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# **Fractional Ownership, Democratization, and Bubble Formation – The Impact of Blockchain Enabled Asset Tokenization**

*Emergent Research Forum (ERF)*

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## **Abstract**

Motivated by the growing importance of research on blockchain applications, this paper conceptualizes the potential impact of blockchain enabled asset tokenization. Asset tokenization is the process of converting real-world assets to digital tokens and trading them fractionally based on a blockchain platform and its smart contract function. This research hypothesizes that tokenizing the asset increases its price by improving the democracy of the market and its liquidity, and eventually results in a price bubble, although it is not clear how long it will last. Furthermore, this impact is hypothesized to be greater on the previously lesser-known assets, because of the dominant investor sentiment and valuation subjectivity. Specifically, the art market is designated as a research context because blockchain applications has been expected to innovate the market by resolving its problems of centralization, inefficiency, and information asymmetry.

## **Keywords**

Blockchain, Blockchain Application, Asset Tokenization, Fractional Ownership, Digital Transaction

## **Introduction**

Blockchain has been referred to as a new technology that will change the entire business ecosystem and as a technological enabler of innovation. At first, academics and practitioners focused mainly on its role as a foundation for a cryptocurrency system because Satoshi Nakamoto, an anonymous entity, introduced the concept of Bitcoin and defined it as "an electronic cash system"(Nakamoto 2008). With Bitcoin, blockchain is used to store "encrypted facts," i.e. Bitcoin transaction data, transparently and in a decentralized manner (Zaninotto 2016). This is how Bitcoin transactions earned their fame as secure, tamper-evident, and tamper-resistant. Beyond the initial cryptocurrency-based discussions, recent research has started to shed light on the high potential of the technology as a form of database that can handle diverse information, not limited to monetary assets. The main concept of this application is to bring all kinds of assets and contracts into a blockchain system and manage them by Smart Contracts. Smart Contract is a "system which automatically moves digital assets according to arbitrary pre-specified rules" (Buterin 2014) or pre-programmed conditions, taking advantage of blockchain's programmable nature (Sanghavi et al. 2018). The types of assets that can be managed via a blockchain system using Smart Contracts include both digital or physical, tangible or intangible, and fungible or non-fungible assets (Weingärtner 2019). To be transmitted and traded through the distributed ledger, these assets, including their ownership, or "external promise" (Rosenfeld 2012), should be converted into digital tokens with a unique signature, by which a new asset class called "smart assets" (Sanghavi 2018), also known as "smart property", is created (Buterin 2014). A token can be defined as a "representation of the physical object in the digital world" (Weingärtner 2019). This process is called asset tokenization. What makes asset tokenization interesting is its divisible nature. One unit of bitcoin can be divided up to eight decimal points or one hundred million Satoshi. Similar to bitcoin, altcoins and digital tokens can also be divided into smaller fractions. This allows for real-world assets, which were impossible to trade easily and conveniently and caused transaction illiquidity, to be owned in a fractional manner. Fractional ownership is a new concept of ownership and a new way to

transact. By this blockchain application, any network participants can share ownership of unique objects (Sanghavi 2018). It is important to note that the ideas of “Smart Contracts” and “Asset Tokenization” are not new, but they recently took form with the development of blockchain technology.

## **Related Literature**

When it comes to blockchain and IS discipline, there is a research gap due to the lack of empirical, theory driven, and multidisciplinary research of the ramifications of blockchain systems that extend far beyond technological issues. There are calls for blockchain studies dealing with economic and societal domains (Risius and Spohrer 2017) and wider business implications (Chong et al. 2019). Furthermore, though there is an increasing number of blockchain-based projects and the term ‘token economy’ has gained popularity, there have not been enough studies on what blockchain tokens represent and their connection to underlying business models (Oliveira et al. 2018). Also, on asset tokenization, there are only a few studies that elucidate basic concepts of tokenized assets.

### ***Security Token and Asset Tokenization***

There are three main types of tokens. A ‘Payment and Exchange Token’ such as Bitcoin is usually called a ‘Coin’ and is used to store value. There is also a ‘Utility Token’ that offers the rights to use and access certain products or services. The last and most important category for this research is a ‘Security Token.’ A ‘Security Token’ is a digital and tokenized version of traditional security and its value depends on the value of the asset, i.e. the value of the ownership, that the token is representing. Thus, it is considered as an investment and investors expect profits to exist. In addition, security tokens can be designed both as fungible tokens that are interchangeable and non-fungible tokens (NFTs) that are unique. Security tokens as NFTs are particularly important because they can contain unique information improving the tokenization of individual assets (Regner et al. 2019). Asset tokenization platforms issue tokens by security token offerings to secure various types of assets, from financial instruments to intellectual property, and enable their transactions within the platform. Because tokenized assets are based on blockchain projects, the use of tokens to represent physical objects not only increases the transparency of their ownership but also allows the division of large values into smaller units by subdivisions. Opportunities for using fractional ownership of illiquid, real assets via a blockchain system include the tokenization of real estate, artwork, and physical commodities like gold bars. For instance, in October of 2018, Elevated Returns, a real estate asset management company, issued a security token named “Aspen Coin” and raised \$18 million for 18.9% stake in the St. Regis Aspen Resort. In 2015, the World Economic Forum projected that the tokenized market is likely to reach \$24 trillion by 2027 and 10% of the world’s GDP will be tokenized and on a blockchain. Deloitte (2018) even contended that “tokenization could make the financial industry more accessible, cheaper, faster and easier, thereby possibly unlocking trillions of euros in currently illiquid assets, and vastly increasing the volumes of trades.”

### ***Effect on Value by Reducing Minimum Trading Unit***

The empirical study of Amihud et al. (1999) includes a sample of 66 stocks traded on the Tokyo Stock Exchange whose issuing company reduced the minimum trading unit (MTU) between 1991 and 1996. The study found that making the stock more affordable and reducing the MTU increased a firm’s investor base, specifically the portion of individual investors. In fact, the average increase rate of individual shareholders of companies that reduced MTUs is 234%, compared to the control samples’ average of 26% increase. Aside from this finding, there are several empirical studies in financial research that examine the aftermath of MTU reduction utilizing the model of Merton. The economist, Robert C. Merton, contends that “investors are generally aware of only a subset of all available securities, ... and that investors can only invest in securities that they know about” (Merton 1987); an increase in the firm’s investor base increases its stock value. This assumption of the investor base is supported by empirical studies. Kadlec and McConnell (1994) and Foerster and Karolyi (1999) analyzed U.S. firms listed on the NYSE and non-U.S. firms listed on U.S. exchanges and presented empirical evidence that greater investor recognition of firms increased their share prices. The logic behind MTU reduction studies is that thanks to the lowered entry barrier, more investors recognize and hold stock; and, consequently, more problems related to information availability are resolved (Merton 1987). Kirchler et al. (2015) also mentioned that the “inflow” of new liquidity by new traders is “one of the most important ingredients of historic price bubbles”. Here, a bubble indicates status that “an

object is traded at high volumes at prices that are considerably at variance from intrinsic values” (King et al. 1993).

Increased investor bases can also affect firm value through their impact on stock liquidity (Amihud and Mendelson 1986); as illiquidity is the direct result of asymmetric information problems (Kyle 1985). Also, it has been found that the bid-ask spread, one of the measures of illiquidity, is in a negative relationship with the number of shareholders (Benston and Hagerman 1974). Amihud et al. (1999) analyzes the phenomenon that the reduction of MTUs attracts small, individual investors who lack information and are liquidity- motivated. An increased portion of noise traders increases the stock liquidity and, consequently, the stock value (Amihud and Mendelson 1986). Therefore, it is plausible to infer that a reduction in MTUs increases the investor base of the stock and leads to its increased value through investor recognition and the increase of stock liquidity. Isaka (2014) proved that the returns for MTU reduced firms were 1.51% higher than those for control firms the day after the announcement of the MTU reduction, 5.33% higher 10 trading days after, and 10.87% higher 670 trading days after.

### ***Investor Sentiment***

Investor sentiment can be simply defined as the propensity to speculate and investors decide their demand considering “the bundle of salient characteristics” of stocks and choosing the one that is compatible with them (Barberis and Shleifer 2003; Baker and Wurgler 2006). This means that investors with lower investor sentiment demand stocks that are perceived as relatively safe and stable, rather than stocks with high risk and high return. Similar to other behavioral factors in investment, investor sentiment has significant effects on stock liquidity, stock price (Liu 2015), and stock returns (Baker and Wurgler 2006). Higher investor sentiment is strongly associated with larger, aggressive noise trading and brings more irrational market makers to the market (Kyle 1985; Liu 2015). These investors are expected to be overconfident and significantly increase trading volumes (Odean 1998) while simultaneously lowering the price impact of the order flow and increasing liquidity (Liu 2015). In addition, the firms’ sensitivity toward investor sentiment fluctuation is reflected in stock price changes and this relationship is determined by the “subjectivity of the stock valuation (Baker and Wurgler 2006).” Stocks that lack an earnings history combined with the presence of apparently unlimited growth opportunities attract unsophisticated investors who defend a wide spectrum of stock valuations, as suits their sentiment. Furthermore, during a bubble period with a high propensity to speculate, these stocks allow investors to further argue for the high end of valuations.

### **The Art Market and Blockchain Based Asset Tokenization Platform**

According to ‘The Art Market Report 2019’ issued by Art Basel and UBS, the volume of global sales in the art market declined by 9% in the 10-year period between 2008 and 2018 (McAndrew 2019). Two challenges that hinder the market from becoming more vital and fertile with new incomers and increasing trading volumes are considered to be correlated: illiquidity and centralization. Velthuis and Colsor (2012) analyzed the art market with the liquidity framework. They noted that elements such as infrequent dense market trading moments, high transaction costs, limited trading volume, long holding periods of artwork, continuously changing trends and tastes of the market and the fact that no market makers guarantee continuous trading of any artwork make the market illiquid. Furthermore, there is an information asymmetry controlled by major auction houses (Mamarabachi et al. 2008). This intense information asymmetry is where asset tokenization based on a distributed digital ledger can be most helpful. Besides illiquidity, the centralization of the market also stems from oligopolistic suppliers. The top two auction houses, Christie’s and Sotheby’s, held 40% of sales from the auction sector and accounted for 46% of global market sales in 2018. Major auction houses operate as ‘taste makers,’ restricting the number of artists and works that can be presented to buyers via the auction route and further promotions (Simpson 1981). This makes the art market a “winner-takes-all-market,” where a large fraction of expenditures is concentrated on a small number of artists (Prendergast 2014).

The platform where consumers trade fractional ownership of artwork that is tokenized on blockchain is an emerging business model utilizing the characteristics and potential of blockchain in the art market. In July of 2018, Maecenas, a decentralized art investment platform, tokenized the multi-million dollar artwork of Andy Warhol, “14 Small Electric Chairs (1980)”. During the auction, \$1.7 M was raised for 31.5% shares of the artwork and more than 6 million ART tokens, the Ethereum based token issued by the platform, were

utilized. The ART tokens can be traded in the platform in exchange for other cryptocurrencies or fiat money. Besides Maecenas, there are several startups working on art tokenization and the vitalization of its market.

## Hypothesis Development

### *Effect on Price by Asset Tokenization*

Trading artwork, or, more precisely, its ownership, in shares by tokenizing is expected to have an impact similar to reduced MTU in the stock market. Reducing the volume of the “required monetary outlay” (Amihud et al. 1999) makes the assets more accessible with respect to both speculation motivation and non-financial motivations. From the investment perspective, asset tokenization increases the overall investor base of artwork on the platform. These new-entering investors are mainly individual investors highly involved in noise trading (Kyle 1985) which enhances the liquidity of tokenized artwork. This is also significantly related to the increase of stock value (Merton 1987). However, as Merton (1987) mentioned, stock value also responds to the change in stock price accuracy. If the negative effect of the decreased price accuracy resulted by increased trading volume and volatility mitigates the positive effect of the increased investor base, the stock price response can also be negative (Hauser and Lauterbach 2003). Pricing accuracy is a proxy of price informativeness. In this study, the negative effect of price accuracy reduction caused by increased volatility is hypothesized to be meaningless. Pricing in the art market has been determined in a highly selective and subjective manner by a few taste makers. Therefore, pricing noise caused by decreased price accuracy and increased volatility is not as severe of a problem as it is in the stock market. In summary, compared with the control group, untokenized artwork which previously had almost the same properties as the treatment group, value of the artwork on the asset tokenization platform can be expected to be higher.

**H1(Baseline):** *Ceteris paribus, going through several transactions, the price of the tokenized assets will be higher than that of non-tokenized ones.*

### *Moderating Effect of Prior Awareness*

This research also proposes that the effect on price of asset tokenization(H1) will be relatively greater on the works of mid-career artists compared to established ones. ‘Mid-career artists’ are those who are less organized and whose reputation has not been fully established. They are distinct from early stage artists; they’ve been evaluated as having some potential to grow but it is still uncertain whether they will be selected by privileged taste makers and eventually become blue-chip artists whose works are highly valued. Because of this, the valuation of artwork in this category is expected to be more sensitive to the dominant investor sentiment. It is highly possible that investors of these artworks would have higher investor sentiment making the proportion of noise traders and irrational market makers higher in that asset's investor base (Kyle 1985; Liu 2015). Additionally, the increased number of investors who are overconfident about their own decision making will scale up the trading volumes of ‘mid-level artwork’ that leads to larger liquidity and higher asset prices. In conclusion, the bubble created from asset tokenization is greater with previously lesser known artwork than their prestigious counterpart because of their dominant investor sentiment and valuation subjectivity.

**H2:** *The effect on price by asset tokenization(H1) is negatively moderated by prior awareness of assets.*

Additionally, the more the business model of an artwork tokenization platform becomes popular, the more the information of the art market becomes public, being stored in a distributed digital ledger and opened to all market participants. This inflow of public information or information discovery could directly increase the demand and value of the relatively lesser knowns. The high possibility of price bubble formation and the quasi-long tail effect can be seen as an opportunity for some groups, but the bubble is not permanent. There is a definite need to hold more debates on the impact of asset tokenization.

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