EUNO.

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https://euno.co

1. Introduction

The upsurge in the number of cryptocurrency projects since the inception of Bitcoin in 2009 has brought tremendous technological innovation and utility models into the decentralized digital currency space. Despite that, cryptocurrencies are still to date mostly viewed as speculative investment and store of value instruments. This notion has devalued the potential benefit of their use in resolving real logistic, economic and societal bottlenecks, and has necessitated a sober approach in addressing obstacles to their wide public acceptance. Indeed, mainstream adoption of cryptocurrencies continues to be hindered by polarized perceptions between different actors – public entities, the financial sector, merchants and consumers. As a result, the overall market remains extremely niche, highly volatile and susceptible to confidence shocks. At face value, this divide can be traced to (i) a wide misconception of use in illicit activities that has suspended the process of public recognition, (ii) perceived risks to traditional financial and monetary structures, (iii) overstated weaknesses in terms of scalability, speed of transactions and network vulnerabilities, (iv) price volatility, and (v) perceived complexity of use. While those concerns are to some extent valid, we view that their influence is overemphasized due to a much more rudimentary cause, which we identify as the status quo bias. As well as adhering to basic requisites of security and usability, diffusion of technologies that potentially carry broad economic and social implications compel the presence of a system that promotes active use and curbs early adopter risk. Short of such a design, potential users would more likely retain their preference for prevalent payment methods, barring the few for which the status quo already imposes greater risks[1].

Building on that, we assess obstacles to cryptocurrency mainstream adoption within the context of a behavioral approach from which we derive key lessons for the development of EUNO coin. EUNO coin was created with the aim of tapping into the core attributes that have hindered wide public acceptance while not compromising the key features that make cryptocurrencies a revolutionary technology: decentralized, trustless, immutable and incorruptible. EUNO combines solid security features building on previously developed cryptocurrencies that have succeeded in addressing network vulnerabilities and minimizing incentives for malicious attacks. From a user's perspective, EUNO is a privacy-by-choice coin focused on accessibility and usability through platforms and tools that aim to support commercial exchange with minimal requirements of operational knowledge and merchant infrastructure. Furthermore, EUNO is built with an aim to survive independently of its founders in the longer run. It embraces a community-driven governance structure that promotes transparency and flexibility, and facilitates adaptation to the needs of the market. In terms of exposure and user acceptance, we introduce into the cryptocurrency space the Adoption and Convergence Incentivized Distribution (ACID) protocol, the function of which is to incentivize the use of EUNO in commercial transactions, and promote a wider and more equitable coin distribution.

The ultimate vision of EUNO is a widely accepted and extensively distributed digital currency to be used by consumers over the air (OTA) in near field communication (NFC), point of sale (POS) transactions, with minimal requirements for technical expertise by users and integration processes by merchants.

[1] For example, in cases of endemic hyperinflation, see reference 3.

2. Theoretical Framework

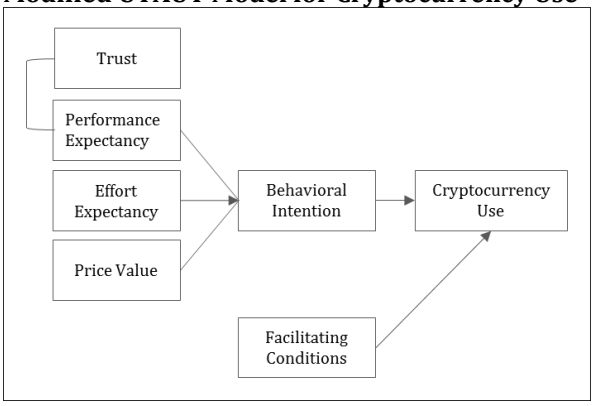
The use of cryptocurrencies as a payment medium depends on the adoption of both, merchants and consumers. Although scarce, empirical evidence suggests that with sufficient consumer demand, merchants are willing to accept cryptocurrency payments in order to gain a competitive edge and expand their consumer base[2]; provided that their exchanged funds are secured against price volatility. The availability of an undemanding and uncostly system that would permit instantaneous exchange of crypto to fiat currencies would thus fulfill merchants' financial security requirements, but not their commercial incentives. In the following sections, we assess factors that determine cryptocurrency use by consumers, and present EUNO's envisioned use case, governance structure and strategic model for incentivized user adoption.

2.1. A Behavioral Approach Towards Understanding Cryptocurrency Adoption

To understand what drives cryptocurrency adoption by consumers, we utilize and build on concepts drawn from behavioral analysis of technological diffusion. Studies undertaken in recent decades have consistently found empirical evidence of inherent behavioral traits and cognitive biases in decision making[3], diverging from neoclassical theories that assume unbounded rationality of actors. Those have been widely assessed and observed in consumer acceptance of technology, which we view as more relevant in the context of cryptocurrencies. Primarily decentralized cryptocurrencies derive their value from public use. The choice to adopt a new currency, the purchasing power of which is influenced by its extent of use, entails a measure of a priori cognitive assessment. Second, we view that bounded rationality plays a major role in decision making within the cryptocurrency space, which in its present condition is mired with asymmetric information and extensive misconceptions, owing to a deficiency in relevant regulatory and financial guidance.

From the unified theory of acceptance and use of technology (UTAUT) [4], we highlight the importance of performance expectancy, effort expectancy, trust, price value, and facilitating conditions on behavioral intention and technology use. We further utilize theories from behavioral economics to identify deterrents to behavioral intention and restrictions to facilitating conditions. Finally, we introduce the need for an incentive system to overcome the former and propose structural autonomy to support the latter.

Modified UTAUT Model for Cryptocurrency Use



Performance expectancy (PE) is the confidence that the adopted technology will assist in performing a particular task, in other words, the perceived success of its functionality. This characteristic is highly relevant to the potential adoption of cryptocurrencies in terms of scalability and speed of transactions, as well as in terms of varied objectives and utility models. PE also

[2] Jonker N. (2018).
[3] Simon H. (1955, 1959, 1982), Cyert R. M. and March J. G. (1963), Tversky, A. and Kahneman, D. (1974, 1990, 2013) Sabrina M. Tom *el al* (2007).
[4] Viswanath V. *el al* (2003, 2012).

correlates directly to trust and the perception of security, which are vital in adoption intention. This is especially relevant to fintech applications due to the high uncertainty associated with combinations of technology and financial services[5]. We address performance expectancy and trust with regards to EUNO coin in sections 3.1 - 3.4.

Effort expectancy is the perceived ease of use of a new technology. It holds a clear correlation to willingness of technology use[6], whereby user-friendly systems are more likely to achieve wider adoption than systems that require operational effort or longer training periods. In the cryptocurrency space we recognize the influence of facilitating conditions and integrated usability catalysts on effort expectancy due to the available albeit unevenly distributed infrastructure that expedites market entry and exit. While data in this area is also scarce, it is safe to say that cryptocurrencies have seen significantly wider adoption rates in countries that support the presence of facilitating infrastructure, such as varied options for cryptocurrency funding, user-friendly platforms and exchanges, and crypto ATMs. We address effort expectancy with regards to EUNO coin in section 3.2.

Price value is the cost of adopting a new technology compared to its perceived benefits[7]. Cost of usage is minimal for most cryptocurrencies in terms of operational use, whereas transaction costs are significantly more economical compared to alternative payment and financial transfer methods, including payment cards and third-party mediated transfers. With that said, cryptocurrency prices are highly volatile due to the still speculative investment nature of use, designating a concern for commercial adoption. Exclusive of a certain measure of price stability, we see that cryptocurrency volatility is an unfavorable factor in the price-value determinant and negatively influences user-intention. We address solutions to price volatility in section 3.4 and from a merchant perspective, in section 3.2.

2.2. Cognitive Biases that Influence User Adoption

Favorable performance expectancy, effort expectancy and price value ordinarily drive what is known as the behavioral intention, an intention to adopt a new technology. When coupled with facilitating conditions, intention becomes actual use. Whereas the promise of performance expectancy and price value has sparked user imagination on the potential solutions that could be offered by trustless blockchain technology and a decentralized medium of exchange, cryptocurrencies have yet to overcome obstacles to mass commercial use.

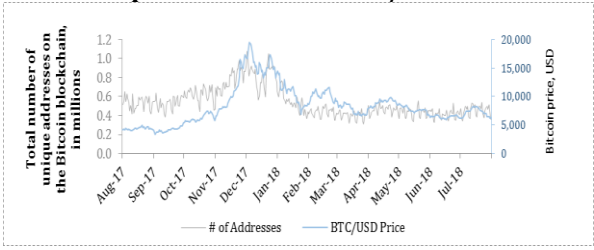
We identify the *status quo bias* as a primary factor for this adoption inertia. Behavioral economics defines the status quo bias as an emotional preference to the current state of affairs, prompted by inherent behavioral traits of *loss aversion*, the *endowment effect*, and the effect of *mere exposure*.

Loss aversion designates an empirically observed bias of greater sensitivity to losses than gains[8]. It influences how people assess uncertainty and has been observed to begin at the neural level[9] indicating a consistent requirement in positive decision making processes for expected gains to significantly outweigh potential losses. This drive can be detected in the speculative investment space[10] whereby untrained traders who do not preempt their predisposition for loss

[5] Alalwan A. et al. (2017), Luo *et al*. (2010).
[6] Venkatesh V. and Davis F (2000), Shafinah *et al* (2013).
[7] Viswanath V. *el al* (2012).
[8] Kahneman *el al* (1991), Kahneman & Tversky (2013).
[9] Sabrina M. Tom *el al* (2007).
[10] Michael S. Haigh and John A. List (2005).

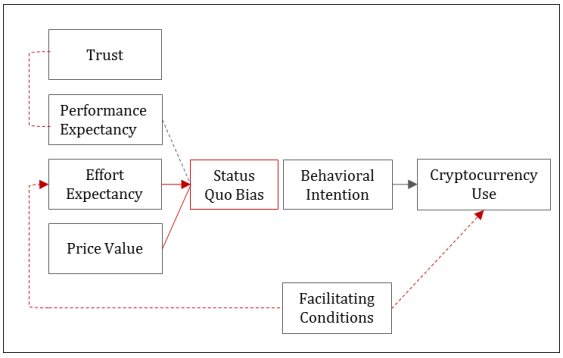
aversion, tend to make riskier investment choices in market uptrends, and over-ask on the sell-side in market downturns.

 # BTC Unique Addresses vs BTC/USD Prices



Loss aversion in cryptocurrencies similarly correlates to the endowment effect, a strong preference for what we already own[11]. The endowment effect prompts people to demand much more to give up what they have, than they would be willing to pay to acquire it[12]. We observe the influence of loss aversion and the endowment effect as two-fold in the cryptocurrency space, restricting market entry with exceptions of substantial perceived upside, and limiting the use of already held cryptocurrencies. As a result, and "because we tend to overvalue current benefits and undervalue potential gains, we also strongly favor the option already in place relative to alternatives"[13]. This statement underlies the status quo bias, which in our view is one of the major obstacles so far preventing cryptocurrency adoption as a medium of exchange.

Effects of Biases and Inadequate Facilitating Conditions



[11] Kahneman *el al* (1990, 1991).
[12] Thaler (1980).
[13] Samuelson and Zeckhauser (1988), Kim and Kankanhalli (2009), Pankratz *el al* (2007).

2.3. Disincentives for Use from a Value Perspective

Under current conditions, potential cryptocurrency adopters are more likely to retain the status quo of utilizing available payment tools due to price-value considerations, in addition to a general deficiency in market trust and insufficient facilitating conditions, which reinforce the loss aversion and endowment effects. It is more likely for new users to enter the cryptocurrency space as investors due to the perceived upside and availability of investment tools and platforms, compared to the marginal upside from actual use of cryptocurrencies. Similarly, cryptocurrency investors would be better off waiting for a future period in the process of adoption or acceptance to utilize their holdings in commercial exchange, with a broad market consensus that more use would drive the value of a cryptocurrency. Assuming an investor with $\boldsymbol{x}$ holdings of cryptocurrency $\boldsymbol{i}$ at price $\boldsymbol{p}$ and time $\boldsymbol{t}$ representing phases in the life of user adoption up to an equilibrium point $\boldsymbol{n}$ in which price stability is achieved:

$$t \in \{0, 1, 2, \dots n\} \text{ and } p_0 \leq p_1 \leq p_2 \leq \cdots \leq p_n$$

With $\boldsymbol{\beta}$ as the anticipated price change at every period in the time sequence and α the fixed percentage of an investor's cryptocurrency holdings used for the purchase of a product or service:

$$0 < \alpha \leq 1$$

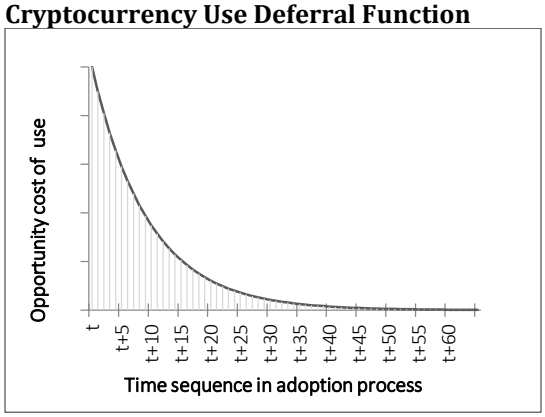
We define the total anticipated opportunity cost of using a portion of $\boldsymbol{x}$ ahead of each expected increase in $\boldsymbol{p_i}$ as:

$$\int_{t=0}^{n} x_{it} p_{it} \alpha_t \beta_{t+1} dt$$

Anticipated price increases in the process of a currency's life drive a loss aversion behavior that incentivizes deferral of use. As a result,

potential users are inclined at each time period to defer spending their cryptocurrencies to the next time period, indefinitely delaying the process of adoption. To Counterbalance this pre-calculated loss, a system that induces a sense of balance or corresponding gain is needed.

Cryptocurrency Use Deferral Function



2.4. The Role of Trust and Facilitating Conditions

Trust is a key element in acceptance of cryptocurrencies. It is influenced by regulatory factors, public perception and specific project features such as the level of exercised transparency. In practice, a lack of consensus within and across governments on a singular definition for cryptocurrencies and the overstated incidence of cryptocurrency related fraud has limited the process of regulatory recognition and prompted negative media attention on the safety and security of use. Lacking clarity on roles of sector oversite has furthermore given way to self-regulation by private institutions in terms of imposing restrictions to facilitating conditions. Cases of banks refusing to transfer funds from personal accounts to crypto-exchanges or undertaking associated account closures have been reported in countries where cryptocurrencies are technically legal[14]. "This arbitrariness to which financial controls and monetary regimes seem to be enacted has resulted in a trust deficit amongst consumers" (Penfold, 2015).

We view that the presently adverse environment in which cryptocurrencies operate necessitates to the extent possible a system of self-sufficiency, and one that fosters trust through public engagement and transparency. This could be achieved by instituting a community driven governance structure on one hand, and by establishing a system that allows for wide coin distribution on the other. The allocation of coins through a trustless mechanism enabled by an algorithm of incentivized use would contribute to higher public exposure and abatement of misconceptions, as well as the curbing of wealth concentration. Such a mechanism would help loosen the negative influence of the endowment effect on non-users and support public trust. Roughly 3.3% of bitcoin wallets own 96% of total coins. Such levels of concentration are similarly shared by a large number of cryptocurrencies. While it is arguably inevitable that a coin's distribution will be highly inequitable in its early life due to accumulation by wealthier buyers, the prevalence of such unbalanced distributions becomes down the line detrimental to adoption willingness limiting exposure and trust. The total number of blockchain wallets created as of the writing date of this paper was roughly 27.5 million[15]. Considering that each individual can own more than 1 wallet or address, this number represents the upper bound of possible cryptocurrency users, an estimated 0.4% of world population. Comparing this figure to the number of people with access to financial services (roughly 3.5 billion), the number of unbanked adults (1.7 billion)[16], or to the estimated 14 billion outstanding payment cards[17] (almost 2 per person), lends some perspective on the limited global use of cryptocurrencies.

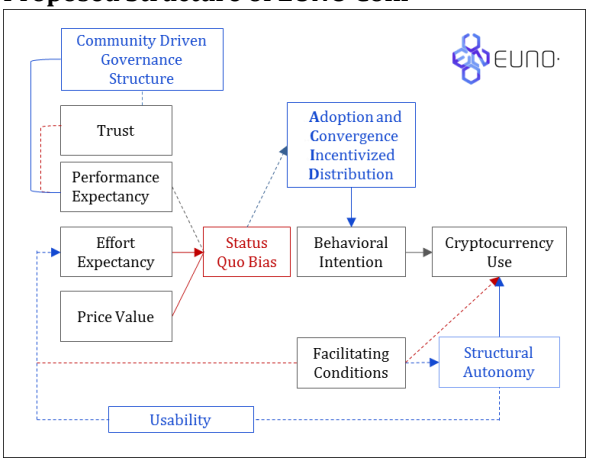
[14] See references 4, 6, 10, & 21.

[15] Blockchain.info (August 2018).
[16] World Bank (2018).
[17] Payment Industry Intelligence (2017).

3. Solutions Offered by EUNO Coin

In order to reinforce adoption determinants and ease adoption deterrents, a breakthrough is needed to change the perception of actors and assign value to potential gains rather than losses. With that in mind, we emphasize the necessity of a decentralized cryptocurrency to actively promote accessibility and use by creating an incentive-focused distribution network that does not require on part of its users a threshold of wealth. Moreover, we develop an inclusive autonomous infrastructure that facilitates commercial use without burdening merchants with integration costs or the need for technical knowhow.

Proposed Structure of EUNO Coin



3.1. EUNO Coin Basics

EUNO Coin combines a stable blockchain reinforced by a three-tiered system of Proof of Work (PoW), Proof of Stake (PoS) and Masternodes, which support network integrity and allow a large number of fast and secure transactions. The EUNO blockchain runs on the X11 proof of work algorithm that uses eleven different hashes: Blake, BMW, Groestl, JH, Keccak, Skein, Luffa, Cubehash, Shavite, SIMD, and Echo, whereby each hash is calculated then submitted to the next algorithm in the chain, creating what is known as algorithm chaining. The X11 PoW restricts network attacks by requiring a concurrent break into its 11 hashes[18]. EUNO also utilizes a Proof of Stake (PoS) system to create an added layer of security by allowing relatively cheap and energy efficient transaction validation, limiting the potential for mining concentration and promoting additional spread in coin distribution. As proof of stake validation depends on the proportion of the stake in the network, POS minimizes the possibility of 51% attacks from a security perspective by requiring potential network attackers to buy 51% of total coins, the cost of which renders the rewards of the attack economically unviable. Finally, EUNO utilizes a Masternode structure to promote incentivized network support by full nodes that keep a copy of the blockchain in real-time, eligible in return for a percentage of total Proof of Stake rewards, and distributed by user depending on the number of operational masternodes at the time. EUNO masternodes perform additional functions dependent on the embedded protocols, currently including the DARKSEND feature that permits users to accept private untraceable transactions. Other masternode functions that will be added to the EUNO ecosystem are respectively EUNO's community driven governance structure (See section 3.3), which permits masternode operators to participate in key decisions regarding EUNO's direction and strategy, and EUNO's ACID Protocol (See section 3.4).

EUNO's secure system and fast transactions that are instantaneously detectable by recipient wallets fulfill the cryptocurrency space's highest standard for performance expectancy, and would along with planned reductions in confirmation requirements for point of sale transactions, place EUNO as an ideal currency for near field communication use.

[18] Duffield E. and Diaz D.

We note that present protocol rewards[19] are not fixed and will be continuously adjusted, either through nominal scaling or reallocation. The monitoring and adjustment of rewards will restrict sudden inflationary pressures and allow EUNO to reallocate rewards to protocols aimed at wider distribution and use incentives that will uphold community trust and benefit the entire EUNO ecosystem.

3.2. EUNO Coin Use Case

In addition to traditional wallet-to-wallet transactions, EUNO coin aims to provide a user-friendly point of sale payment system that utilizes near frequency communication technology. NFC technology allows two systems to establish close-range communication through radio frequency identification. NFC enabled payments are processed when a customer holds their mobile phone close to a merchant's payment terminal, allowing for an instantaneous settlement. Non-cryptocurrency NFC powered payment systems have been gaining traction over the past few years due to the fast and energy efficient transactions that they facilitate. However, currently available NFC payment systems require specialized and sometimes costly terminals. For EUNO Coin, this will not be the case as merchants will be able to use their standard point of sale terminal, solely requiring a simple software update that allows the system to accept EUNO payments and an instantaneous conversion into the merchant's local currency. For merchants, this would provide an exchange rate risk-free transaction, through a low maintenance and secure system, prompting merchant exposure to a new customer base. For consumers, it will provide a secure and fast payment mechanism through the EUNO mobile wallet application, in addition to a utilization return facilitated by the ACID protocol. Stressing accessibility and usability, the EUNO mobile wallet that would allow point of sale transactions aims to minimize effort expectancy, and offer to the extent possible an autonomous medium for everyday consumer-merchant transactions.

3.3. Governance Structure and Durability

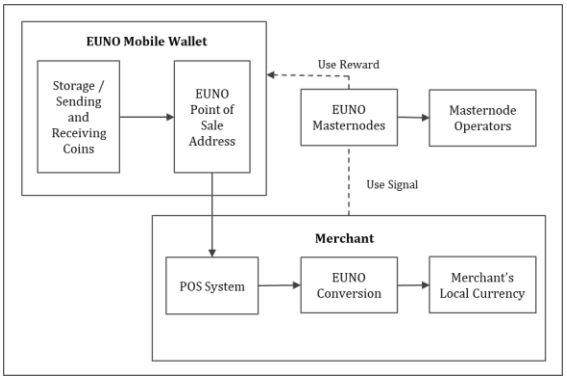
EUNO coin stresses the importance of a community-driven governance structure that allows for continued progress in the project's development and ensures adequate improvements in functionality, usability and security as well as public exposure. The decentralized governance structure would give stakeholders the chance to submit proposals on all aspects related to EUNO coin and participate in a smart voting mechanism, following public proposal deliberations. It would furthermore ensure that stakeholders partake transparently and democratically in the process of the coin's overall strategy and development, with proposals, discussions, and voting taking place over a specialized and easy to use platform. This process would add a new layer of long term security and promote consumer confidence in EUNO's durability by preventing partial decision making and permitting the team to focus on development, implementation, and marketing.

3.4. ACID Protocol - Adoption and Convergence Incentivized Distribution

The ACID protocol is a mechanism introduced by EUNO coin aimed at promoting wide coin distribution and incentivizing coin use in commercial transactions to support exposure, trust, and counterbalance negative price considerations including volatility and opportunity cost of use. The ACID protocol makes use of EUNO masternodes to provide a generous share of rewards to EUNO point of sale users, effectively reimbursing users with a portion of pos-transacted coins through the EUNO mobile wallet application.

[19] Details available on official EUNO website: https://euno.co.

ACID Protocol



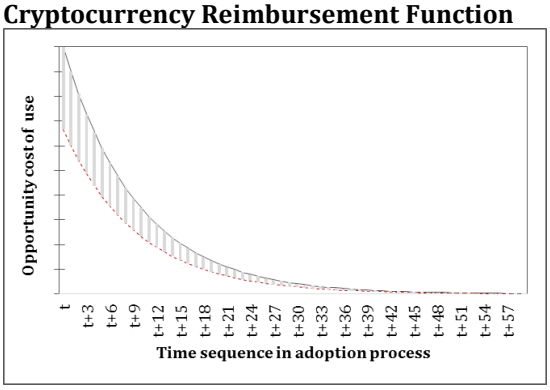
Using the same notation as in section 2.3 and assuming an equal percentage price change $\boldsymbol{\beta}$ for each period $\boldsymbol{t}$ in a considered time sequence, perception of foregone capital gains on total use of a cryptocurrency $\boldsymbol{i}$ would add up exponentially as purchasing power increases, in comparison to retaining the same number of held coins up to equilibrium point $\boldsymbol{n}$. In downtrends, volatility between obtaining and using EUNO coins would result in purchasing power losses.

$$x_{i0}p_{i0}(1+\beta_t)^t(1-(1-\alpha_t)^t)$$

To counterbalance the effects of price volatility for users, the EUNO wallet application for point of sale transactions allocates a reward $\boldsymbol{r}$ after each transaction, reducing perceived opportunity cost, and on downside movements, ensuring the partial or full reimbursement of losses, subject to the exchanged amount.

$$\int_{t=0}^{n} x_{it}p_{it}\beta_{t+1}(\alpha_t - r_t)dt$$

Cryptocurrency Reimbursement Function



In order to support decentralization, public exposure and trust, ACID protocol rewards will be inversely proportional in percentage terms to coin use, permitting wider distribution regardless of initial wealth levels. By similarly retaining a broad balance with masternode rewards, this will discourage system exploitation and keep a sufficient number of operational nodes to preserve network integrity. In terms of user incentives, we expect this structure to balance the risk-reward dynamics between actors and underscore the benefits of collaborative game-theoretic decisions.

Simulating a game in which two players A and B can either choose to spend currency $\boldsymbol{i}$ that rewards use with a partial reimbursement $\boldsymbol{r}$, or hold on to the currency until a future period $\boldsymbol{t+1}$. A choice to hold would yield:

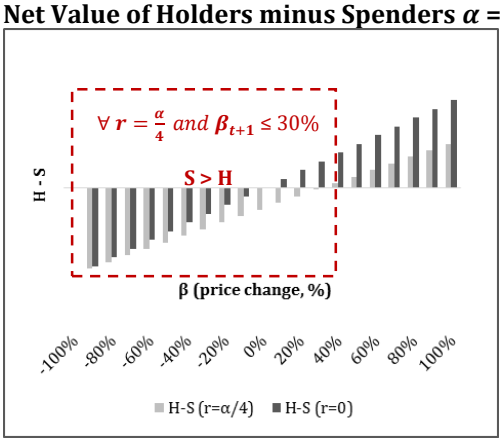
$$H_i = x_{it}p_{it}(1+\beta_{t+1})$$

Whereas the choice to spend a portion α of the currency would yield:

$$S_i = x_{it}p_{it}(1+\beta_{t+1})(1-\alpha_t+r_t)$$

Taking $\boldsymbol{\alpha}$ = 0.1, $\boldsymbol{r} = \frac{\alpha}{4}$ *and* $\boldsymbol{x_{it}p_{it}}$ =100, we measure the net worth of holders for different values of $\boldsymbol{\beta_{t+1}}$.

Net Value of Holders minus Spenders α = 0.1



Clearly, a drop in purchasing power results in a preferable outcome for spenders who retain the value of their purchased product/service, and more so for those who are reimbursed ¼

of their expenditures. In cases of increased purchasing power, the net worth of reimbursed spenders outperforms that of holders up to $\boldsymbol{\beta_{t+1}}$= 30%, whereas in cases of major price run-ups, holders are better off, however by a significantly lower absolute amount than reimbursed spenders, and at around 50% of the preferable position of spenders in the case of an extreme price drop. This adjusted risk-reward dynamic of reimbursement brings more value to a collaborative decision of use, due to the higher risk of a negative $\boldsymbol{\beta_{t+1}}$ in the case of either A or B deciding to spend.

Currency Use Dynamics

Adoption and Convergence Incentivized Distribution		A	
		$\alpha = 0$	$0 < \alpha \leq 1$
B	$\alpha = 0$	(H_i, H_i)	(H_i, S_i)
	$0 < \alpha \leq 1$	(S_i, H_i)	(S_i, S_i)

4. Final Remarks

EUNO Coin was created by a team that believes in the significance of user autonomy in matters of personal finance. Technology has permitted the presence of an impartial arbiter to uphold these values, free from the sway of centralized control and bad actors. However, the transition to adoption on a sizable scale cannot be expected to be easy. It requires a gradual approach that would moderate risks and ease restrictions of habit to demonstrate what is possible. For this reason, EUNO emphasizes openness to all developments in the cryptocurrency space, and flexibility in the direction of technology and in strategy. Above all, EUNO stresses its commitment to decentralization through community engagement and transparency.

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