

Building a Decentralized Sovereign Wealth Fund - an innovative Blockchain Economics model for Acala Network on Polkadot

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Abstract. An innovative Economics model is proposed to solve a common sustainable development challenge of blockchain projects. Consider network of a Blockchain project as its own sovereign, by building a decentralized Sovereign Wealth Fund (dSWF) with its own cryptocurrency holding foreign cryptocurrency reserve and strategic investments, a well-managed dSWF could be financially sufficient to support the whole network perpetually and raise the network development to a higher level. Application on Acala Network is discussed to demonstrate how a dSWF may help the network become self-sustainable and beyond.

Keywords: Blockchain, DeFi, Decentralized Finance, cryptocurrency, Stablecoin, Polkadot, Acala

1 Introduction

One of the major challenges faced by all Blockchain projects is how to maintain sustainable development after spending all fund raised in ICOs, IEOs, IPOs and etc. Consider network of a Blockchain project as its own sovereign, if we build a decentralized Sovereign Wealth Fund (dSWF) with its own cryptocurrency holding foreign cryptocurrency reserve and strategic investments in other crypto assets, a well-managed dSWF could be financially sufficient to support the whole network perpetually. Furthermore, additional utility access and non-monetary benefits provided by strategically chosen investment portfolio could raise the network development to a higher level.

In contrast to Sovereign Wealth Funds that aim for growth in wealth only, a dSWF invest in crypto assets that must not only have *value* and *yields*, but also provide *utility access* to other blockchain networks and services, that its decision making in investment portfolio require more *technical expertise* than

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financial expertise. Although most existing cryptocurrencies do not meet all three criteria of value, yield and utility access, we foresee that there will be more next-generation tokens meeting these criteria.

Acala Network is a decentralized stablecoin platform powering cross-blockchain open finance applications for the Polkadot ecosystem, the next generation decentralized web, on which multiple blockchains are built and integrated with each other. One distinguishable feature of Polkadot is that DOTs, as the native token of Polkadot, not only serve as a network token with value, generate a return if the DOT holders participate as a validator or a nominator of the network (most cryptocurrencies such as Ether of Ethereum do not generate similar yield), DOTs also provide utility access to their network, for instance, as compulsory bond to operate your own Parachain connected to the Polkadot network.

Acala aims to build a dSWF from income surplus of its network, which will hold DOTs as its foreign cryptocurrency reserve, as well as strategic investments in other crypto assets if they also satisfy all three criteria of value, yield and utility access. The DOTs and return from all investments will firstly be used to help the Acala Network become self-sustainable. Once the goal is reached, further strategic investments aim to bring the network development to a higher level.

2 Inspiration

2.1 From the Off-Chain World

Sovereign wealth funds have existed for more than a century, and the number of sovereign wealth funds has increased significantly since 2000. All sovereign wealth funds held more than \$5 trillion in assets in 2012.

A sovereign wealth fund is a state-owned pool of money that is invested in various real and financial assets such as stocks, bonds, real estate, precious metals, or in alternative investments such as private equity fund or hedge funds. The assets are typically held in domestic and different reserve currencies (such as the dollar, euro, pound, and yen).

The money typically comes from a nation's budgetary surplus. When a nation has excess money, it is not always desirable to hold this excess liquidity as money or to channel it into immediate consumption or back into the economy, a sovereign wealth fund can be used to funnel the money into strategic investments. Many nations use sovereign wealth funds as a way to generate wealth for the benefit of its citizens and future generations, as well as stabilizing the its economy through diversification and maximizing long-term return.

On the other hand, in the commercial world, a common business strategy for large enterprises is to invest in existing and potential business partners for various benefits including intangible advantages in existing and future business partnership (e.g. bargaining power), which could be an one-way investment or cross holdings. For instance, Google have invested in a variety of IT fields ranging from the Internet, software, hardware to cyber security.

2.2 From the On-Chain World

One of the major challenges faced by all Blockchain projects is how to maintain sustainable development after spending all fund raised in ICOs, IEOs, IPOs and etc. Consider network of a Blockchain project as its own Sovereign, if we build a decentralized Sovereign Wealth Fund (dSWF) with the network income surplus, holding foreign cryptocurrency reserve and strategic investments in other crypto assets that meet three criteria of value, yields and utility access, it could be beneficial for the whole network through the following two channels:

- Investments in foreign cryptocurrencies with value that also generate stable yields could provide financial support for network maintenance and development. For instance, DOTs of Polkadot provide an estimated annual return around 20% if staked as a validator.
- Strategically chosen investments in utility tokens of other Blockchain networks, with existing or potential partnership opportunities, could provide utility access to these networks and services, and bring extra non-monetary benefits to the sovereign network. For instance, DOTs also provide utility access to their network as the compulsory bond to operate your own Parachain connected to the Polkadot network.

3 The Innovative Third Way

Most Blockchain networks issue their own cryptocurrencies, and these native tokens are distributed in two common ways - the inflationary supply by minting additional tokens to be distributed as reward, and the deflationary supply by buying back and burning some existing supply. Having its own dSWF hosting foreign cryptocurrency reserve, rather than changing supply of its own native tokens, provides an innovative third way for a blockchain network.

ACA is the native token of Acala Network. The total supply of the ACA Tokens will be minted at the launch of the mainnet and stored in the ACA Reserve Pool to be distributed to Acala Foundation, Seed Investment Partners, IPO

and other network participants as Reward, and the rest reserved for ecosystem development and future sales.

The initial design of Acala Network was to buy back its native ACA tokens from the market with income surplus of the network received in other cryptocurrencies, which would be burnt to be removed permanently from ACA supply, that long-run supply of ACA tokens decreases as more token being burnt.

A small proportion of ACA tokens are reserved for ecosystem development that will be gradually distributed to developers as grant and or bounties as the network grow, that fund for ecosystem development is restrained by the amount of ACA tokens reserved at the beginning.

The initial design would lead to the scarcity of ACA tokens by reducing the total supply gradually, which benefits each ACA token holder, while the major challenge of maintaining a long-term sustainable development of the network that faced by all other blockchain projects still exist.

Is there a third way to benefit the ACA token holders, other than burning the ACA tokens? Yes, and this innovative third way could lead to a win-win situation where not only benefit the ACA token holders, the challenge of maintaining long-term network maintenance and development may be also solved perpetually.

Consider Acala Network as its own Sovereign, if a decentralized Sovereign Wealth Fund (dSWF) is built with network income surplus to invest wisely in DOTs as its foreign cryptocurrency reserve as well as strategic investments in other crypto assets that provide value, yield and utility access, a well-managed dSWF could continuously generate returns from yields in DOTs and other investments as well as utility access and extra non-monetary benefits, which could help the Acala network become sustainable, and benefit both ACA owners as citizens of this decentralized sovereign and future development of the entire network.

4 Goals of the dSWF of Acala Network

The primary goal of the dSWF is to make the Acala Network *self-sustainable*. Instead of paying gas fee for each transaction on Ethereum, Polkadot offer Parachain slot for other blockchain applications and networks to lease, at a cost equivalent to a fixed-term subscription payable in DOTs¹. Acala is planning to lease the Parachain slots for three rounds of two years each, which is the major expense of running the network that 30% of its ACA tokens are scheduled to be distributed to cover this cost.

¹ The bond deposited in DOTs that is required to lease a Parachain slot is a reflection of the opportunity cost of the yield of DOTs if staked.

The dSWF will firstly aim to buy in as many DOTs as possible to be kept in its DOT reserve with the network income surplus. If the dSWF manages to contribute a proportion of DOTs needed for the Parachain slot lease, a fraction of ACA tokens scheduled to be distributed to IPO participants will be saved and used to top up the dSWF to gain return to yield more DOTs for future lease. When the dSWF owns enough DOTs to lease the Parachain slot independently, Acala Network becomes self-sustainable.

Once this primary goal is reached, further income surplus will be invested in strategic investments with diversification if there also exist other crypto assets meeting all three criteria, aiming to bring the network to a higher level, e.g. investing in utility tokens of other networks with existing or potential partnership opportunities that could bring additional utility access and non-monetary utility benefits to the Acala network, investing in the sovereign network development, and directly funding the ecosystem community to promote building of relevant blockchain products and services.

5 Source of Income Surplus

There are three primary sources of income surplus in Acala Network that will contribute to the dSWF.

5.1 Realized Stability Fee of CDPs

To close any CDP that has been created to generate aUSDs, the US Dollar stablecoin of the Acala Network, some ACA tokens are required to be paid as the Stability Fee, charged in the percentage of the outstanding debt of the CDP, which represents interest payable of the debt position. The realized stability fees are paid in aUSDs, or other supported crypto assets which will be automatically exchanged to aUSDs via the built-in exchange.

The accrued stability fees of all open CDPs are calculated in each block and are accounted as system profit as accumulated. Once a CDP is closed, the accumulated stability fee in the CDP becomes realized and will be kept in the system treasury. Whenever the system profit exceeds a certain threshold, instead of being exchanged to ACA tokens to be burnt as designed in the initial model, these aUSD tokens will be used to purchase DOTs from the market, then deposited to top up the DOT reserve held by the dSWF.

5.2 Liquidation Penalty of Risky CDPs

All open CDPs are constantly monitored by the system, once the value of the CDP collateral has fallen below the liquidation ratio, the CDP is regarded as a risky position and automatically liquidated by the system that a liquidation penalty in aUSD, sourced from the collateral sale auction, will be charged to the CDP holder.

Similarly, the liquidation penalty is kept in the system treasury that whenever system profit exceeds a certain threshold, instead of being exchanged to ACA tokens to be burnt as designed in initial model, these aUSD tokens will be used to purchase DOTs from the market, then deposited to top up the DOT reserve held by the dSWF.

5.3 Protocol Fee of L-DOTs

Through the decentralized staking pool established by the Homa Protocol of Acala Network, DOT owners could lock their DOTs to exchange for L-DOTs (a liquidable and tradable token that can be invested or used in other applications, e.g. as a collateral to generate aUSD in a CDP), while gaining returns in DOTs through the Homa Protocol.

Return of a L-DOT holder is equal to Polkadot's nominator staking reward for the amount of the DOTs he locks in the Homa Protocol, minus the L-DOT protocol fee charged by Acala Network. Income of these protocol fees are sourced from Polkadot's staking reward and paid in DOTs, which will be deposited to top up the DOT reserve held by the dSWF.

6 DOT Reserve

Once the DOTs that are purchased with excess profit in system treasury, and the DOTs charged as L-DOT protocol fees are deposited into the DOT reserve of the dSWF, they will be used in the following ways depending on the timing and circumstances, given the first and primary goal is to gain enough DOTs to lease the Parachain slot independently.

6.1 Locked for Further Reward in DOTs

When it is not within the unbond staking period² before the next Parachain auction, the DOTs in the DOT reserve will be locked into the decentralized staking pool established by Homa Protocol in Acala Network, to generate further return in DOTs sourced from Polkadot's nominator staking reward. The returns and the protocol fees will be deposited to top up the DOT reserve continuously.

6.2 Parachain Lease

A large proportion³ of ACA tokens are designed to be distributed to IPO participants as rewards for bonding their DOTs to back Acala's three rounds of Parachain lease (two years in each round) with Polkadot. The first round of IPO for the first Parachain lease auction will be conducted before the launch of the Acala mainnet, i.e. before the existence of the dSWF. The DOTs collected in the dSWF's DOT reserve will be used to contribute to IPO in the second and third round of Parachain lease.

When it reaches 28 days before the second or the third Parachain auction, all L-DOTs exchanged from locking DOTs that belong to the dSWF in the Homa Protocol will be returned to make sure all these DOTs will be all unbonded from staking and free to use for IPO of the next Parachain lease.

When it is within 28 days to the second or the third Parachain auction, instead of being locked into the Homa protocol for staking returns, all newly accumulated DOTs from the three primary income surplus sources will be kept in the DOT reserve until the auction day to be used for IPO of the Parachain lease.

Same as other IPO participants, the dSWF will receive the IPO reward of ACA tokens in every block throughout the two-year lease for each DOT locked as bond of the Parachain lease. These ACA tokens are kept in system treasury and to be exchanged to DOTs and then locked into Homa Protocol for continuous returns as in Section 6.1.

Since there will be another two-year gap till the next Parachain lease auction, all newly accumulated DOTs from the three primary income surplus sources after the previous auction will be locked into Homa Protocol again for continuous returns as in the previous round, until the dSWF holds enough DOTs to lease the Parachain slot independently.

² The time period required to unlock DOTs that staked in Polkadot network could be up to 28 days, that we use 28 days in this paper.

³ 30% of total ACA supply as in White Paper version 0.9 at 22 Jan 2020

7 After Achievement of Self-sustainability

Once the first and primary goal of holding enough DOTs to lease the Parachain slot independently is achieved, dSWF may spend the remaining fund to achieve other goals.

7.1 Investment Diversification

The dSWF may sell some of the DOTs in the DOT reserve to invest in other crypto assets for portfolio diversification and maximization of long-term return of the dSWF, e.g. purchasing utility tokens of a strategic partner chain if the tokens not only have value and yields, but also provide utility assess to their network that benefits Acala Network.

7.2 Network Development

The dSWF may also vote through the Acala General Council to distribute or sell some of the assets owned by the dSWF for further development of the Acala Network, e.g. to be rewarded as grant to promising developers of the ecosystem, or to be paid to cover cost of network upgrade.

7.3 Governance

ACA holders have voting rights on how fund in the dSWF is used, through proposing and voting through the Acala General Council on potential change in future expenditure and investment plan.

Note that, merely holding the ACA token does not entitle holders to any rights to returns generated by any part of the Acala Network, including the dSWF.

8 A Simple Numerical Example

A simple and conservative numerical example is discussed to demonstrate a brief idea of how the Acala dSWF works.

Suppose Acala Network charges 1% Protocol Fee for L-DOTs on staking reward of the DOTs locked in Homa protocol. Suppose annual yield of staking DOTs

as a nominator of Polkadot is 18%, and 200,000 DOTs (owned by others, excluding dSWF) are locked in Homa for L-DOTs. All income surplus in system treasury are invested in Homa protocol for compounded return at end of each calendar day. The dSWF only buy DOTs using its income surplus as its foreign cryptocurrency reserve with no other investment.

Since Acala is not live yet, Q1 2019 revenue analysis of MakerDao is used as a reference to estimate for CDP relevant income in the first two years since launch of the mainnet, with a conservative assumption that the average CDP trading part of Acala Network in the first two years is half the scale of MakerDao as in Q1 2019.

Accumulated income surplus from the three primary sources (Realized Stability Fee of CDPs, Liquidation Penalty of Risky CDPs and Protocol Fee of L-DOTs) with return from locking the DOTs in Homa Protocol in the first two years is estimated to be 9,058 DOTs.

If we include the estimated income of 11,705 DOTs from the unrealized stability fees (this part of the accumulated system profit can be realized before closing of the open CDPs by issuing crypto bonds) and their additional return through L-DOTs, the total income surplus in the first two years since mainnet launch of the Acala Network is estimated to be 20,763 DOTs.

That is, by the end of the second year, the dSWF of Acala Network is estimated to hold 20,763 DOTs, which will be used for the second Parachain slot lease auction.

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