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Reserve Utility Token Model

Economics Design

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Glossary

Economics Terms

Behavioral economics - A field of economics that applies psychological insights to understand economic decision-making.
Economic lever - A variable that a game studio is able to change in order to impact the economy.
Endowment effect - The tendency for people to value something more highly simply because they own it.
Fundamental demand - The quantity of goods or services that consumers are willing and able to purchase due to the intrinsic benefits they provide.
Hedonic pricing model - A model used to determine how specific factors impact an item's market price.
Loss aversion - The tendency for people to prefer avoiding losses over acquiring gains of equal value.
Opportunity cost - The cost of an alternative that must be given up when choosing another option.
Price ceiling - A maximum market price, enforced through unlimited asset sales at that price.
Price floor - A minimum market price, enforced through reserves of another asset.
Risk-averse - A preference for lower-risk options, often resulting in the selection of a safer but lower-return investment.
Speculative demand - Demand for a good or service that is driven by the expectation of future price increases.
Sunk cost - A cost that has already been incurred and cannot be recovered, and therefore should not be considered in future decision-making.
Utility - The measure of satisfaction or happiness that a consumer derives from consuming a good or service.

Gaming Terms

Battle pass - A type of game monetization that allows players to purchase access to additional game content and rewards.
Gun skin - A cosmetic alteration to the appearance of a gun in a game.
XP - Experience points, which are earned by a player and used to level up or gain new abilities.

Introduction

An extremely common motivation for creating a token is to raise funds, however it is becoming increasingly difficult to design a token that accrues value to satisfy investors, remains legally compliant, and doesn't harm the user experience. The design space for tokens that accrue value has become quite limited by securities regulations, especially for companies targeting US users. Mechanics like dividend distribution or buyback and burns are unlikely to be legally viable. Utility focused around the token acting as a medium of exchange is also problematic due to tensions between motivations to spend and motivations to hold, given the opportunity cost of potential gains. Based on established economic theory, assets without rough price stability do not make for successful currencies. Models that involve actively locking tokens for a set time to obtain benefits are promising, but can be a poor user experience for non-web3 native users. To leverage the liquidity benefits and retail access of value accruing tokens, the web3 gaming industry needs new potential frameworks for structuring them.

This article presents a new model that drives intrinsic value to the token through locking tokens as reserves to back NFTs representing key game utility, while keeping the token from negatively impacting the user experience. The examples will focus on a web3 gaming context, but the model can reasonably be applied in other non-gaming economy designs as well.

Model Overview

The Reserve Utility Token model involves locking the token as a reserve backing the value of NFTs in the ecosystem. The NFTs can broadly represent a variety of assets or benefits that participants value, such as cosmetic items, gameplay-impacting items, battle passes, or gameplay experience improvements. In order to mint an NFT, some of the tokens need to be locked as reserves, which could be redeemed later by burning the NFT. This can be abstracted away in the user flow, so the user can pay in dollars (with a constant $ price) and a portion of that revenue goes towards buying and locking tokens as reserves.

Let's make this more concrete with an example. A game studio issues a Reserve Utility Token, called GAME, with a limited supply and monetizes their game through sales of cosmetic items. The studio chooses to sell cosmetic baseball cap NFTs for $2 each on their storefront. They've selected a 50/50 dollar/GAME split, so $1 goes to the game studio (as revenue) and $1 is used to buy GAME off the market. Those tokens are locked in a reserve pool tied to that specific baseball cap NFT. Players can pay $2 or $1 plus $1 worth of GAME. Either way, the player will effectively own $1 worth of GAME, locked within that NFT. Later on, that player may decide they no longer want the baseball cap. They can list it for sale on a marketplace, or choose to instantly burn that NFT to get the reserved GAME tokens (and sell those if they wish). As more players buy the $2 baseball caps or other assets, they're locking up tokens, reducing the circulating supply and positively affecting the token market price.

The NFT could also provide in-game benefits, rather than exist as an item. For example a premium pass that gives the player double XP, a larger inventory, and the ability to fast travel. Anything that players value, be it related to time, status, power, or another desire can require the token for access, but be abstracted away.

Benefits

Enable flexible and predictable value accrual between equity and tokens: Each purchase has a defined split between direct revenue to equity holders (through the dollar spending part of the transaction) and value accrual to token holders (through the token lockup reducing circulating supply). Equity holders would likely include the founding team and venture capital investors while token holders include those groups and a variety of retail participants. This mechanism specifying how the asset cost structure benefits equity holders vs token holders allows better predictability and transparency for everyone, compared to the status quo of ambiguous distinction between the benefits of the two asset types.

New economic lever: This model also creates another lever to adjust the economy, as the dollar cost and token locking requirement for purchasing a NFT can be changed independently of each other. E.g. in the baseball cap example, the game studio could increase the reserve requirement to $2 worth of GAME, while keeping the dollar portion at $1. This would increase the sticker price to $3, while keeping the sunk cost the same at $1. This allows teams to make adjustments to balance equity and token valuation goals, as well as experiment with pricing strategies with different mixes of spending vs token locking requirements.

Provide immediate liquidity: By implementing a reserve of tokens backing each NFT, this creates an option for immediate liquidity if an asset holder wants to sell. The flow would be to burn the NFT for tokens, then sell tokens for the desired currency. This could also be abstracted into a single click for the end user.

Improve buyer confidence and spending: The presence of reserves also increases buyer confidence and potentially willingness to pay. They are guaranteed the ability to get some value back, even when there is currently no demand for that specific NFT (barring the value of the token dropping to 0). The secondary benefit of that process is a supply reduction for that NFT, which is likely to be oversupplied in that scenario. The additional reserve value should also increase secondary market pricing for the NFT, which can increase transaction fee revenue.

Discourage excessive speculation on NFTs requiring accessible pricing: Keeping the cost of minting fixed, in dollar terms, and having a flexible NFT supply creates a price ceiling that discourages excessive speculation. For example, if the game studio is always willing to sell another gun skin cosmetic for $5, that should stop speculators from driving the price above $5 and out of budget for most players. This mechanic synergises well with the reserve as it can constrain the maximum market price to a level where the value of the reserve "floor" price still remains relevant. E.g. $3 worth of token reserves feels relevant for a $5 skin, but not if the market price got pushed up to $100 from speculation.

Note that this mechanic is good for assets that are meant to have a low price to remain accessible for most users (for example a minimum level of cosmetic content or a battle pass), but not for status symbol goods like a rare cosmetic. Those generally should have limited supply and variable pricing, allowing for large spenders to show off, give speculators an outlet to trade on, and bolster secondary market revenue.

Built-in resilience to external market fluctuations: When the price of tokens is low, a higher quantity is locked up with each NFT purchase, given a fixed dollar cost. This helps push the price of the token up to align with fundamental demand for in-game benefits, such as in a scenario where the token price had dropped due to external crypto market movements while demand for items in that game remains strong.

Existing token holders price exposure: In other models where users need to spend tokens (with a variable market price) on NFTs, the opportunity cost of potential token price appreciation can reduce spending. But in the Reserve Utility Token model, players still have access to the tokens and corresponding price exposure, while taking the tokens out of the circulating supply. While this is not as strict of a supply reduction as a burn or fixed-period lockup, gating the tokens behind NFTs provides a barrier to them being sold that can be strengthened through designs that leverage psychological biases from the field of behavioral economics (see the Evolving NFTs section).

While there is a flipside of downward token price exposure that may at first seem unwelcome to a risk-averse web2 player, consider the implications compared to the alternatives. Using the same example of a player that spends $2 (in fiat) for a baseball cap NFT, the comparison between a web2 monetization model and a standard NFT model is the ability to resell the baseball cap if there is an available buyer. How the Reserve Utility Token model further differs for this user is that there is always some ability to sell the NFT and get some money back, regardless of the presence of buy orders or a need to wait for a buyer. The token can be completely abstracted away with only the fiat value of the reserve tokens shown. So even if the value of the token in reserves drops, it's still better than getting nothing back.

Use tokens without fiat onramp issues: Fiat onramp options are plagued with high bank rejection rates for fiat to cryptocurrency transactions. However, the rejection rate is significantly lower for items. This structure allows for a better onboarding experience by making the purchase be for an item, while still creating demand for the token, as the token swap can be done on the users' behalf.

Risks

Legal: While this design may avoid securities classification based on learnings of best practices from legal teams of past clients of ours (and at least should be less risky than dividend and burning value accrual mechanics), this particular model has not been vetted by any legal teams at the time of publication. It may or may not have legal implications on the classification of the NFTs as well. This is not legal advice and a lawyer should be consulted prior to implementing any version of this model.

Correlated NFT and token devaluation: If demand for both NFTs and tokens drops at the same time, it could cause a mass NFT burn and token sale. This would reduce expectations of potential redemption value and potentially lead to a bank run scenario of token selloffs. However, the counteracting force would be the corresponding NFT supply reduction prompting buyers to step in who would be willing to pay above the value of the token reserve.

In the end, the value of both the NFTs and token are tied to the fundamental demand from players of that game and should be expected to have price fluctuations based on that demand. Large drops in speculative demand can be more problematic and less predictable or deserved, so deterring excessive speculation through price ceilings can help with this. For situations where retaining value of the reserves is critical, using a stablecoins instead of a Reserve Utility Token for reserves may be more appropriate.

Fractured market: By implementing a fiat price ceiling, the quantity of tokens locked in that NFT's reserves may differ between similar NFTs (due to a fluctuating token/$ exchange rate over time). Adding evolving benefits to the NFT (see below) can also further differentiate NFTs. While this does make creating aggregated markets more difficult and reduces liquidity, the assets are inherently non-fungible and therefore may not need to pursue a goal of semi-fungibility. Additionally, buy side liquidity from bids is less important given the ability to immediately liquidate the NFT for reserved tokens. Marketplace tooling could also be developed to allow for multi-asset bids to concentrate liquidity that separately accounts for the various factors affecting NFT value, using a hedonic pricing model.

Implementation Options

The Reserve Utility Token model can be implemented in a wide variety of ways and should be customized to the needs of each individual project. The following section covers a few of the options for mechanics to strengthen the model in various scenarios.

Evolving NFTs: Additional retention mechanics can be layered onto the NFTs to disincentivize redemption for tokens. Use of that NFT over time can provide tangible or emotional benefits that would be lost if the player chose to burn (or potentially trade) the NFT. Some example benefits would be a 2x XP boost that took six months of holding and playing to achieve, improving cosmetic effects over time, or a personalized stat tracker.

This taps into two important psychological biases from the field of behavioral economics that would reduce burning (note they may also reduce trading depending on how the mechanism is designed). The first is loss aversion[1], where players feel like they would be giving up something valuable if they choose to redeem or trade their NFTs. This can incentivize players to hold onto their NFTs even if they are not currently using them, in order to maintain access to the benefits that they have accumulated over time. The fear of losing those benefits can be a powerful motivator for players to keep playing and engaging with the game, even if they might be tempted to cash out or trade their NFTs for other assets. The other bias is the endowment effect[2], which leads people to assign more value to something because they already own it. The effect can be magnified by the level of personal connection they have with the item, reducing their willingness to burn or sell the NFT.

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1 The Decision Lab. (n.d.). Loss Aversion. Retrieved from https://thedecisionlab.com/biases/loss-aversion.

2 The Decision Lab. (n.d.). Endowment Effect. Retrieved from https://thedecisionlab.com/biases/endowment-effect.

Price ceiling on NFTs: A price ceiling can be imposed through creating an open offer to sell an unlimited supply of new NFTs at a stated price (the "ceiling price"). This disincentivizes any secondary market trading above that price by speculators that could otherwise price out most players. Note that this is useful for NFTs that are meant to be widely accessible, but is not suitable for status symbol assets or others that are meant to be exclusive. Those still could have token reserves, but would be less effective with a potentially larger gap between market price and reserve value.

This aspect differs from Enjin's ENJ token[3], which has similar properties to this model. Without a price ceiling or fixed dollar amount for reserves in the ENJ model, the dollar cost to create a new unit of an asset is volatile and may trend upward over time. This creates either a poor user experience if the cost is put on the player or a poor cost forecasting experience for costs put on a developer.

Also, even for teams that are not planning on implementing a token, using reserve and/or price ceiling mechanisms (for example using a stablecoin reserve) can provide a range for NFT prices to improve buyer confidence and prevent excessive speculation from harming players.

Temporary NFTs: If the NFT represents a temporary benefit (e.g. a month-long battle pass) then it can be beneficial to make the NFT have only temporary economic relevance or require ongoing costs to achieve the benefit. Game economy designers should consider how this impacts the design for reserves, with a potential strategy being that the reserves gradually get allocated to the team as the player progresses through the battle pass/uses the benefit or based on time to expiration. The option to potentially get some money back from the purchase, if underused, could increase spending. While the reduction in reserves for use is essentially equivalent to spending for ongoing use of the benefit (a potential disincentive for activity), that change is much less noticeable than funds leaving a player's wallet and less likely to impact their behavior.

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[3] Enjin. (n.d.). Enjin Coin. Retrieved from https://enjin.io/enjin-coin.

Automatic excessive reserve distribution: Situations may arise where the token appreciates enough that the reserved tokens become more valuable than the NFT. If designers implement mechanisms that make players attached to an NFT, this could create an undesirable decision to make about burning the specific NFT in order to get the tokens (while potentially minting a new one with a smaller token reserve). A mechanic to mitigate this would be an automatic distribution of some of the reserved tokens to the NFT holder if the dollar value of the reserves rises above a certain threshold (such as the NFT ceiling price).

Using the baseball cap example, the player may have initially bought a baseball cap for $2 and had $1 worth of GAME token reserves, but now the value of GAME has more than doubled and the reserved tokens are worth $2.10. With a $2 threshold, the $0.10 worth of GAME tokens are automatically sent from the NFT reserves to the player. The threshold for automatic reserve distribution can be set at a level that players do not feel a need to take action to burn and re-mint NFTs to pull out reserved tokens when the token price rises.

Semi-stable currency: The examples above involve users paying in dollars, which can be processed off-chain through fiat, or on-chain through stablecoins. However, developers do not necessarily have to resort to fully collateralized stablecoins or fiat to provide a medium of exchange that has the purchasing-power stability needed to meet the standard requirements of a good currency. Instead, they can consider a semi-stable currency, which leverages reserves and a flexible supply for stability. This involves minting and selling new tokens on the open market if the token rises above a stated price to enforce a price ceiling and deter speculators. It also requires maintaining enough public reserves to buy back all currency at a stated price level to enforce a floor price and create confidence in that currency. Given the importance of stability here, the reserves would likely best consist of fiat-backed stablecoins. To be clear, a semi-stable currency would replace dollars in this model, not the value accruing Reserve Utility Token.

Implementing a semi-stable currency has a variety of benefits. It can generate higher revenue because as new currency demand increases from a growing user base, the team can realize revenue (from the difference between currency sale revenue and reserves) at the point of new currency minting, not only at the time of trade. Secondly, that difference between the price ceiling & floor also gives flexibility for using some tokens for targeted incentives. With a fully-collateralized stablecoin model, those incentives would require funding from elsewhere. Lastly, it allows for customizable monetary policy as the size and range of the price window can be adjusted as needed to balance user confidence, revenue, and incentives funding. The customization also means that the currency is not directly tied to the inflation rate of a reference fiat currency and adjustments can be made based on the specific needs of that metaverse's economy.

While I have not seen examples yet in web3, this is not a novel idea. Second Life[4], a metaverse that has been around since 2003 and has a $650 million GDP[5], uses a semi-stable currency. Their Linden Dollar predates bitcoin, but is still tradable for dollars on the open market within a constrained price window. MMOs like Second Life, where trading is an important part of the experience and the team values additional levers to control the economy, can stand to benefit from implementing a semi-stable currency.

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4 Linden Research, Inc. (n.d.). Second Life. Retrieved from https://secondlife.com/. Linden Lab. (2019, January 9).

5 High Fidelity Invests in Second Life. Retrieved from https://www.lindenlab.com/releases/high-fidelity-invests-in-second-life.

Conclusion

Implementing a Reserve Utility Token model involves examining the fundamental utility of a game and then requiring tokens to access it, while abstracting tokens out of the main user experience. The model creates a variety of benefits for both players and game developers, including flexible token value accrual, a new way to make economic adjustments, access to instant NFT liquidity, higher confidence in NFT value, reductions in excessive speculation, optimization for fiat on-ramp restrictions, resistance to negative external crypto market trends, and allowing the use of a token for NFT acquisition while users retain price exposure.

For game developers reading this, I highly recommend not to think of this as a direct blueprint to copy, but as a potential tool to iterate on. Each game has its own unique goals and constraints that should be designed around. The implementation options section gives a few ideas of potential adjustments or decisions to be made to customize this model, but much more thought should go into the design and understanding of how to craft a game economy that fits your goals.

For help with implementing a Reserve Utility Token model or any other assistance with creating or auditing a sustainable economy, feel free to reach out to Economics Design (hello@economicsdesign.com) or directly to Kiefer Zang (kiefer.z@economicsdesign.com).