

Economics of NFTs:

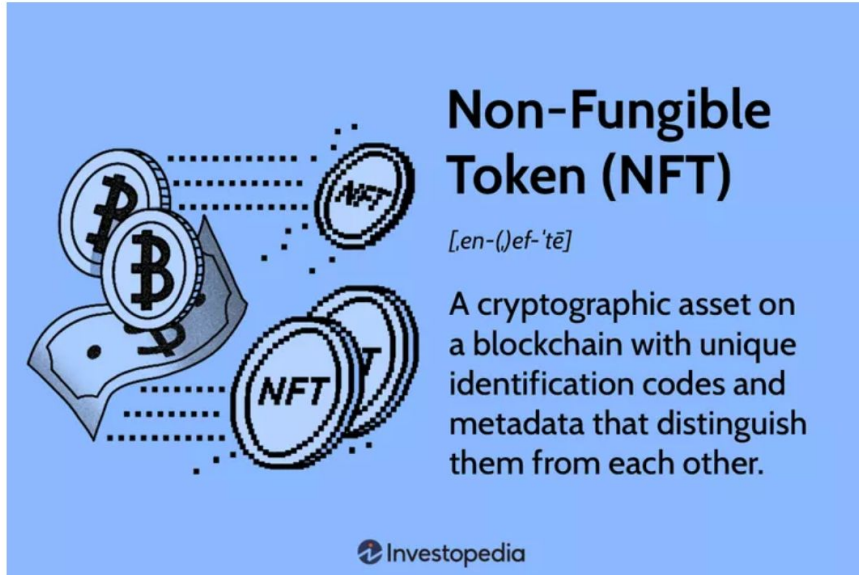
The Value of Creator Royalties

Brett Hemenway Falk
Bin Gu
Gerry Tsoukalas
Niuniu Zhang

Outline

1. Definition
2. Motivation and Background
3. Research Question
4. Model

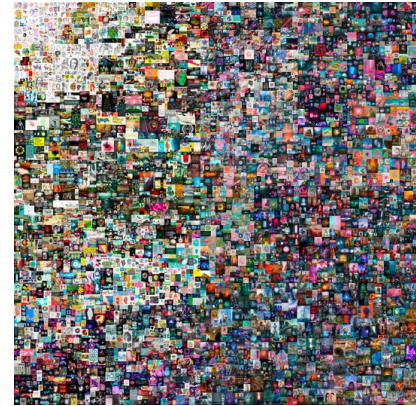
What is Non-Fungible Token (NFT)?



Investopedia / Julie Bang

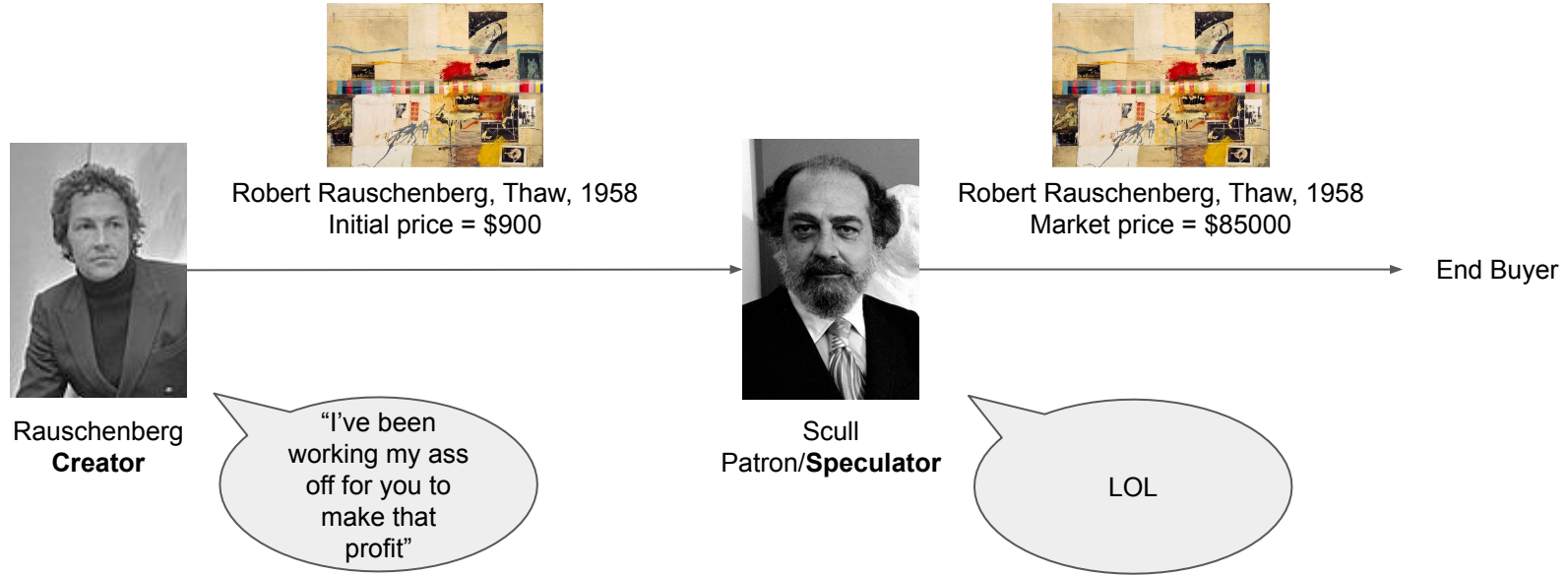


Bitcoin, a fungible asset



“Everydays: The First 5000 days”, Beeple, sold for \$69.3 million at Christie’s in 2021

Why do we care about royalties? Scull Auction, 1973



Op-Ed

Artists Have Been Attempting to Secure Royalties on Their Work for More Than a Century. Blockchain Finally Offers Them a Breakthrough

There's a throughline from attempts to reform the art market in the '60s to artists like Simon de la Rouviere's work today.

Charlotte Kent, April 7, 2021

Artist Royalties Are Among ‘Most Compelling Features of Crypto’: Zora Co-Founder

Jacob Horne expressed concern about the NFT market heading toward zero-royalties on the latest episode of the gm podcast.



By [Jason Nelson](#)

📅 Dec 22, 2022

🕒 4 min read

The NFT Market

- [\\$25B in annual sales](#) (both 2021 and 2022)
- [\\$1.5B paid in NFT royalties on Ethereum](#) (2022)
- Some projects make majority of revenues off of royalties
 - [BAYC](#)
 - [Doodles](#)
 - [Goblin Town](#)



What role do royalties serve?

“I don't think it (royalty) makes a difference” -
Haseeb Qureshi, managing partner at
Dragonfly, a crypto fund



Our paper shows his claim is true to a certain extent, but incomplete. Let's look at why it's true.

Baseline model

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Creator sets $p = \operatorname{argmax} p \cdot \Pr[V > p]$

Markov's inequality states $p \cdot \Pr[V > p] \leq E[V]$

Creator can only earn $E[V]$ when V is constant

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 - Buyer with stochastic valuation, V , arrives
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Creator sets $p = E[V](1-r)$
Creator earns $E[V]$ in expectation
Speculator earns nothing

Royalties are useless in this model

Haseeb was right:

- Speculator increases creator revenue
- Royalties get “priced in”
 - Creator has same profit with and without royalties

When do royalties help?

Risk-Aversion

Review: Baseline model (with Speculator)

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Mean-Variance Utility

$$u_s(p, r) = \mathbb{E}[v_s(p, r)] - \eta_s \cdot \text{Var}[v_s(p, r)]$$

$$u_c(p, r) = \mathbb{E}[v_c(p, r)] - \eta_c \cdot \text{Var}[v_c(p, r)]$$

Optimal royalty under risk aversion

$$r^* = \frac{\eta_s}{\eta_s + \eta_c}$$

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Optimal royalty is
positive whenever
speculator is risk
averse

Increase

Under risk aversion, royalties can increase creator utilities by:

$$\Delta = \sigma^2 \frac{\eta_s^2}{\eta_s + \eta_c}$$

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Extra Utility increases as:

- 1) future market uncertainty increases,
- 2) speculator becomes more risk averse, and
- 3) creator becomes less risk averse

Three situations where royalties help

- Risk-Aversion:
 - When the speculator is risk-averse, royalties increase creator revenue
- Information asymmetry:
 - When the speculator has better information about V than the creator, royalties allow the creator to capture the profits of this information advantage
- Multiple units:
 - When the creator has multiple units but must sell all units at the same price

Thank you!

Economics of NFTs: The Value of Creator Royalties, Falk, B., Gu, B., Tsoukalas, G., and Zhang, N. (2022).
Information Systems Research, Major Revision.

niuniu.zhang.phd@anderson.ucla.edu

