of the supervisors and those of EXC token holders. In addition, we note that the supervisors have interests in certain service providers to GMF and the EXC platform. These include GVE and Quadrac – both of which will supply technology or hardware to the EXC platform (and GVE and GMF have entered into a loan agreement under which GMF will lend up to 25,000 EXC to GVE in exchange for the provision of technology by GVE to GMF). These relationships may give rise to conflicts of interests in relation to GMF and EXC token holders.

Liquidity providing mechanism⁷:

GMF has already 21 million EXC tokens in issue but which have not yet been circulated into the market. Under the EXC system, where the price of EXC reaches \$N, the Nth EXC will be supplied into the market.⁸ This system means that the 100,000th EXC will only come into circulation if the price of EXC reaches \$100,000 per token.

If the price of EXC reaches \$100,000 at the main exchange, it is likely that 100,000 EXCs will be in circulation. (Exceptions exist in a number of situations. For example, the buy back operation has taken place or a central bank is negotiating with or other similar negotiations are taking place, which is explained in the footnote.) In this instance, the market capitalization of EXC will be \$10 billion (100,000 coins times \$100,000).⁹

⁵ In order to capture the price fall opportunities for the remaining token holders, the buy back operation may be restricted to be around 20% of the market volume

⁶ We are considering a framework how we keep the first six principles even if we change the supervisors of GMF, while in the long-run, after major countries' have decided the direction how to interpret digital currencies and/or crypto currencies, we would like move to digital voting for EXC owners to decide how to evolve the EXC including how to elect two or more supervisors for GMF. However, this is unlikely to be addressed for the moment when a number of key jurisdictions would consider the proof of stake incorporated scheme as securities. We therefore cannot guarantee the proof of stake would be incorporated in the foreseeable future.

⁸ Please note that our patent lawyer is working on the patent application on this structure at the moment. Once the patent is granted, we will post to <http://excor.org>.

⁹ There would be some exceptions. When we go into a discussion with a credible central bank which is likely to agree to take up 5,000 EXC in order to use the EXC Platform at their own country's digital system, we will reserve the 5,000 EXC tokens for that price until such time that we came to the conclusion. During the negotiation, there would be 5,000 EXC token worth of reserve would not be

Mathematical Formulae for The Level of Reserves of GMF, Money Supply and Buying Back

Mathematically, GMF's reserves = $(1+N)*\$N/2 = \$1/2*(N^2+N)$, while EXC's market cap is $\$N^2$ (In the above example, the reserve level is \$5 billion while the market cap is \$10 billion).

Which means, when N units of EXCs are in circulation, each EXC's net asset value or reserve = $\$(1+N)/2$

Assuming the set up cost of GMF¹⁰ will cancel out the interest earnings of reserves, the net asset value or the reserve value per EXC would be always $\$(1+N)/2$. This means if the EXC price falls 50% from the peak price - $\$N$, GMF has the ability to buy back all the outstanding EXC tokens.

Initially, our buy back algorithm plans to target buy backs of 20% of the daily volume, starting when the price falls at or below the average reserve amount. If the price keeps falling, EXC's remaining reserves will increase. This is a form of visualized value-added for the EXC Platform.

GMF will announce the level where buy backs will start before the change if it differs from the initial target, but it is not planned that GMF will carry out buy back volume in order to optimize the value of remaining EXC token owners.¹¹

The bought back EXCs will be held at GMF until the price recovers to $\$N$, the historical highest price at the main exchange. We can sell, say 20% daily volume, from $\$N+1$, but the re-sale algorithm is unlikely to be announced as such publication may not be in the best interest of EXC holders.

This mechanism is not new to the investment world. It is well known that Berkshire Hathaway will buy back shares if its share price reaches 1.1x net asset value ('NAV'). Once Buffett announced in September 2011 that Berkshire would buy back shares at 1.1 NAV, its share price hardly reached 1.1x of its NAV. Earlier this year, Buffett said he would buy back Berkshire Hathaway at 1.2x NAV. After this announcement, its share price hardly reached 1.2x NAV. This illustrates investors psychology. Investors feel comfortable when a large amount of cash has been reserved for a large buy back; they will start buying back before it reaches the target buy back price. This is the mechanism of providing liquidity to the EXC system.

Medium term goal setting for GMF to become the bank of last resort

The EXC project is achievable but ambitious. The EXC Platform is likely to be most eco-friendly and scalable. Our design is scalable in the sense that the Platform has assumed up

credited to GMF's account. If we enter into two countries simultaneously, then 10,000 tokens may be reserved for these discussions.

¹⁰ The initial development cost is born or guaranteed by GVE, the system development company which has the patent rights of the EXC Platform. GVE has the right to borrow up to 25,000 units of EXC from GMF as a part of compensation for the guarantee.

¹¹ This non-announcement of buy back daily volume may change at any time.

to 8 billion or 10 billion people on our Planet can use the EXC system while keeping the energy cost minimal.

In terms of GMF's numerical goal, GMF recognizes that its capital base needs to be larger than that of the IMF to become the bank of last resort or the central bank of central banks. IMF's capital base was SDR 477 billion (about US\$692 billion as of 2016).¹² Although \$692 billion) is a big number, for the EXC Platform \$692 billion is likely to be achievable once EXC price reaches \$1,176,500 per token and the price does not go below \$588,250 per token. Once the EXC price reaches \$1,176,500 per token, the reserve of GMF would become \$692 billion.

GMF would become one of the most healthy digital SPVs or banks since it has no borrowings and it has large enough cash on its balance sheet. It is likely that the banks would understand that GMF is unlikely to default as it has large cash and the technology to maintain its level for the long-term with minimal cost. At the same time, banks around the world are likely to understand the underlying collateral value of EXC being 50% of the historical highest price, and this value per token would be readily available to the public. Once a bank understands the risk profile of GMF and its uniquely designed liquidity provision mechanism and EXC's collateral value, the bank may extend leverage to EXC token owners. Once EXC owners as a whole get leverage of more than 2 times on average, EXC owners' investment power would become positive.

Below illustrates the benefit of such a partnership with a bank with 4x leverage which is not uncommon in the crypto or FX exchange world.

If an EXC user made \$100,000 investment at Day 1, the historical high price at the main exchange, and he or she can get the average leverage of 4x of the original EXC investment, the following scenario is plausible.

1. The price of \$100,000 per token can become close to \$50,000 per coin.
2. 4x leverage would give the power to this investor to buy up to \$200,000 per coin.
3. If the entire group of EXC owners are happy to take leverage of 4x, the demand of EXC would expand to \$200,000 per token.
4. Once the EXC token price reaches \$200,000 per token, the price is likely to stay above \$100,000 per token. This would allow this investor to make an investment of up to \$400,000 per token.
5. Once the EXC price reaches \$400,000, the price is likely to stay above \$200,000 per token. This would allow this investor to make an investment of up to \$800,000 per token.
6. Once the EXC price reaches \$800,000, the price is likely to stay above \$400,000 per token. This would allow this investor to increase the investment up to \$1.6 million per token.
7. At \$1.6 million per token price, the capital base of GMF reaches \$1,280 billion, a higher capital base than that of the IMF in 2016. The following table illustrates how the initial investor has the ability to invest unless an extreme case emerges. The following table shows the price per token, corresponding market capitalization of EXC, and corresponding capital base.

¹² Source: <http://www.imf.org/en/About/Factsheets/IMF-at-a-Glance>

Circulation	Unit Price	EXC market cap	GMF capital base
100,000	\$100,000	\$10 Billion	\$5,000,050,000
400,000	\$400,000	\$160 Billion	\$80,000,200,000
1,600,000	\$1,600,000	\$2,560 Billion	\$1,280,000,800,000

Changes to structure

The supervisors may amend the structure, functions or any other aspects of GMF, the EXC platform, the EXC token and/or the token offering at any time in their sole discretion if, for example (but not limited to) the tax, legal or regulatory position changes or it is more favourable from a tax, legal or regulatory position to make such amendments.