GAMEFI TOKENIZATION AND MONETIZATION: USING AILAND, AN AI DRIVEN TAXI GAME AS A CASE-STUDY

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FOR ETH RESEARCH GRANT (DORAHACKS)

ROUND 3

OVERVIEW

Designing an efficient tokenization model for GameFi projects is one of the major problems being tackled today as web3 continues to scale. This paper will focus on the design of a dual-token system connected with the numeric design of the game suitable for providing monetary and non-monetary benefits to gamers, investors, developers,etc.

GAME BACKSTORY

Our game(AILAND) is set in an alternate timeline in 2022 where futuristic AI-driven cars sare already available and they serve as taxis. Players undergo missions with the purpose of driving citizens of AILand around the city as they navigate their daily life. AILand has 6 levels (L1, L2, L3, L4, L5, L6) of gameplay with an increase in car autonomy as players progress through the levels.

1.0 UNDERSTANDING THE PROBLEMS
1. The relationship between the token model and the numeric design.
2. The distribution of the token.
3. The DAO governance

1.1 TOKEN MODEL x NUMERICAL SETTINGS
The token economic model within the GameFi ecosystem involves the tokenization of the in-game currency in exchange for resources while also serving as a source of real income. Using a dual-token system in which one token is used for utility transactions within the game (AUT) while the other is used as a governance token (AIL). The utility token is available only within the game, and only players can own it, while the governance token is available both to the players and investors in and outside the game.

Tokens are strongly linked to the numerical setting and relationship between resources within the game especially the utility token. There are four types of resources within the game:

a) generated resources, which refers to resources generated by players by virtue of completing missions or transacting. An example is the 'transport fare' paid to the player for completing a mission.

b) destructive resources, which refer to money sinks which burn resources generated by players, this particularly helps in cutting down inflation and promoting internal circulation. Examples are charging, and repairs

c) tradeable resources, which are resources available on the game marketplace for trading, and examples are cars and upgrades

d) limited resources, which are one-of-one resources which players own by virtue of participating in the game experience. players may decide to trade it in some instances, but it's quite unique and can't be replaced. Examples are unique NFT items found within the game.

1.1.1 NUMERIC DESIGN

The numeric design will be the basis of the token model. There are some core metrics/features upon the numeric design depend upon, they are:

I. Car – The AI-CAR is a central resource within the game. Without a car you cannot take part in mission, thus earn tokens. Each level has its own set of cars. You can't use a L2 car for L3 and vice versa. The car is the base metric for other metrics like durability, speed, acceleration, etc.

II. Distance – Distance is a core metric in the game, it's a measure of how far, how hard and how long a mission will take to complete. Distance is variable and generated randomly within the game for a player before the mission starts. Distance is in metres(m)

III. Time – Time is another core metric, similar to distance. Time is quite important because players have to complete their missions on time. Also completing the mission faster is good for player ratings (which is a key metric for earning the governance token). Players can optimize their time within the game by investing in power upgrades like battery. Time is in seconds (s)

IV. Complexity – Complexity is how tough a mission is. Each level has 10 categories of complexities with unique tasks fitted to it. C1 is quite easy, compared to C10 which is quite hard.

Each mission has two core tasks. The distance to be travelled vs the complexity of the mission. The player completes the mission by reaching the destination in time. Of course to complete the mission the player needs a car in optimal and efficient condition.

Mathematically;
Distance $\propto$ Time
Complexity $\propto$ Time

Each task will have an an average time in which players are expected to complete it based on the distance and complexity. Understanding the average time, players will take to complete a particular task is a very useful constraint and balancing mechanism within the game, and the token economy itself.

For the purpose of this paper, let's say:
100 m = 60s.

To complete a distance of 100m will take an average of 60secs. Complexity introduces variability which determines how fast or hard it takes to complete this distance. In terms of token supply complexity does two things, it makes it harder to earn tokens as you progress further, while making you burn resources to complete it.

Additionally, the fact that the distance is randomly generated for each task in a game, makes it hard for players to predict their expected income from each level.
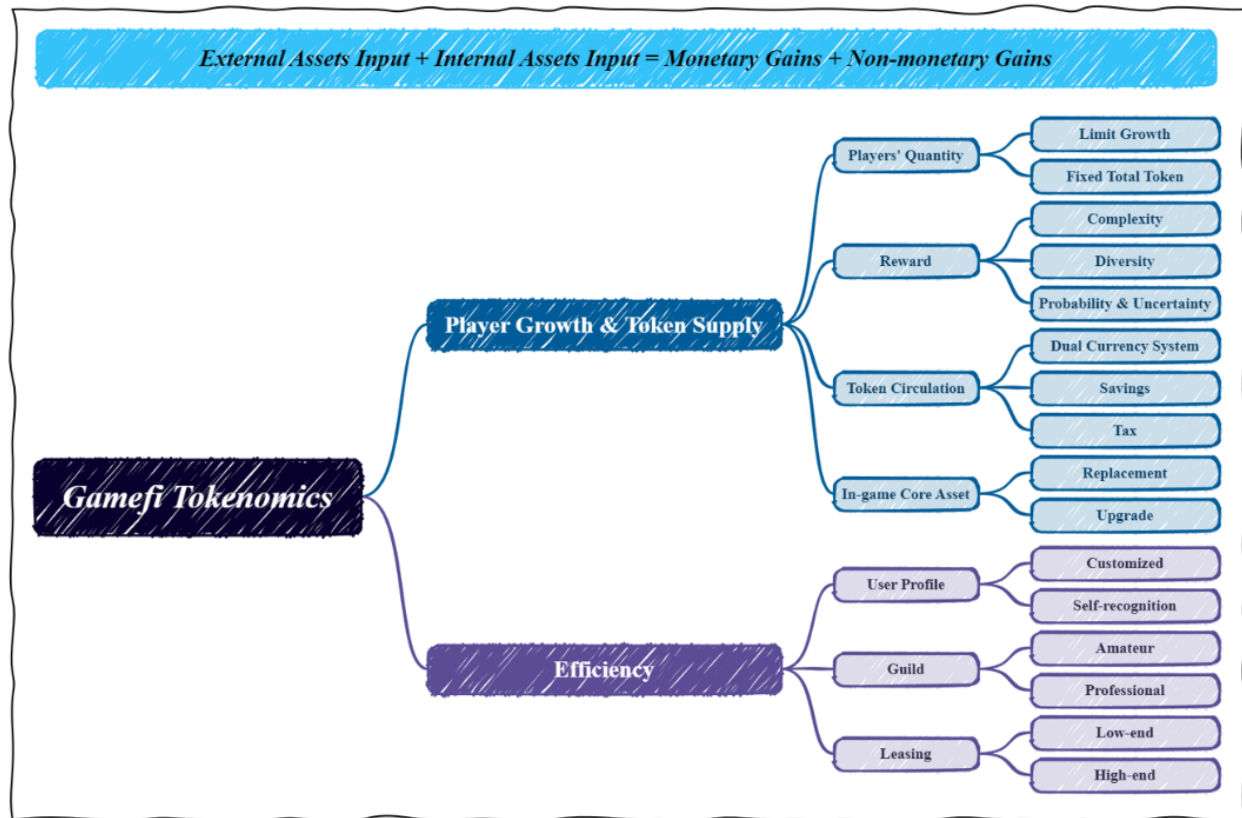
Fig1: Schema of a typical GameFi Tokenomic model.

1.1.2 GENERAL NUMERIC METRICS AND THEIR RELATIONSHIP

The goal of the game is to train and maintain the AI-CAR and completing the tasks given. A succesful task carried out earns the player some AUT/AIL while failing to do so doesn't. Players spend AUT within the game for repairs, charging, upgrading, etc. This economic system of working/playing to earn within the game, coupled with the buying and selling of game resources forms the basis of our game-fi economy in AILand.

I. CAR FEATURES AND UPGRADES
- Wheels = 10%
- Power = battery level = time i.e a car with 100% will have more time work than that with 80%
- Battery = 10%
- Charger = 10%

- Antivirus = protection against hacks and viruses = 10%
- Nitro = boost car speed
  ◦ Nitro = 10%
  ◦ ECU = 10%
- Design = useful for specific tasks that require certain utilities
  ◦ Utility = 10%
  ◦ Aesthetics = 10%

This totals 100% for a fully upgraded car.

Upgrades, are available in the garage but can also be traded in the marketplace for players who want to exchange theirs for AUT.

It's important to make the price system of upgrades 'not fixed' and allow the market demand to control the supply and price. This will in turn help balance the flow and total amount of tokens in the system. For example, let's say after a virus attack, a large number of batteries in cars affected are damaged, there will be a high demand for batteries which in turn increase the price of batteries in the garage. To go along with this idea, is to only stock the garage with a fixed amount of upgrades at specific periods. This can promotes the desired feeling of scarcity that compels players to burn their AUT tokens especially when the game needs to token in circulation to deflate.

The AI-CAR is a major resource in this game. Without a car, players can't play and act on missions. At LVL1(tutorial) players can simply just rent their vehicles, beyond that they have to buy their own cars. The choice to cars to pick from are unique to each level, you can't use a LVL2 car in LVL3 because they have different characteristics. However you can buy as much as you can, customize, upgrade and then trade. A car's durability is its key feauture and determines its car health and capability to complete a mission. It can not be directly upgraded, though other features upgrades can improve it. These other features are:

- Speed = distance/time
  ◦ Motor = 20%
- Acceleration = speed/time
  ◦ Reducer = 10%

II.   CAR HEALTH

Important features/metrics that determine car health are:

Charge, is the electric fuel percentage of the car. All cars have a base charge of 60% when newly bought. Charge is a naturally depletive resource within the game. It depletes with car activity during missions in the game. Charging replenishes it and can be done in DeAuto garage, during this period, the car is not active and can't take part in missions.

Durability, refers to how strong/fragile a car is. It's a measure to how much a car can withstand attacks like hits from other vehicles, virus attack, hacks from malevolent traditonal car owners and general obstacles within the game. Highly durable cars are often available in the higher levels than the lower levels because of price and the level of skill needed to acquire it. Hence at level 2, you may have a car with a durability of 30%. Durability takes a hit during attacks and can only be restored through repairs in the garage. Highly skilled players or highly durable cars may be able to avoid attacks

Upgrades, are tiny but effective improvements to existing car parts which can make the car more durable, charge faster, or store more charge. Beyond car health, upgrades also makes the car faster, have more utility for specific missions and design or more aesthetically beautiful.

All of this features aggregate into the singular most important metric within the game Car Health(CH). CH is a measure of a car capability to carry out a mission, a car with a an high health level of say 92% is faster, stronger, while another with 13% is severly weak. At 0% the car automatically switches off and it's unable to take part in missions, hence the player can't earn money. Thus it's important in the game, to watch the car's health and improve it. This means charging it at appropiate times, buying more durable cars as the player progresses through missions.

The calculation for CH;

CH = Charge(50%) + Durability(40%) + Upgrades(10%)

For example to calculate the car health of a AI-CAR at level 2 in AILand with the following characteristics;

Charge = 60%

Durability = 40%

Upgrades = 20.

Car Health = (60 x 0.5) + (40 x 0.4) + (20 x 0.1) = 40%

If a car runs out of health, it's unable to work and carry out missions. At lower levels where players can't have access to better cars with durability, they may need to focus on keeping their car charged consistently.

Charge = Battery level = Time

You can improve charging by using power upgrades to the battery(capacity) & charger(time taken to charge)

Electric Charging => 1000mH = 100% = 10mins driving time = 5 AUT.

Where, Durability $\propto$ 1/Fragility

III.   CAR ATTACKS

Car attacks mainly serve to consume resources and tokens in the game.

Repair = Attacks x Fragility

• Attack is the number of times a car is attacked. Attacks can be:

◦ Hits (random) = affects nitro & design (if you hit a car succesfully you get nitro too)

◦ Viruses (general) = affects the speed & power of the AI-CAR. also cuts off access to AI Dev

◦ Obstacles (general) = affects acceleration & design

◦ Hacks (random + targeted)

Fragility is inversely proportional to durability

All attacks affect durability hence CH (Car health)

You can improve fragility by upgrading your car efficiently. power upgrades can't fight against virus attacks tho :(

Repairs = Number of Hits x Fragility of Cars = 2 x 8 = 16 AUT.
* the fragility of cars will be one of the key features to consider when buying a car

IV.   COMPLETING MISSIONS AND GETTING PAID

Completing missions, means getting paid, failure to complete means you don't get paid. Players are paid in AUT, the in-game currency for purchasing utilities.

Fee calculations is based on the distance covered for and the mission's complexity. For example, a mission of level 2 complexity and distance of 200m;
Fee = Distance x Complexity of Mission = 200 x 2/10 = 40 AUT.
Thus if a player completes this particular mission, they automatically earn 40AUT.

* Distance (m). Minimum distance is 100m.
*maximum for each level
* L1 = 100m
* L2 = 300m
* L3 = 600m
* L4 = 1000m
* L5 = 1500m
* L6 = 2100m

Complexity is how hard the mission, there are 10 acts of complexitites for each level, e.g: mission of complexity 2 = 2/10.
Thus, Fee = Distance x Complexity = 100 x 2/10 = 20 AUT
Hence the highest amount a player can earn at the highest level of L6 is 2100 AUT.
For each mission, the distance generated will be random however, to make expected earnings harder to predict for players
100m = 1min
1/10 = x1

When you start the game, you register with 30 AUT to play in LVL1. LVL is the tutorial level where

Registration Fee Breakdown

reg fee = 10 AUT

rent fee = 10 AUT

charge = variable tho full charge costs 10 AUT

V.   PLAYER RANKINGS AND GOVERNANCE

RANK = Ratings (50%) + Passengers/Day(20%) + Damage(15%) + Escapes(15%)

- Ratings is a measure of performnce, how much time you can shave off the expected time to complete a mission
- Passengers/day is the number of passengers per day.
- Damage is how many cars you get to wreck.
- Escapes is how many times you are able to escape attacks against you in a game

1.1.3 TOKENOMICS MODEL

AILAND will run on a dual token model with an inflatIonary model; one token for in-game transactions (AUT) and the other for governance and staking(AIL). Economics and trading will be based on the resources present within the game, with tokens supplied whenver a mission is completed in the game.

1) AUT can be earned only within the game by completing missions. AIL can be bought and used for staking on popular exchanges. Players also get AIL through a separate ranking system within the game. Most importantly, AIL and AUT are separate from each other. Investors have access only to AIL, while players have access to both AIL & AUT.

2) There are a bunch of resources that consumes AUT like:

a) charging the NEV-CAR

b) doing repairs when the car is damaged.

c) upgrading the car parts.

d) tax levies via marketplace trading.

3) For AIL, the consumption involves burning some of the governance token as you progress through the levels.

4) The token economy runs on an inflationary model. Game difficulty serves as a direct constraitnt for creating scarcity at different points in the the game. The harder the

game is, the harder it is to complete the mission, without completing the mission, you can't earn new tokens.

SPECIAL CONSIDERATIONS
   I.   INFLATION

The demand curve is based on player's willigness to pay more for resources. The game economy is a positive-sum economy, in which players have the capacity to keep generating wealth without other players losing theirs. Thus overtime, players get richer, with the total money in the economy. This is an inflatory model in which their is no fixed cap on how much tokens is released.

The demand curve shifts to the right, prices of resources increase as players are willing to pay higher prices since they have more money than before.

The problem with this model of course is the new players who are left holding the last buck, they can never really catch up because they are still earning little due to their level, while older players who are earning more are pushing the price higher.

What's the solution to this?

Introduce money sinks..

Money sinks permanently remove money from the economy, examples of money sinks in this game is:

      • charging - charging is a consumable resource that constantly depletes and needs to acquired again to keep playing. Players pay for charging in AUT which sucks the inflation a little.

      • repairs - repairs are done to maintain the car health and durability, thus like fuel it's a constant neccessity to maintain.

      • virus, and targetted hacks especially at the higher levels which serves to reduce the money at the top and rebalance the economy.

      • Limited NFTs and car designs which don't affect gameplay advantage but is a sign of high status in the game, again this will be targetted at the higher level.

   II.   TRADING

Incentivizing trading by providing players with items which they don't currently need which they can trade for something they need. these can be unique items.

Trading mechanics usually serve as a negative-feedback loop, especially within a closed economy. Players are generally more willing to offer favorable trades to those who are behind, while they expect to get a better deal from someone who is ahead (or else they won't trade at all).

Loans. Buying items on credit. Or renting it. These deals are binding and players who fail to come through will be penalized.
Some resources are not tradeable, e.g Car Health, a car is tradeable but not its health or durability, these are features of a car anyway.
Players can trade at any time but not during missions. Maybe freeze trading at some time.
Trading tax to prevent trading coalitions. You can barter upgrades of the same class.

III.   AUCTIONS

Auctions are a special form of trading. Players can auction off their stuff in auction season. The game itself can conduct its own auction. Creating an item out of thin air which players bid for. Cars can be put up for auction by players/special items? What type of auction to choose? How to auction?

- ➢ one item at a time
- ➢ a set of items in which the highest bidder gets the first pick, and so on and so forth. the last person can get nothing.
- ➢ To prevent a player from winning auctions in a row, after three wins, the next auction they are exempted from auction
- ➢ Or something bad happens to the loser in an auction to encourage bidding.
- ➢ auctions happen on each level vs general auctions
- ➢ all players pay their bid for set of items
- ➢ for single item only the highest bid pays.
- ➢ auction bids paid to the bank which leads to deflation and can be used for redistribution later
- ➢ if no one bids, withdraw the item or give a pre-designated person which people may not want to win
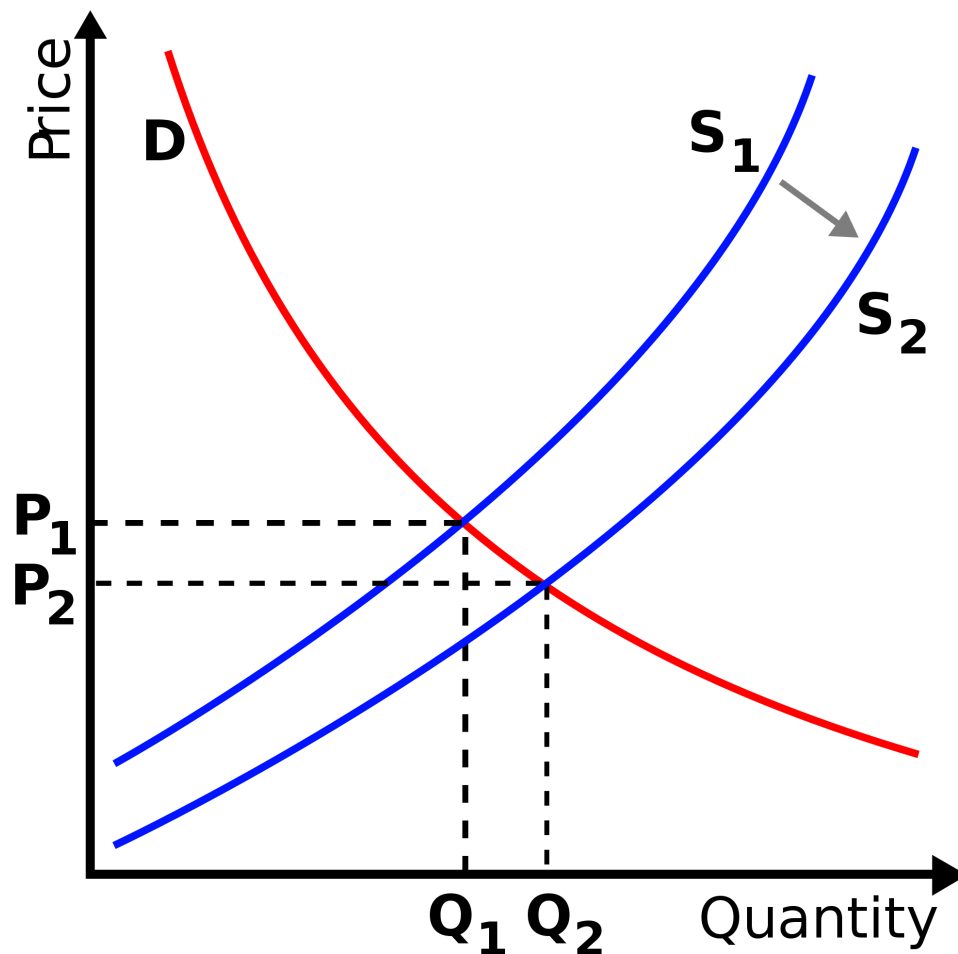
1.2 TOKEN DISTRIBUTION x CREATOR ECONOMY

Fig 2: Diagram showing demand-supply curve as it affects the price of tokens as the quantity increases or decreases.

In this game, demand for tokens will technically always be higher than the supply for tokens because it's impossible for the number of missions completed per day to be higher than the number of missions started per day. What we are really monitoring then is the rate of supply vs rate of demand i.e the rate at which players complete the game vs the rate at which players start the game. Hence as the number of players playing the game decreases, also the lesser the number of players completing the game. Hence in this case, supply is dependent on the demand.

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Hence the token price will fall, if players stop playing. The solution to figure out then is how to keep players playing the game. From the pure gamer perspective, this involves making the gameplay as exciting and addictive as possible which engages the player to keep playing, keeping the demand and consumption higher, hence the token price on a high.
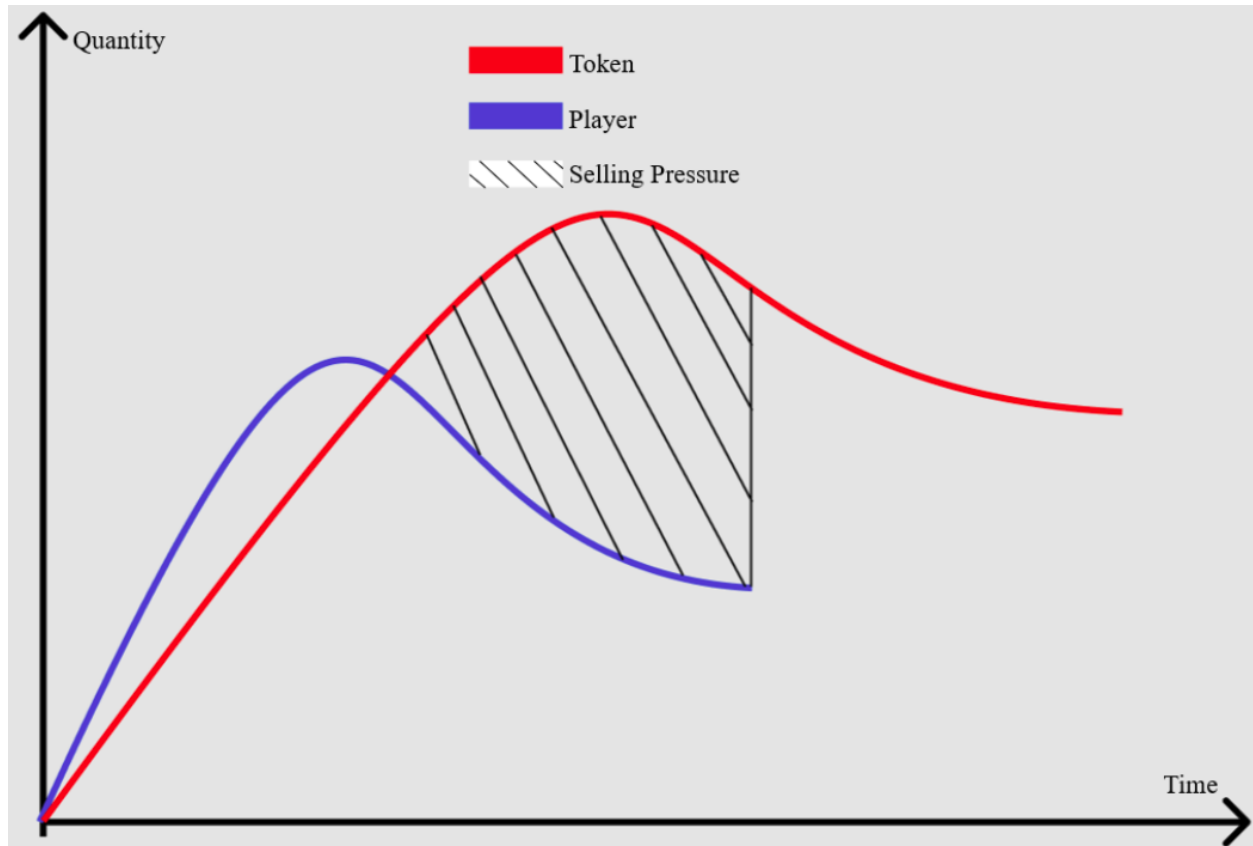

Fig 3: Diagram showing the influence of selling pressure over time vis a vis the behaviour of the available quantity of token and player in the game.

1.2.1 SOLUTION

I. Controlling inflation and the supply of tokens is directly tantamount to controlling players progression in the game and how much they can earn at every period in time. This involves managing periods of player surge which is likely to occur in the beginning of the game. The gameplay at L1 doesn't provide much earnings, this encourages player investment to progress to L2. Player investment is important because it creates a group of core players who play the game for its own sake of

competitiveness, leaving the period of actual earning later in the game stimulates this same spirit. Stages between L2 - L3 are quite critical, here players are grinding hard to earn AUT tokens, AUT purpose however is for utility payment within the game and trading in the marketplace. At L4 and beyond that players begin earning AIL, by this time their is very investment in the game on the part of the players. From L4 and higher players will be rightly interested in the governance of AILand and how it scales.

II. Introducing probabilities and unpredictability into AIL earnings. AIL is calculated by:
AIL = ratings + clean body + beat the opps + passengers per day.
- ratings = depends on the % time you are able to save by arriving at your destination earlier. this will always be variable.
- clean body = state of the car after a mission = durability - hits * viruses * obstacles (all of this negatives are random but are usually higher as you progress
- passengers per day = no of missions completed/no of passengers carried.
- beat competitors = this is the damage you can cause!? * non monetary awards * titles.
upgrades and car prices = price fluctuates with the game state

III. AIL should be harder to acquire than AUT. It should also be consumed at critical stages when progressing to the next level. This aids game-longetivity and internal circulation. Token consumption should be higher than Token acquistion. Token consumption will be consistently spent on in-game resources which players need to get better. All transactions should be done within the game/marketplace using AUT/AIL and cashing out attracts a % tax.
Levy is determined by:
- Time: The longer you sell the equipment after acquiring it, the lower the tax will be;
- Quantity: The more quantity sold within a certain period, the higher the tax will be;
- Seniority: The more hours a player has spent and the more honors they have earned, the more tax relief they will receive.

IV. The core asset of the game which is the AI-CAR should be consistently upgraded and repaired to ensure token consumption within the game.

V.   Players level at any point in the game becomes a source of self-identification and culture which creates a clear structure of different needs, benefits and perks. Tokens are distributed differently for each level.

1.3 DAO GOVERNANCE

Distributing tokens amongst players, and recognizing players as co-creators of the in-game assets being traded and used. To start with AILERS will be broadly divided into three groups: Beginner, Grinder, Flayer, Whaler with all AILERS starting as Beginners and then progress up the food-chain to be a whale.

When you start the game as a beginner, you get 100points(NS) to start with. To become a grinder, you have to grind and make 1000points at which point you can now exchange for utility tokens, 100points = 1 token.

To become a flayer, you need to acquire 20 tokens. 10 utility tokens = 1 governance token.

To become a whale, is just for flex, and you will need to burn 100 tokens = for regenerative NFT.

The whole point of this player stratification is to incentivize the playing of the game itself, control players growth in the game and inflation. Managing player entry surges into the game by putting them through a preliminary stage where they do not have access to the game currency immediately will help solve the discrepancy between demand and supply for tokens. This approach works in the later stages in which selling tokens indsiscrimately is discouraged because you have to stack your coins to a sufficient level to move from a grinder to a flayer with governoship abilities in the DAO. Correspondingly the move to becoming wahle inspires the same principle of holding on to your coins due to the perks available to the whale. Plus, whales won't actually be able to to sell their regenerative NFT due to it being soulbound though it will sure come with goodies and real life merch as well.

With different level comes differnet needs, which establishes a clear system of self-identification and aspiration. Using user profiles, with unique access to different game modes and types according to their levels. This also includes a diversification of the rewards system. The tokenomics designed for each user profiles will stimulate their spending power in different ways according to their levels.

The creator economy and the leasing of NFT assets owned by the players. Leasing means lending in-game assets like equipment owned by players to other players so they can make use of it while paying rent on it.

This has two advantages: one, players don't have to sell their NFTs outright and also solves the liquidity problem for very skilled players who can turn in a little bit of revenue for themselves by renting, it also helps upcoming players to get better and have access to superior game experience above their level. The monetary and non-monetary value for both sides of the divide represents a win-win solution.

For example the repair costs will be different for each level, so will the probability of failure for each level, the gameplay, access to high-level equipmeent
The presence of Whales, Flayers for instance brings in a great inflow of external funds to the game.

Players shoudld be incentiivized to upgrade their core assets, achieving the aim of consuming the original assets which promotes internal circulation of the economy. This will be done is such a way that upgrading means improved game experience.

The governance token has been designed to be harder to come by to curb inflation, also exploiting it in critical stages close to the end of game season by consuming it is useful for internal circulation and game longetivity. Also if inflation becomes too high, it's neccessary to adjust the ratio between game token and governance token.

SKETCH IDEAS

Make the game formula had to exploit, make the reward system hard to predict.

Investors
* Seed Investors
* Governors
* Portfolio Investors
* Crypto Traders

players can only acquire items set for their level.

created limited items that creates demand, useful for when balancing demand and supply.
make cars limited?

marginal pricing?

Ratings

Durability of the car = 100%
@ 0% car is spoilt and can't move again
thus a car has to repaired whenever it is hit, to continue performing.

governance token can be exchanged for game token but not vice versa directly.

introducing randomness/scarcity to upgrades and cars.

> Profit for player = Fee - (fuel + repairs)

Tokenomics
External Asset Inputs + Internal Asset Inputs = Monetary Gains + Non-monetary Gains

External Asset Input = advert placement, game-cobranding.

Maintaining the balance between the demand and supply of tokens.

Demand increases with the more players play the game while supply increases with the more players complete the missions.