

Determinants of NFT Trading Behavior: Evidence from the Theory of Planned Behavior

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Abstract

I examine the determinants of Non-Fungible Token (NFT) investment decisions by adapting the Theory of Planned Behavior (TPB) to a blockchain setting. Unlike previous TPB applications that rely on survey or experimental data, we leverage on-chain transaction history to construct objective measures of investor behavior. Using a comprehensive dataset spanning a full bull-bear market cycle to mitigate selection bias, we find that behavioral intentions are driven by attitudes, subjective norms, and perceived behavioral control. While attitudes and perceived behavioral control positively predict investment activity, measures of subjective norms yield heterogeneous results. These findings suggest that NFT market participation is influenced by complex, multifaceted community sentiments rather than unidirectional social pressures.

Keywords: Non-fungible tokens, Digital assets, Theory of planned behavior, Behavioral intention

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1. Introduction

A Non-Fungible Token (NFT) represents ownership rights to a digital asset recorded on a blockchain, encompassing various forms including digital images, videos, musical works, athletes' digital trading cards, virtual real estate, and digital apparel (Dowling, 2022). The term "non-fungible" denotes uniqueness, while "token" refers to a cryptographic string encoded on a blockchain. While both fungible tokens (e.g., Bitcoin [BTC] and Ether [ETH]) and non-fungible tokens utilize blockchain technology to generate unique, immutable identification codes, they differ fundamentally in their characteristics. Fungible tokens possess equivalent value regardless of the specific token instance and can be fractionalized into smaller units, making them suitable as mediums of exchange in commercial transactions. In contrast, non-fungible tokens are inherently unique, with each NFT representing distinct value propositions and lacking divisibility. This intrinsic uniqueness enables NFTs to function as digital assets characterized by scarcity.

In terms of market demand, the most used blockchains in the market today include Ether Chain (ERC), Binance Smart Chain (BSC), ThunderCore (TT Chain), Solana, and Cardano. Buyers can trade and transfer peer-to-peer with other users directly on the chain, or through a non-homogeneous currency sub-market platforms, such as OpenSea. In general, these platforms support a variety of crypto wallets that can be easily traded. There are currently a wide variety of NFT products available on the secondary market. Take OpenSea as an example, there are 11 categories: Trending, Top, Art, Collectibles, Domain Names, Music, Photography, Sports, Trading Cards, Utility, Virtual Worlds, etc.

In July 2022, the NFT market is facing an all-time market calm due to the Fed's sharp rate rise, the LUNA crash and Three Arrows Capital bankruptcy, regulatory concerns and correlation with the stock market. The Google Trends searches for the keywords "NFT" and "Non-Fungible Token" increase dramatically in 2021 and decline after peaking in January 2022. Despite the bear market, according to NFTGO market statistics, the total market capitalization of the NFT market reached 24.73 billion as of July 2022, although the peaking at 36.8 billion in March of the same year, the market still shows a growth of nearly 24 times from 2021 to July 2022. It is clear that although the NFT market is still in its early stages of development, it is undoubtedly a very promising market for the future. Continuing with the cryptocurrency field, NFT is also gaining attention from academia.

The current NFT-related literature focuses on the risk-return relationship and market efficiency of the NFT market, the relationship between the NFT market and the cryptocurrency market, the stock market or other markets (Aharon and Demir 2022; Ante 2022a; Ante 2022b; Dowling 2022a; Dowling 2022b; Karim et al. 2022; Maouchi et al. 2021; Umar et al. 2022; Yousaf and Yarovaya 2022). In addition, the data mostly tested in late 2021 and early 2022, the period that NFT market reaches its peak of popularity. Some studies focus on the NFT pricing with a hedonic feature regression model

and exploring the extent how rarity affects the value of NFTs (Kong and Lin 2021; Schaar and Kampakis 2022).

Grounded on the Theory of Planned Behavior (the TPB, Ajzen 1985, 1991), human behavior is directed by three kinds of considerations: behavioral beliefs, normative beliefs, and control beliefs. In a given context, human behavior is influenced by the combination of attitudes toward the behavior, subjective norms, and perceived control over the behavior into a behavioral intention. This theory fully explains how motivation and information influence human behavior and suggests that individuals tend to make decisions that are both beneficial to them and consistent with the expectations of others. To apply the theory to financial market, this study suggests that investors' willingness to invest in digital assets is influenced by their own attitudes toward the digital assets, as well as by the public's focus on hot issues that may affect their behavior. The individual's ability to control resources is also an important factor in the decision to purchase a digital asset. Therefore, individuals will make their investment decisions based on the three TPB factors. In other words, this paper uses TPB to define the behavioral intention of investors in order to understand their NFT investment decisions.

With the coming of the digital era, digital assets have become an important asset that cannot be ignored by enterprises. Among them, non-homogenized digital assets have become the new stars of attention because of their unique characteristics of high scarcity and collectability. The purpose of this study is to identify the motivational factors that induce investors to purchase non-fungible tokens (NFTs) based on the behavioral theory of social psychology.

Unlike past research examines TPB in several different fields mainly through experimental design, this study empirically captures those three beliefs through an empirical study of NFT with a unique and non-tamperable identification code and the ability to trace the address of a trade to an individual investor. The sample is expected to be drawn from a professional data aggregation platform that focuses on the NFT domain, and the sample period will contain a complete cycle of bull and bear markets to eliminate any suspicion of sample selection bias.

The empirical analysis yields several key findings regarding NFT investment behavior. First, this study documents that investors' attitudes toward NFTs and their perceived behavioral control exhibit significant positive associations with investment intentions, suggesting that value perception (e.g., scarcity, artistic merit, social signaling) and self-efficacy in market understanding are crucial determinants of investment decisions. Second, I uncover a nuanced effect of subjective norms, where social influences operate through dual channels: positive community pressure (e.g., KOL recommendations, forum discussions) tends to enhance investment intentions, while negative external sentiment (e.g., bubble concerns, fraud risks) appears to diminish them. Third, the effects of these behavioral factors remain robust across various model specifications and control variables, validating the applicability of TPB in digital asset markets. These findings collectively suggest that NFT

investment decisions are driven by a complex interplay of psychological factors that extend beyond traditional financial considerations, highlighting the unique nature of this emerging asset class.

This paper contributes to the literature in several important ways. First, it extends the behavioral finance literature by applying the Theory of Planned Behavior to NFT investment decisions, providing novel insights into psychological factors driving digital asset investments. Second, this study reveals unique characteristics of subjective norms in NFT markets, where community influences operate through dual mechanisms, thereby refining our understanding of social influences in digital asset investments. Third, the findings provide practical implications for NFT project developers and platform operators in designing effective community engagement and market communication strategies. Fourth, the results inform policymakers on potential regulatory considerations, particularly regarding influencer marketing and investor protection in NFT markets.

2. Literature Review and Hypothesis Development

2.1 Behavior Theories

The Theory of Planned Behavior (TPB) is a behavioral decision model that is often used to explore and predict human behavior. It was introduced by Ajzen (1985), who argued that human behavior is the result of a series of deliberations. Ajzen (1991) further elaborated that human behavior in a given context is influenced by attitudes toward the behavior, subjective norms, and perceived control over the behavior combined with behavioral intentions. Armitage and Conner (2001) also demonstrate the validity of the structure of the theory of planned behavior.

In the past, the theory of planned behavior has been applied to a variety of fields of study, such as marketing, electronic transactions, management, public relations, health care, sustainability, and environmental protection. The objective of this study is to understand the investment behavior of investors in the NFT market through the theory of planned behavior.

The theory of planned behavior (TPB) is originally from the theory of reasoned action (TRA), proposed by Ajzen and Fishbein (1975) and the rationale of this theory are basically from the social psychological research. This theory fully explains how motivation and information influence human's behavior and suggests that individuals tend to make decision which can both benefit themselves and fit others' expectation. According to the theory, human behavior is directed by three kinds of considerations: behavioral beliefs, normative beliefs, and control beliefs². Those three beliefs decide three important factors, the attitude toward the behavior, the subjective norm, and the perceived behavioral control, to decide behavioral intention and further change human's behavior. The major difference between the theory of reasoned action (TRA) and the theory of planned behavior is the

² Behavioral beliefs are the beliefs about the likely outcomes of the behavior and the evaluations of these outcomes. Normative beliefs are the beliefs about the normative expectations of others and motivation to comply with these expectations. Control beliefs are beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors.

perceived behavioral control (Ajzen and Fishbein 1988; Ajzen 1991). The diagram of TPB are shown in Figure 1.

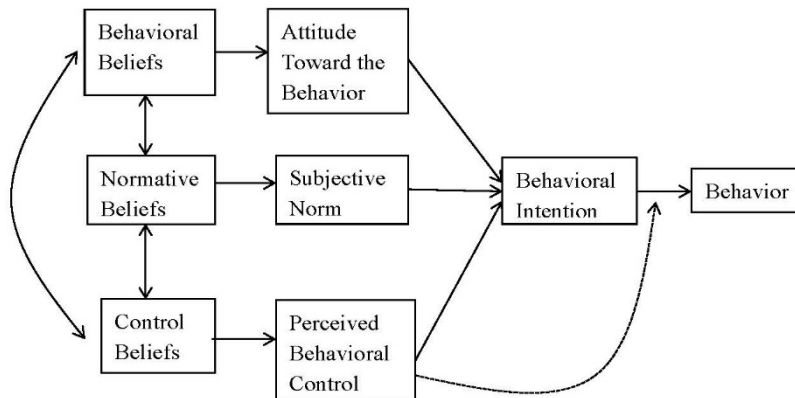


Figure 1. The TPB Diagram (<http://people.umass.edu/aizen/tpb.diag.html#null->

Recently, Adam and Shauki (2014) apply TPB to discuss and directly examine how behavioral attitude, subjective norm, and perceived behavioral control affect investors' behavior in SRI in Malaysia. They conduct a questionnaire survey of Malaysian investors. The evidence suggests that investors' decision making in SRI may be positively affected by above three factors.

2.2 Non-Fungible Tokens (NFTs)

Definition 1: NFT is the unique "ownership" of a specific asset. NFT has brought about a major change in the ownership of digital assets, allowing investors in the virtual investment market to use digital cryptocurrencies as a medium of exchange in the virtual world (for example, the Metaverse), and transfer the ownership of digital assets. Therefore, NFT is a transfer of ownership of specific assets. Unique Ownership.

Definition 2: NFT fundamentally changes the life patterns related to "all" and "transaction" of investors. The key lies in the cryptocurrency that has brought great changes to various industries. The "T" in NFT is a token.), and to understand NFT clearly, you first need to understand the two key words of NFT: non-fungibility and tokens. Irreplaceability means that the individual is unique and irreplaceable. (Examples: paintings, cars, houses, and land.) Tokens which are stored on the blockchain, it can mark a specific digital asset. The asset type is not limited. Virtual, physical and conceptual assets can be converted into blockchain tokens. (Examples: digital artwork, digital music, tickets.)

In short, NFTs are digital data that tokenize specific assets on the blockchain. Each NFT is unique and is an irreplaceable token. Once an NFT is generated, it cannot be deleted or changed. Therefore, it is applied to the Certificate of Authenticity of related assets and can be used as a Certificate of Ownership and can also endow infinitely replicable virtual assets (eg, digital art) with "scarcity".

2.3 Hypotheses Development

Nevertheless, Adam and Shauki (2014) apply theory of planned behavior (TPB) proposed by Ajzen (1985, 1991) to discuss and directly examine how behavioral attitude, subjective norm, and perceived behavioral control affect investors' behavior in SRI in Malaysia. The experimental evidence suggests that investors' decision making in SRI may be positively affected by above three factors. Based on TPB, investors' behavior might follow the attitudes and beliefs that they can doing good while making money. Therefore, this study proposes that investors may pay more attention on the hot industries where the public opinion focuses on and make their investment decisions established on the three features of TPB.

Unlike past research examines TPB in several different fields mainly through experimental design, this study empirically captures those three beliefs through sentiment analysis to measure investors' attitude, subjective norm and perceived behavioral control through NFT transactions. Specifically, attitude is a continuous assessment of an individual's liking or disliking of a particular object or idea. Apply to NFT markets, if the seller hold NFT items at a huge value, then the one should have strong belief in investing the items and shows an optimistic attitude in the outcome evaluation. In addition, subjective norm refers to the social pressure an individual feels to perform a particular behavior. The stronger the positive subjective norm, the more likely it is that the individual will have the behavioral intention to engage in the behavior. Perceived Behavioral Control refers to an individual's perception of the ability to control the resources and opportunities needed to engage in a particular behavior. The public's attention transmits the normative belief to each individual and the motivation to comply. Previous studies find that investors' attention affects asset prices (Da et al. 2011; Liu and Tsyvinski 2021). Similarly, the price of NFT assets may be positively affected when investors are more aware of NFT and Ether-related applications. Accordingly, the study proposes hypotheses as follows.

H1 : Investors' behavioral intention to purchase NFTs is positively influenced by "attitude". That is, the stronger the attitude, the stronger the behavioral intention.

H2 : Investors' behavioral intention to purchase NFTs is positively influenced by the "subjective norm". That is, the stronger the subjective norm, the stronger the behavioral intention.

H3 : Investors' behavioral intention to purchase NFTs is positively influenced by "perceptual behavioral control". That is, the stronger the perceptual behavioral control, the stronger the behavioral intention.

3. Methodology

3.1 Sample period and data source

A. Data source

The data source of the research sample is the API provided by NFTGO, using transaction-level cross-sectional data, excluding the data suspected of wash trading. Daily transaction data and NFT collections details are provided by NFTGO, while Cryptocurrency market data is crawled through Glassnode for prices and wallets. The daily data includes the transaction price, whether the seller is Whale, whether the seller the Super Blue Chip, Rarity Score, the number of buyers, sellers, transfers, and wallets, the exchange rate between ETH and USD, the price of S&P500 index and Dow Jones index. The NFT items tested in this study are Bored Ape Yacht Club (BAYC) and Meebits. BAYC is the first NFT project launched by the creative team Yuga Labs. The Profile for Picture (PFP) avatar series, consisting of 10,000 Boring Ape NFTs, was launched on April 30, 2021 and began to have secondary market trading records on May 1. The initial mint price of BAYC was 0.08 Ether, and the highest floor price was 153.7 Ether (around \$460,000 USD) on April 25, 2022. The list of NFT items and related sample information are presented in Table 1.

[INSERT TABLE 1 ABOUT HERE]

B. Sample Periods

This paper takes the time when BAYC starts to have transaction records as the starting point, i.e., May 1, 2021. Since September 2022, Ethernet will be upgraded to merge and move from Proof of Work (PoW) to Proof of Stake (PoS) to complete the merging of execution and consensus layers. The sample period of this paper is expected to end on August 31, 2022, which is just after a bull and bear cycle of NFT market and can avoid the unexpected impact of different proof mechanisms on NFT trading behavior.

3.2 Empirical Model

Based on TPB, the behavior intention can be simplified into three simple statements: “Do I want to do it or not” (attitude, AT), “Other people's perceptions” (subjective norm, SN), and “Would I be able to do it” (Perceived Behavioral Control, PBC). Accordingly, the study establishes following model:

$$\ln BI_i = \alpha + \beta_1 AT_i + \beta_2 SN_i + \beta_3 PBC_i + \sum_{n=1}^N \gamma_n Controls + \varepsilon_i$$

where $\ln BI_i$ represents the natural logarithm transaction price of an NFT item i sold on date t . α is the regression intercept, and the coefficients β_i denotes three intention factors of the NFT item i on date t . The definition of all variables shows in Table 2.

[INSERT TABLE 2 ABOUT HERE]

3.3 Variable definition

Dependent Variable: Behavioral Intention (BI)

Individuals' propensity to engage in a particular behavior and the degree to which they want to do so. It is also the psychological intensity of the individual's action or inaction in the decision process of behavioral choice. The more positive an individual's attitude toward a particular behavior, the more subjective norms support engaging in that behavior, and the stronger the perception of behavioral control over that behavior, the higher the individual's intention to engage in that behavior. To measure the level of BI, people can be transformed into whether an individual is willing to try hard or how much effort he or she is willing to put in. In other words, this variable can explain and predict an individual's actual behavioral performance. Accordingly, this study would use the price of each NFT transaction as the proxy of BI. Empirically, the natural logarithm of BAYC prices in USD as the dependent variable.

1) Attitude (AT)

Attitude is a continuous assessment of an individual's liking or disliking of a particular object or idea. In other words, attitude is a positive or negative evaluation of a particular behavior. The more positive an individual's attitude toward behavior is, the higher his or her behavioral intention will be; the more negative it is, the lower his or her behavioral intention will be. For example, to decide whether to buy red wine or not. The positive side is a symbol of high life style; the negative side is an alcoholic or a money waster.

Apply to NFT markets, if the seller hold NFT items at a huge value, then the one should have strong belief in investing the items and shows an optimistic attitude in the outcome evaluation. A whale indicator is defined as an address with a holding value of more than \$1 million. As of August 2022, according to the platform's statistics, the address with the highest holding value held more than the equivalent of \$500 million in NFTs, while the address with the lowest holding value held more than the equivalent of \$20 million in NFTs. Blue-chip projects are those that are relatively mature and stable in the market, widely recognized and worth holding for a long period of time, and there are no specific and uniform criteria for screening blue-chip projects in the market.

NFTGO is currently one of the few platforms that has a selection criteria which is as follows: (1) projects with the highest market capitalization among all collections listed on NFTGo; (2) leading projects in their category. The platform adjusts its blue-chip list on a quarterly basis. The platform defines a Blue Chip holder as an address that holds at least one Blue Chip NFT; a Super Blue Chip holder is defined as an address that holds a Blue Chip NFT multiplied by the floor price of that Blue Chip item to add up to more than 200 Ether. As of August 31, 2021, the following blue chip projects have been screened under NFTGO: CryptoPunks, Bored Ape Yacht Club (BAYC), Meebits, Mutant Ape Yacht Club (MAYC), CLONE X - X TAKASHI MURAKAMI, Moonbirds, Azuki, Doodles, VeeFriends Bored Ape Kennel Club (BAKC), Cool Cats NFT, World of Women, PROOF Collective, Space Doodles, CyberKongz, a total of 15.

According to the categories of the platform, the results of the above-mentioned blue-chip project

screening, except for Moonbirds, Azuki, and PROOF Collective, which are practical items (Utility), all others are collectibles (PFP, Collectibles), and the three categories of art, metaverse, and games are not selected as blue-chip projects.

2) Subjective Norm (SN)

SN refers to the social pressure an individual feels to perform a particular behavior, i.e., the pressure an individual perceives from significant others or groups (e.g., parents, spouse, friends, co-workers, etc.) as to whether the individual should perform the particular behavior. The stronger the positive subjective norm, the more likely it is that the individual will have the behavioral intention to engage in the behavior. For instance, parental, spousal, and even social perceptions about buying red wines.

Previous studies find that investors' attention affects asset prices (Da et al. 2011; Liu and Tsyvinski 2021). Similarly, the price of NFT assets may be positively affected when investors are more aware of NFT and Ether-related applications. Kong and Lin (2021) observed that the increased market interest in Ether seems to lead to higher prices of NFT collectibles. Those studies use Google Trend search volume to capture investors' interest in specific financial assets. The public's attention transmit the normative belief to each individual and the motivation to comply. In this study, I establishes the search volume summation SVI_Sum as the sum of the search terms "NFT" and "Ethereum" and the search volume of each sample item, the "BAYC", or the "Meebits" to proxy SN.

3) Perceived Behavioral Control (PBC)

PBC refers to an individual's perception of the ability to control the resources and opportunities needed to engage in a particular behavior. Therefore, even if an individual wants to engage in a particular behavior, he or she will eventually be unable to do so because of a lack of ability to control resources. In addition, the limitations of perceived behavioral control can be divided into self-efficacy, which refers to the perception of one's ability to perform the behavior, and external resources, which refers to the availability of and barriers to the resources available to the individual, both of which may influence the individual's decision to engage in a behavior. For example, someone earned \$35,000 per month would less likely to buy a bottle of red wine for \$50,000.

Wang et al. (2021) point out that the trading model of NFT market is that buyers and sellers bid and resell through direct peer-to-peer transactions or through the NFT trading platform. Transaction payments are run by sending transactions and transferring NFTs via ERC-777-compliant encrypted wallets and smart contracts. Crypto wallets are tools needed to provide interaction with the blockchain and are used to receive virtual currency. This study proposes that the change of unique wallets in NFT markets everyday may reflect the resources under the control of individual (i.e., the control beliefs) and the perceived facilitation. By the same token, the gas fee³ per transaction could be an alternative

³ Investors who trade crypto assets on the blockchain pay a fee, which many people interpret as a processing fee. The more complex the transaction is (or the more people are currently trading on the chain), the more computing resources

to present PBC. On Ether, each transaction of NFT buyers or sellers are required to pay an additional transaction cost (Gas Fee), whose value is dependent on the market supply and demand, that is, high transaction activity usually leads to higher transaction costs. The data is obtained from NFTGO website.

4) Control variables

Kong and Lin (2021) address that the pricing of NFT depends heavily on the scarcity of the tokens and the aesthetic preference of investors. Schaar and Kampakis (2022) demonstrate that rarity plays a significant role in the NFT pricing of collectible types. Therefore, this study uses the Rarity Score calculated by NFTGO as a proxy for rarity. The calculation uses a statistical method called the Jaccard Distance to assess the true rarity of NFT. The Jaccard distance considers the similarity between NFTs based on their feature attributes, and assigns a rarity score from 0 to 100.

Collection Metrics provided by NFTGO are also included in the model to control for changes in transaction prices over the sample period, including Transfers, Sales, and dummy variables calculated from the number of Buyers and Sellers. All of the above information is obtained from daily market statistics obtained by NFTGO, and the natural logarithm is taken. Kong and Lin (2021) shows that the NFT market and the stock market are significantly positively correlated, so representative stock indices, including the Dow Jones Industrial Average and the S&P 500, are included in the model, and data are obtained from Yahoo Finance.

Since NFT is mainly traded on an ethereum-backed trading platform and priced in ethereum, and most papers suggest that NFT is linked to the cryptocurrency market, this study includes the daily price change of ethereum (ETHUSD) and the daily change of spot trading volume (ETHVol) as control variables for the network attribution category, and the above information is obtained from Yahoo Finance.

4. Results

Table 3 reports the results of descriptive statistics. When examining transaction prices denominated in USD (lnBI_USD), while BAYC and Meebits show similar average transaction values, BAYC exhibits notably higher price volatility as evidenced by its larger standard deviation. A similar pattern is observed in ETH-denominated prices (lnBI_ETH). The mean value of AT_Whale for BAYC is 0.13, compared to 0.07 for Meebits, indicating that transactions involving whale sellers constitute 13% and 7% of all transactions in the BAYC and Meebits samples, respectively.

[INSERT TABLE 3 ABOUT HERE]

The correlation between all variables are shown in Table 4. This study alternates between the

must be consumed, which means more Gas Fee is spent; conversely, the simpler the transaction is (or the fewer people are currently trading on the chain), the lower the Gas Fee is.

Dow Jones Industrial Average ($\Delta\text{DowJonesIndex}$) and S&P 500 Index ($\Delta\text{SP500Index}$) as market variables to examine potential differences in results. The correlation coefficient of all other explanation variables are generally low and the problem of collinearity could be exempted.

[INSERT TABLE 4 ABOUT HERE]

(1) Analysis of BAYC Regression Results

The regression coefficients for *AT_Whale* (0.147, $t = 11.041$), *AT_SBCH* (0.141, $t = 11.012$), *SN_SVI_Sum* (0.100, $t = 3.418$), *SN_BuyerSellerDV* (-0.233, $t = -21.153$), *PBC_lnWallets* (0.051, $t = 2.711$), and *PBC_GasFeeUSD* (0.142, $t = 17.590$) are all statistically significant at conventional levels. These results strongly support Hypotheses 1, 2, and 3. Notably, the economic significance is particularly strong for *AT_Whale* and *AT_SBCH*, suggesting that trader characteristics substantially influence NFT valuations.

[INSERT TABLE 5 ABOUT HERE]

(2) Analysis of Meebits Regression Results

To make empirical results robust, the study use alternative NFT items, the Meebits to test the relation between AT, SN, PBC, and BI. Different from BAYC, which is classified as PFP, Meebits is classified as Collectibles by NFTGO.

The regression coefficients for *AT_Whale* (0.095, $t = 3.281$), *AT_SBCH* (0.070, $t = 2.538$), *SN_SVI_Sum* (-0.090, $t = -2.882$), *SN_BuyerSellerDV* (0.095, $t = 3.026$), *PBC_lnWallets* (0.094, $t = 2.204$), and *PBC_GasFeeETH* (-0.010, $t = -0.827$) demonstrate varying levels of statistical significance. Specifically, all variables except *PBC_GasFeeETH* show significant coefficients, providing partial support for Hypotheses 1, 2, and 3. The economic impact appears more modest compared to BAYC, with smaller coefficient magnitudes for trader identity variables (*AT_Whale* and *AT_SBCH*), suggesting that whale trading may have less influence on Meebits valuations.

[INSERT TABLE 6 ABOUT HERE]

5. Robustness Check

To ensure the robustness of the main findings, this study conducts additional analyses using ETH-denominated prices (*lnBI_ETH*) as an alternative dependent variable. The results largely corroborate the primary findings while revealing some nuanced differences in the pricing dynamics.

For the BAYC sample in Table 7, the key variables maintain their statistical and economic significance. Specifically, *AT_Whale* ($\beta = 0.154$, $t = 11.808$) and *AT_SBCH* ($\beta = 0.148$, $t = 11.765$) remain significantly positive, consistent with the USD-denominated results. The three TPB

components also retain their significance: SN_SVI_Sum ($\beta = 0.064$, $t = 2.205$), SN_BuyerSellerDV ($\beta = -0.257$, $t = -23.712$), and PBC_InWallets ($\beta = 0.080$, $t = 4.328$) exhibit similar patterns of influence. However, PBC_GasFeeETH demonstrates different significance patterns compared to its USD counterpart, suggesting potential currency denomination effects in transaction cost considerations.

[INSERT TABLE 7 ABOUT HERE]

In the Meebits sample in Table 8, the robustness tests similarly support the main conclusions while revealing some variations. AT_Whale ($\beta = 0.119$, $t = 4.155$) and AT_SBCH ($\beta = 0.069$, $t = 2.523$) maintain their significant positive effects, albeit with slightly different magnitudes. The TPB variables generally retain their significance, though PBC_GasFeeETH becomes statistically insignificant in this specification. Notably, the explanatory power of the models differs between denominations, with the ETH-denominated model showing a lower adjusted R-squared (0.132 versus 0.347 in USD).

The alternation between market indices ($\Delta\text{DowJonesIndex}$ and $\Delta\text{SP500Index}$) yields consistent results across both denominations, suggesting that the findings are robust to different specifications of market conditions. These results collectively reinforce the primary findings while highlighting the role of currency denomination in NFT pricing dynamics.

[INSERT TABLE 8 ABOUT HERE]

6. Conclusion

This study investigates the motivational factors influencing investors' purchase of Non-fungible tokens (NFTs) through the lens of behavioral theory in social psychology. Through empirical analysis, this research validates the applicability of the Theory of Planned Behavior (TPB) in NFT investment decisions and identifies three primary factors affecting investors' behavioral intentions: Attitude, Subjective Norms, and Perceived Behavioral Control.

The findings demonstrate that investors' attitudes toward NFTs and their perceived behavioral control both exhibit significant positive effects on investment behavioral intentions. This indicates that when investors perceive value in NFTs (e.g., scarcity, artistic collectible value, social identity signaling) and believe they possess adequate market knowledge or investment capabilities, they are more inclined to invest in NFTs. Moreover, these results reflect the distinctive nature of the NFT market, where individual beliefs and self-efficacy play crucial roles in investment decision-making.

However, contrary to traditional TPB model predictions, this study reveals divergent effects of subjective norms on NFT investment behavioral intentions. On one hand, positive social pressure from specific NFT communities or market participants (e.g., KOL recommendations, investment

forum discussions) may enhance purchase intentions. On the other hand, negative external sentiment (such as concerns about NFT bubbles and fraud risks) may diminish investment intentions. This suggests that NFT investors' decisions may be influenced by diverse community effects rather than unidirectional social norms.

Synthesizing these findings, this study provides novel insights into NFT investment behavior and validates the applicability of social psychological theory in digital asset markets. These results not only enhance our understanding of investment behavioral mechanisms in NFT markets but also establish a crucial foundation for future research in digital asset investment psychology.

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Table 1 List of NFT Items

NFT Items	Categories	Start Date	Observations
BAYC	PFP	2021-5-1	21,545
Meebits	Collectibles	2021-5-3	6,537

Notes: The sample period for this study is set at the time when each NFT item starts to have transaction records and ends on August 31, 2022.

Table 2 Variable Definition

Dependent Variable	Variable Definition
lnBI_USD	The natural logarithm of NFT prices (in USD) on date t.
lnBI_ETH	The natural logarithm of NFT prices (in ETH) on date t.
Independent Variable	
AT_Whale	A dummy variable that equals one if the seller of the transaction is a Whale; other sets to 0.
AT_SBCH	A dummy variable that equals one if the seller of the transaction is a Super Blue Chip; other sets to 0.
SN_SVI_Sum	Google search volume index (SVI) on date t. Index values range between 1 and 100. The natural logarithms of the total number of searches for the terms "NFT", "Ethereum", and "Bored Ape Yacht Club" on the day of the transaction. The search terms "Bored Ape Yacht Club" may change to other alternative name of NFT for the robustness check.
SN_BuyerSellerDV	A dummy variable that equals one if the number of buyers on date t is greater than the number of sellers; otherwise, sets to 0.
PBC_InWallets	The change of active wallets in NFT markets on date t.
PBC_GasFeeUSD	The change of gas fee (in USD) in NFT markets on date t.
PBC_GasFeeETH	The change of gas fee (in ETH) in NFT markets on date t.
Control Variable	
RarityScore	The natural logarithm of the rarity score for the transacted NFT
Transfers	The natural logarithm of the daily count of receiving or sending transactions for the specific NFT
Sales	The natural logarithm of the daily count of purchase or sale transactions for the specific NFT
Δ ETHUSD	The first difference of the natural logarithm of the daily Ethereum price
Δ ETHVol	The first difference of the natural logarithm of the daily total Ethereum spot trading volume
Δ SP500Index	The first difference of the natural logarithm of the daily S&P 500 index
Δ DowJonesIndex	The first difference of the natural logarithm of the daily Dow Jones Industrial Average
LUNA_D	A binary indicator is employed, where transactions are coded as 1 for the pre-LUNA collapse period (prior to May 9, 2022) and 0 for the post-event period.

Table 3 Descriptive Statistics

	Panel A1: BAYC (N=21,545)				Panel A2: Meebits (N=6,534)			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Dependent Variables								
lnBI_USD	9.541	2.178	0.0003	14.890	9.529	0.728	0.885	17.704
lnBI_ETH	1.625	2.162	-6.908	6.990	1.671	0.622	-6.216	9.592
Independent Variables								
AT_Whale	0.130	0.332	0.000	1.000	0.071	0.256	0.000	1.000
AT_SBCH	0.140	0.344	0.000	1.000	0.076	0.264	0.000	1.000
SN_SVI_Sum	0.028	0.163	-0.469	0.478	0.012	0.247	-0.866	0.741
SN_BuyerSellerDV	0.670	0.471	0.000	1.000	0.152	0.359	0.000	1.000
PBC_InWallets	0.041	0.256	-0.777	0.658	0.006	0.185	-0.597	0.642
PBC_GasFeeUSD	3.291	0.899	0.860	10.440	3.355	1.223	-0.514	8.836
PBC_GasFeeETH	-4.628	0.767	-6.730	2.140	-4.503	0.995	-7.824	0.700
Control Variables								
RarityScore	4.039	0.378	-3.220	4.610	3.263	0.455	1.085	4.477
Transfers	-0.218	1.060	-3.737	2.611	0.245	1.004	-4.245	3.775
Sales	0.061	0.562	-1.792	2.269	0.299	0.801	-1.735	2.313
Δ ETHUSD	0.005	0.061	-0.182	0.226	-0.003	0.043	-0.182	0.165
Δ ETHVol	0.021	0.243	-0.686	0.923	-0.022	0.265	-0.780	0.655
Δ SP500Index	0.000	0.009	-0.041	0.030	-0.001	0.014	-0.040	0.030
Δ DowJonesIndex	0.000	0.008	-0.036	0.026	0.000	0.011	-0.032	0.026
LUNA_D	0.041	0.197	0.000	1.000	0.289	0.453	0.000	1.000

Note: All variables are defined in Table 2.

Table 4 Correlation

Variables	lnBI_USD	AT_Whale	AT_SBCH	SN_SVI_Sum	SN_BuyerSellerDV	PBC_InWallets	PBC_GasFeeUSD	RarityScore	Transfers	Sales	ΔETHUSD	ΔETHVol	ΔSP500Index	ΔDowJonesIndex	LUNA_D
lnBI_USD	1.000														
AT_Whale	-0.038***	1.000													
AT_SBCH	-0.021***	0.746***	1.000												
SN_SVI_Sum	0.085***	-0.044***	-0.048***	1.000											
SN_BuyerSellerDV	-0.492***	0.037***	0.035***	-0.067***	1.000										
PBC_InWallets	0.008	0.030***	0.028***	0.113***	-0.006	1.000									
PBC_GasFeeUSD	0.410***	-0.071***	-0.065***	0.090***	-0.086***	-0.055***	1.000								
RarityScore	0.038***	0.023***	0.014**	0.016**	-0.012*	-0.001	-0.005	1.000							
Transfers	0.294***	0.029***	0.039***	0.033***	0.033***	0.159***	0.071***	-0.002	1.000						
Sales	0.177***	0.034***	0.042***	0.048***	0.048***	0.212***	-0.042***	-0.009	0.255***	1.000					
ΔETHUSD	-0.116***	0.004	0.007	0.034***	0.112***	0.193***	0.050***	0.002	-0.052***	-0.049***	1.000				
ΔETHVol	-0.053***	-0.016**	-0.022***	0.296***	0.063***	0.178***	0.064***	0.003	-0.044***	-0.202***	0.110***	1.000			
ΔSP500Index	-0.072***	-0.010	-0.008	-0.009	0.123***	0.014**	0.066***	0.001	-0.020***	-0.067***	0.177***	-0.013*	1.000		
ΔDowJonesIndex	-0.114***	-0.013*	-0.014**	0.047***	0.160***	0.044***	0.123***	-0.003	-0.041***	-0.115***	0.152***	0.052***	0.930***	1.000	
LUNA_D	0.225***	-0.009	0.006	0.000	0.039***	-0.017**	-0.067***	0.000	0.060***	0.056***	-0.128***	0.022***	-0.084***	-0.079***	1.000

Note: All variables are defined in Table 2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5 Results of BAYC

Dependent Variable: lnBI_USD	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	10.846 ***	131.130	10.803 ***	130.555	10.830 ***	130.906	10.788 ***	130.330
AT_Whale	0.147 ***	11.041	0.146 ***	11.043				
AT_SBCH					0.141 ***	11.012	0.141 ***	11.033
SN_SVI_Sum	0.100 ***	3.418	0.094 ***	3.209	0.101 ***	3.452	0.095 ***	3.242
SN_BuyerSellerDV	-0.233 ***	-21.153	-0.230 ***	-20.837	-0.234 ***	-21.225	-0.230 ***	-20.907
PBC_InWallets	0.051 ***	2.711	0.047 **	2.502	0.052 ***	2.779	0.048 ***	2.567
PBC_GasFeeUSD	0.142 ***	17.590	0.142 ***	17.557	0.142 ***	17.604	0.142 ***	17.569
RarityScore	0.224 ***	19.419	0.224 ***	19.448	0.225 ***	19.527	0.225 ***	19.556
Transfers	-0.039 ***	-8.397	-0.038 ***	-8.390	-0.039 ***	-8.432	-0.039 ***	-8.426
Sales	-0.018 **	-2.021	-0.019 ***	-2.132	-0.018 **	-2.092	-0.019 **	-2.203
ΔETHUSD	0.883 ***	11.441	0.941 ***	12.086	0.875 ***	11.332	0.933 ***	11.984
ΔETHVol	0.139 ***	6.968	0.135 ***	6.790	0.140 ***	6.995	0.136 ***	6.815
ΔSP500Index			-3.090 ***	-6.182			-3.117 ***	-6.235
ΔDowJonesIndex	-1.611 ***	-2.878			-1.632 ***	-2.916		
LUNA_D	-0.279 ***	-4.912	-0.245 ***	-4.303	-0.274 ***	-4.830	-0.240 ***	-4.218
Monthly fixed effect	Yes		Yes		Yes		Yes	
Adj. R-Square	0.914		0.914		0.914		0.914	
Observation	21,545		21,545		21,545		21,545	

Note: All variables are defined in Table 2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6 Results of Meebits

Dependent Variable: lnBI_USD	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	8.972 ***	107.461	8.981 ***	107.324	8.948 ***	107.513	8.957 ***	107.372
AT_Whale	0.095 ***	3.281	0.095 ***	3.283				
AT_SBCH					0.063 **	2.272	0.064 **	2.293
SN_SVI_Sum	-0.093 ***	-2.946	-0.094 ***	-2.965	-0.095 ***	-2.993	-0.095 ***	-3.011
SN_BuyerSellerDV	0.165 ***	5.135	0.168 ***	5.261	0.166 ***	5.182	0.170 ***	5.316
PBC_InWallets	0.135 ***	3.150	0.141 ***	3.270	0.132 ***	3.074	0.138 ***	3.205
PBC_GasFeeETH	0.019	1.587	0.019	1.578	0.021 *	1.778	0.021 *	1.770
RarityScore	0.142 ***	8.788	0.142 ***	8.804	0.142 ***	8.828	0.143 ***	8.845
Transfers	0.010	1.176	0.009	1.076	0.011	1.276	0.010	1.169
Sales	-0.003	-0.233	-0.001	-0.092	-0.004	-0.341	-0.002	-0.193
ΔETHUSD	0.951 ***	4.498	0.858 ***	3.897	0.953 ***	4.505	0.852 ***	3.867
ΔETHVol	0.093 ***	3.084	0.092 ***	3.044	0.090 ***	2.986	0.089 ***	2.941
ΔSP500Index			0.173	0.250			0.234	0.339
ΔDowJonesIndex	0.173	0.250			-0.519	-0.632		
LUNA_D	-0.636 ***	-10.166	-0.646 ***	-10.311	-0.615 ***	-9.845	-0.626 ***	-10.003
Monthly fixed effect	Yes		Yes		Yes		Yes	
Adj. R-Square	0.347		0.347		0.347		0.347	
Observation	6,534		6,534		6,534		6,534	

Note: All variables are defined in Table 2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Robustness Test of BAYC

Dependent Variable: lnBI_ETH	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	4.184 ***	49.118	4.140 ***	48.428	4.169 ***	48.924	4.125 ***	48.231
AT_Whale	0.154 ***	11.808	0.154 ***	11.810				
AT_SBCH					0.148 ***	11.765	0.149 ***	11.785
SN_SVI_Sum	0.064 **	2.205	0.057 **	1.983	0.065 **	2.242	0.058 **	2.018
SN_BuyerSellerDV	-0.257 ***	-23.712	-0.254 ***	-23.423	-0.258 ***	-23.788	-0.255 ***	-23.497
PBC_InWallets	0.080 ***	4.328	0.076 **	4.107	0.081 ***	4.401	0.077 ***	4.177
PBC_GasFeeETH	0.085 ***	9.913	0.084 ***	9.846	0.085 ***	9.929	0.084 ***	9.861
RarityScore	0.227 ***	19.930	0.227 ***	19.959	0.228 ***	20.045	0.228 ***	20.074
Transfers	-0.032 ***	-6.984	-0.032 ***	-6.986	-0.032 **	-7.021	-0.032 **	-7.025
Sales	-0.007	-0.758	-0.007	-0.827	-0.007	-0.834	-0.008	-0.903
Δ ETHUSD	0.728 ***	9.552	0.783 ***	10.186	0.719 ***	9.437	0.774 ***	10.077
Δ ETHVol	0.145 ***	7.372	0.142 ***	7.197	0.146 ***	7.401	0.142 ***	7.224
Δ SP500Index			-3.048 ***	-6.188			-3.076 ***	-6.244
Δ DowJonesIndex	-1.770 ***	-3.210			-1.792 ***	-3.250		
LUNA_D	-0.020	-0.362	0.011	0.195	-0.015	-0.276	0.016	0.285
Monthly fixed effect	Yes		Yes		Yes		Yes	
Adj. R-Square	0.915		0.915		0.915		0.915	
Observation	21,545		21,545		21,545		21,545	

Note: All variables are defined in Table 2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8 Robustness Test of Meebits

Dependent Variable: lnBI_ETH	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	1.202 ***	10.327	1.210 ***	10.382	1.195 ***	10.261	1.204 ***	10.324
AT_Whale	0.119 ***	4.155	0.119 ***	4.163				
AT_SBCH					0.069 **	2.523	0.070 **	2.538
SN_SVI_Sum	-0.087 ***	-2.789	-0.089 ***	-2.844	-0.088 ***	-2.830	-0.090 ***	-2.882
SN_BuyerSellerDV	0.089 ***	2.813	0.093 ***	2.959	0.091 ***	2.871	0.095 ***	3.026
PBC_InWallets	0.091 **	2.154	0.097 **	2.283	0.087 **	2.063	0.094 **	2.204
PBC_GasFeeETH	-0.013	-1.091	-0.013	-1.095	-0.010	-0.823	-0.010	-0.827
RarityScore	0.138 ***	8.705	0.138 ***	8.722	0.139 ***	8.773	0.140 ***	8.792
Transfers	0.017 **	2.098	0.016 **	1.982	0.018 **	2.222	0.017 **	2.098
Sales	-0.005	-0.437	-0.003	-0.269	-0.006	-0.567	-0.004	-0.389
Δ ETHUSD	0.796 ***	3.825	0.704 ***	3.247	0.798 ***	3.830	0.696 ***	3.208
Δ ETHVol	0.059 **	1.994	0.059 **	1.974	0.055 *	1.868	0.055 *	1.842
Δ SP500Index			-0.195	-0.286			-0.125	-0.183
Δ DowJonesIndex	-1.044	-1.291			-1.026	-1.269		
LUNA_D	-0.306 ***	-4.933	-0.317 ***	-5.102	-0.282 ***	-4.548	-0.294 ***	-4.732
Monthly fixed effect	Yes		Yes		Yes		Yes	
Adj. R-Square	0.132		0.132		0.130		0.130	
Observation	6,534		6,534		6,534		6,534	

Note: All variables are defined in Table 2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.