

Recent Development in Fintech: Non-Fungible Token

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Non-Fungible Token (NFT) has risen rapidly since 2020 and has become one of the most popular applications in the Fintech field. Many NTFs exist; for example, one of the NFT market statistics websites shows the top 100 rankings of NFT collection by sales volume: <https://cryptoslam.io/> (accessed on 9 November 2021). Among those, the top five all-time sales are Axie Infinity, CryptoPunks, Art Blocks, NBA Top Shot, and Bored Ape Yacht Club, and as of 8 November 2021, their all-time sales are over 200,000 ETH or approximately 940 million USD. Similar to the cryptocurrency market, each type of NFT in the market has its own unique features and purposes. However, in comparison to the popular market atmosphere, there is still very little academic research on NFT. *Fintech* journal welcomes original and innovative research in this new field, for example, studies identifying and analyzing aspects of the nature, market performance, and the potential of NFT. Through the qualitative description of its features, and the quantitative analysis of market data, the seminal papers have done exploratory work in this field. However, some references have not yet been published. Below, we briefly summarize the methods and conclusions raised by selected articles to inspire new researchers.

As an emerging field of research, an important feature is that almost all existing papers provide a brief introduction to NFT. The papers [1] “Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges” clearly explain the basic characteristics of NFT, which originally came from ERC-721, a protocol of Ethereum. Unlike traditional cryptocurrencies such as Bitcoin, tokens based on ERC-721 smart contracts have distinguishable signs and cannot be exchanged equivalently. NFT has been further developed to incorporate ERC-1155 protocol, which also integrates Fungible Tokens (FTs), and has now expanded to non-Ethereum blockchains such as Flow, Wax, Hyperledger, Fast Box, etc. “Mapping the NFT Revolution: Market Trends, Trade Networks, and Visual Features” explores the development path and performance of the NFT market using transaction data on Ethereum and WAX blockchains from 23 June 2017 to 27 April 2021 [2]. The results show that the first popular example of NFT is CryptoKitties, which caused the blockage of the Ethereum network in December 2017 and led to the development of the NFT market. The size of the NFT market remained stable until mid-2020, with an average daily trading volume of \$60,000. Since July 2020, the market has experienced rapid growth, with the total daily volume exceeding 10 million in March 2021, thus becoming 150 times larger than it was 8 months earlier. The areas where NFT is most used are: art, collectibles, games, metaverse, other, and utility.

Research on the efficiency and spillover effects of the NFT market is the most abundant and representative direction of existing papers. First, “Fertile LAND: Pricing Non-fungible Tokens” chooses Decentraland, one of the most popular NFT applications, to explore the efficiency of the NFT market [3]. Based on the transaction data of Decentraland from March 2019 through March 2021, all the tests of the automatic variance ratio (AVR), the automatic portmanteau (AP), and the Domínguez and Lobato (DL) consistent test prove that the market is inefficient, and there may be market manipulation or other



Citation: Bao, H.; Roubaud, D. Recent Development in Fintech: Non-Fungible Token. *FinTech* **2021**, *1*, 44–46. <https://doi.org/10.3390/fintech1010003>

Received: 16 November 2021

Accepted: 6 December 2021

Published: 13 December 2021

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fraudulent practices in Decentraland pricing. Further, the paper by Lennart Ante “Non-fungible Token (NFT) Markets on the Ethereum Blockchain: Temporal Development, Cointegration and Interrelations”, explores the interactions of the 14 largest NFT projects using data from the Ethereum blockchain between June 2017 and May 2021 [4]. Through the VECM—the cointegrated VAR model—the results show that there is a short-term causal link between the NFT submarkets; therefore, the success of new projects can increase the activity of old projects, while older projects have both positive and negative impacts on younger projects. Second, Michael Dowling’s, “Is Non-fungible Token Pricing Driven by Cryptocurrencies?” examines the spillover effect between Bitcoin, Ethereum, and the three most popular NFT projects, which are Decentraland, CryptoPunks, and Axie Infinity [5]. By constructing a matrix of generalized impulse responses and using the wavelet coherence technique, their analysis indicates that there is little spillover between individual NFT markets, unlike the cryptocurrency and stock, but low volatility transmissions between NFTs and cryptocurrencies, especially Decentraland and Ethereum. Finally, the paper by De-Rong Kong and Tse-Chun Lin, “Alternative Investments in the Fintech Era: The Risk and Return of Non-fungible Token (NFT)”, conducts a comparative analysis of NFT and other investment tools by constructing an NFT index with hedonic regression models and a database consisting of 13,712 transactions recorded from June 2017 to May 2021 [6]. The results indicate that the NFT index has positive co-movement with the cryptocurrency exchange rate (i.e., ETH/USD) and stock indices and a negative correlation of returns with common hedging vehicles (such as VIX index, gold, and bonds). During their sample period, the geometric (arithmetic) average of monthly returns on NFTs was 16.99%, with a standard deviation of 58.77%, and a comparable Sharpe ratio to the NASDAQ index. In addition, their analysis found that the pricing of NFT largely depends on the scarceness of individual tokens and the aesthetic preference of investors, which cannot be explained in traditional asset-pricing models, such as the CAPM, Fama–French three-factor, Carhart four-factor, or Fama–French five-factor models. In a similar vein, the paper by David Y. Aharon and Ender Demir “NFTs and Asset Class Spillovers: Lessons from the Period Around the COVID-19 Pandemic”, also analyzes the relationships between NFT and other financial assets during the period from January 2018 to June 2021 [7]. Using the time-varying parameter vector autoregressions (TVP-VAR) approach, the static analysis indicates that NFTs have only weak interactions with Ethereum, gold, bonds, equities, oil, and the USD index; however, the dynamic analysis shows that NFTs bear some similarity to gold and the USD index in terms of risk absorption during the COVID-19 crisis.

“Prospecting non-fungible tokens in the digital economy: Stakeholders and Ecosystem, Risk and Opportunity” constructs a business ecosystem framework of NFT, briefly consisting of the digital NFT creator, core/related intermediaries, and marketplaces; it also outlines the roles and interactions of stakeholders [8]. On top of this framework and existing application directions, potential impacts of NFT are also mentioned, such as disruptions to property, vehicles, financial markets, expansive augmented and virtual reality technology, and immersive digital worlds. Similarly, “Non-fungible Tokens: Blockchains, Scarcity, and Value” distinguishes NFT from cryptocurrency, regarding it as a more important development direction of blockchain technology to further explore the potential of decentralization and distributed ledgers [9].

Author Contributions: Both H.B. and D.R. conceived and designed the analysis; H.B. wrote the paper and D.R. supervised the findings of this work. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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