Danu

## Improving NFT liquidity

# Towards optimal AMMs for NFTs

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**Why exist?**

## Which problems do we want to solve?

1. Interest in NFTs is waning, as demonstrated by 64 % less volume in Q2
2. Lack of consensus on correct NFT pricing leads to volatility and scarcity
3. Liquidity within NFT collections is also distributed very unevenly…

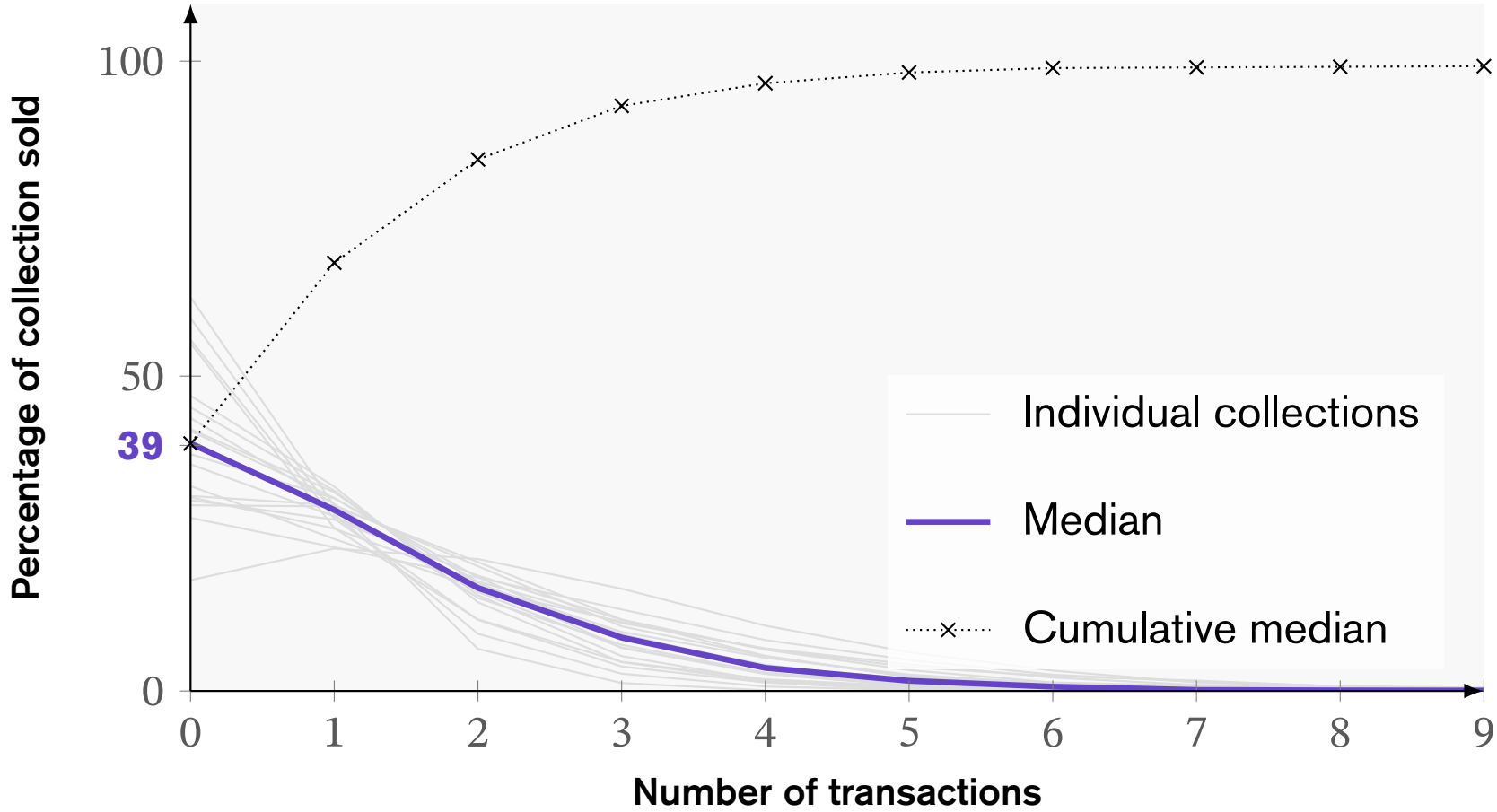


Figure 1: Pareto chart of the percentage of collections sold, including e.g. Bored Ape Yacht Club (BAYC), for the twenty most-traded PFP-based collections on OpenSea. 39 % of indexed collections do not trade at all and 29 % exchange hands only once.

**The solution**

## What do we propose?

If we could wave a magic wand, how would we improve the situation?

→ Build an AMM for NFTs, with a marketplace front-end à la OpenSea

→ Incentivize sustainable liquidity with tokenomics, à la Filecoin or Chainlink

**This scheme would provide liquidity instantly, as well as a marketplace to discover and trade exceptional NFTs on.**

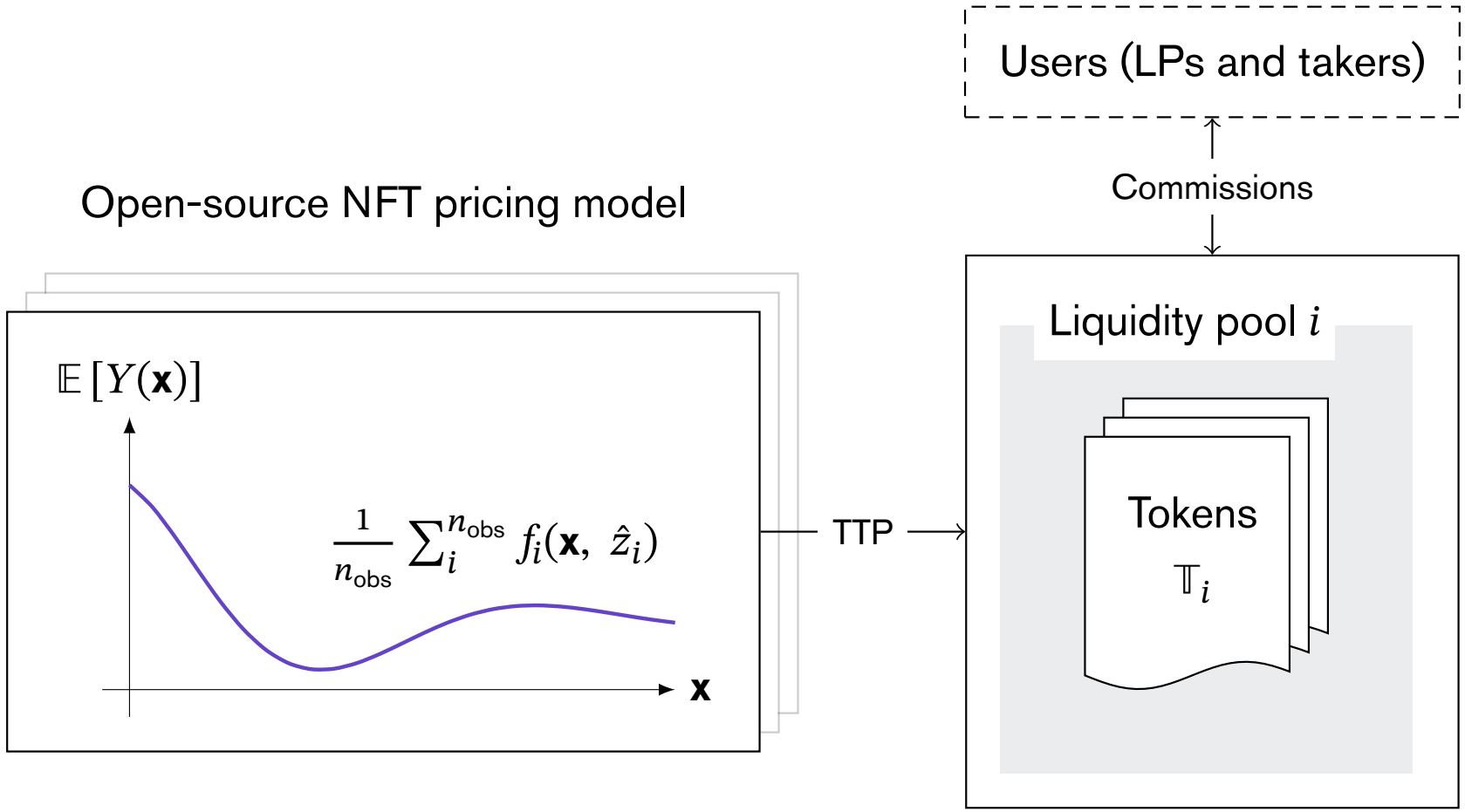


Figure 2: One of our novelties is the use of an off-chain pricing model in transactions, as opposed to the established solution of using bonding curves. That way, liquidity providers (LPs) accrue less risk and traders obtain much more accurate pricing.

**The solution**

## Embracing the superiority of off-chain pricing models

Why not use an on-chain NFT appraisal model à la Sudoswap, or a variation thereof? Because off-chain pricing models…

→ allow vulnerabilities to be patched without fragmenting liquidity and can be **updated dynamically**.

For example, even if an on-chain model had $R^2 \approx 0.99$ now, who is to say that will always remain the case?

→ are **gas-optimal**, as gas price is independent of model complexity. Models can therefore also be arbitrarily complex

→ readily allow securities and API dependencies to be built upon them with **blockchain-agnostic** and **automatic price updates**

### The solution

## But doesn't this go against the DeFi ethos?

No, to the contrary! We think it's time to finally start viewing the blockchain as a means to an end, rather than the end-goal itself.

From a standpoint of pragmatism, if the model is open-source, verifiable, much more secure, faster (think of e.g. database indexes), and distributed, why *not* allow it to complement the deficiencies of blockchains?

**Our best-of-both-worlds approach allows for a level of performance and flexibility that on-chain NFT-AMMs can never achieve.**

### The solution

## In other words…

> “If a concern can possibly be addressed outside of a smart contract, then that’s what we should do.”
>
> — R. Hitchens

**The solution**

## Mainnet pricing model

Our mainnet NFT appraisal model…

→ is **open-source**, audited, and thoroughly motivated in documentation

→ provides **reliable prices** to our traders and API customers

→ implements a **risk premium** (RP), to ameliorate systemic and idiosyncratic risk and protect our LPs

And yes, we will pay out bounties for every merged considerable improvement!

Figure 3: The NFT appraisal model can be run “in reverse”, as statistically-optimal generative models for a given set of traits and art styles. To be released as several collections on mainnet. Why cats and not frogs? Because we’re saving the best for last…

## Differences between testnet & mainnet

**Simplified pricing model** The testnet is not representative of the real world. We therefore chose to demonstrate our pricing model using a toy example on one collection, as to not create unrealistic expectations.

**No guaranteed liquidity** As a consequence of the above, we do not have an appropriate tokenomics model for testnet behavior. After six months, even our mainnet tokenomics are to be fine-tuned.

**No optimizations or regards to security** The code is meant to be understood easily, while being written in the allotted time.

But what it *can* do, is demonstrate the viability of the off-chain NFT-AMM beyond any reasonable doubt.

**Check out the demo at testnet.danu.fi/marketplace**

For more information, check out our light paper.