



# Investment Decision of Cryptocurrency in Millennials and Gen Z

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**Abstract**— Cryptocurrencies have experienced exponential growth in the 10 years after their discovery in 2009. Despite the popularity of cryptocurrencies as an investment, there is still much to be understood about the factors that influence cryptocurrency investment. This study seeks to find the influence of behavioral finance factors, specifically herding, heuristics, and prospects on investment decision for millennials and gen Z in Indonesia. The research method used is multiple regression with several stages including reliability and validity tests, descriptive analysis, and hypothesis testing analysis. With a sample of 140 respondents, it is concluded that herding and heuristic factors have a significant influence on investment decisions in the cryptocurrency market, while the prospect factor does not have a significant influence on investment decisions in the cryptocurrency market. The results of this study indicate that non-fundamental factors are still high as reflected in herding and heuristics on millennials and gen Z investors in Indonesia. Another implication is that many investment decisions are “not yet” sound in a very dynamic situation in the cryptocurrency market.

**Keywords:** *cryptocurrency, millennials, gen Z, herding, heuristics, prospects, and behavioral finance.*

## I. INTRODUCTION

Financial investment has undergone tremendous developments in the last few decades, ranging from simple investments in common stocks, bonds, and mutual funds to more advanced financial derivatives, including forwards, options, and futures [1]. The turbulence in the financial markets

has caused most investors to look for new investment opportunities. Among the many new investment instruments, Cryptocurrency has caught the attention of many people mainly because of its success with Bitcoin [2]. According to Statista's market analysis (February 2019), the bitcoin price has skyrocketed from less than \$10 in August 2011 to \$7,017.35 in August 2018 and continues to show a consistent upward trend. In Germany and Japan, Bitcoin has become a legal form of payment and alternative investment. In addition, Bitcoin has been launched as an innovative financial asset and is being regulated as a legal commodity in the US and many other countries [3].

The Cryptocurrency market is a new investment platform for investors to invest their capital in addition to financial equity markets [4]. Cryptocurrency means digital cash or virtual currency that is designed to be faster, cheaper, and more reliable than the currency of an ordinary central authority. Although there are researchers who do not agree that cryptocurrency has value as a currency, most researchers believe that cryptocurrency has value as an investment [5].

The cryptocurrency market has experienced exponential growth in the 10 years after its founding in 2008. The cryptocurrency market has been stealing the attention of the public since early 2013 due to the magnitude of price fluctuations. With significant price growth and high returns, there has been an increase in individual investors who have considered cryptocurrencies as an investable asset despite their extreme volatility. According to CoinMarketCap (Crypto-asset

capitalization website), there are more than 6,000 cryptocurrencies in existence, including Bitcoin, Ethereum, Ripple, Litecoin, Ripple, Tether, Mintchip, Dash, Doge-coin, Monero, Nxt, Bit-Shares, Maida-safe-Coin, and Byte-coindan, with a total market value of \$334.33 billion as of October 2020.

Despite the popularity of cryptocurrencies as an investment instrument, much remains to be understood about the factors that influence cryptocurrency investment. Two conflicting financial theories that can explain what factors can influence investment decisions in the cryptocurrency market, namely classical finance theory and behavioral finance theory. Classical finance theory states that asset prices will not be influenced by behavioral finance factors because investors are assumed to always think rationally to maintain an efficient market, thereby reducing the potential impact of emotional investors. On the other hand, behavioral finance theory assumes that asset prices are influenced by behavioral finance factors [6]. This theory is based on variations and oddities in human behavior, where investment decisions do not depend solely on analysis and rational thinking. This causes the financial market to fluctuate up and down. We will examine this behavioral financial theory further, considering that investors' investment decisions are not only influenced by rationality factors.

This study seeks to find literature related to the cryptocurrency market by considering various aspects and underlying behavioral finance factors, namely, herding factors, heuristics, and prospects. [7] [8]. Herding behavior in behavioral financial theory is identified as investor decision-making behavior based on other investors' investment decisions in the market. It causes the market to become inefficient (inefficient market) because investors do not use all the information available in the market in making investment decisions, but "follow" other investors. Meanwhile, heuristic factors in investment can be identified as a form of financial behavior where investors simplify decision-making quickly when faced with uncertain situations. Finally, the prospect factor explains how investors make a decision under certain risk conditions and or choose between two risk options in an uncertain condition.

Several studies have linked behavioral finance factors in investment decisions. [6] and [7] stated that the herding factor had a significant effect on investment decisions, while [9] stated the opposite. Several studies state that heuristics have a significant effect in investment decisions [6] [10] [11] [7], while the heuristic measured by overconfidence has no significant effect on investment decisions [12]. Furthermore, research that uses prospects on investment decisions is carried out by [6] and [7] with significant results.

None of these studies have been specifically applied to millennials and generation Z. Millennials along with generation Z also make up the majority of cryptocurrency users. According to a survey conducted by CNBC International and Acorn's, the number of cryptocurrency investors from millennials and generation Z is three times more than any other generation [13]. In Indonesia itself, based on data from the Ministry of Trade, there is 90 percent of young people aged 20

to 30 carry out cryptocurrency asset transactions. In addition, there are very few studies using cryptocurrency as an investment instrument in Indonesia.

This research needs to be done to prove whether cryptocurrency investors who are young (and also considering that cryptocurrency is a new investment instrument), make rational decisions or not by considering behavioral finance. From this phenomenon, the problem in this study is, based on behavioral finance theory, whether herding, heuristics, and prospect factors affect cryptocurrency investment decisions for millennials and generation Z investors?

## II. LITERATURE REVIEW

### A. Cryptocurrency

Cryptocurrencies are digital currencies created through encryption technology as a faster, cheaper, and more reliable alternative to fiat currencies [14]. The first cryptocurrency that was successfully launched in a decentralized manner was Bitcoin in 2009 and until 2020 it became the most dominant type of cryptocurrency with a market cap of 43.2% and a capitalization value of US \$ 1.23 trillion. Since the launch of Bitcoin, other cryptocurrencies have started to emerge. In addition to being a medium of exchange, today's cryptocurrency is used in terms of speculation as an investment instrument. In investing by relying on cryptocurrencies, investors must be careful because cryptocurrencies are the most volatile when compared to the foreign exchange and stock markets, and tend to be vulnerable to temporary explosiveness in the short term [15] [16].

Meanwhile, the valuation of cryptocurrencies is determined by three things: the use of the currency in current transactions, the decision of investors to buy cryptocurrencies thereby reducing supply, and other elements that can encourage more individuals to use cryptocurrencies as a medium of exchange in the future [17]. Another factor that affects the price of cryptocurrencies is public information because price movements respond according to the connotation of positive or negative information. Therefore, it can be said that cryptocurrency is still in line with the Efficient Market Hypothesis theory [18].

In the efficient market hypothesis, all participants in the market are assumed to be rational investors. However, this assumption is responded with skepticism from parties who are against the efficient market hypothesis theory, because individuals who participate in the market are influenced by psychological bias in making investment decisions. Another factor that makes the market inefficient is the presence of noise traders, namely investors who carry out transactions in the market without professional advice or the ability to perform fundamental and technical analysis for instrument valuation. The existence of noise traders in the cryptocurrency market creates a bubble that results in an inefficient market and creates a niche where investors' psychological factors can contribute to investment decision [6].

## B. Financial Behavior

[19] defines financial behavior as a theory that tries to explain and seeks to understand how investment decisions are made, including the emotional processes involved and the extent to which these emotional processes can influence the decision-making process.

Behavioral finance theory tries to find answers to the questions "what, why, and how finance and investment from a human point of view". Behavioral finance theory also tries to understand and predict the systematic implications of financial markets from a psychological point of view. Behavioral finance theory is built on a variety of assumptions and ideas from behavioral economics. The involvement of emotions, traits, likes, and various kinds of things involved in humans as intellectual and social beings can be the basis for making decisions in taking an action.

In making a decision, including investment decisions, people are often faced with uncertainty. [6] and [7] explain the basis of the notion of closed investor rationality, which emphasizes that in the face of uncertainty, the investor's decision-making process can be influenced by various things, such as herding, heuristics, and prospects.

### 1) Herding

Herding behavior in behavioral financial theory is identified as investor decision-making behavior based on the investment decisions of other investors in the market. Investors who exhibit herding behavior in investing tend to trust the investment decisions of other parties and also the collective information circulating in the public [20]. This "herding" behavior causes investors to often ignore their own beliefs and imitate the actions of other investors. This causes the asset to not be priced accordingly as traders do not include all the information available in the market due to their irrational behavior. Therefore, analyzing the presence of the herding factor in the cryptocurrency market is very important because the presence of this phenomenon will lead to an inefficient market.

[21] found that the herding factor affects cryptocurrency investment decision. The cryptocurrency market circumstances are identical to the characteristics of fluctuating prices, lack of quality information, and also market participants who have expectations of getting fantastic returns from speculative activities. These circumstances make investors believe that big players have the best information and well-planned strategies so that they have the power to control price movements. The market tends to believe in the role of big players and makes a few investors make investment decisions without being based on sufficient literacy regarding the decisions that have been made, thus triggering the emergence of herding behavior [22]. The significance of the influence of herding behavior in the cryptocurrency market on investors' investment decisions is also evidenced by [6] [7] and [23].

### 2) Heuristics

Heuristic factor in investing can be identified as a form of financial behavior in which investors simplify their decision-making quickly when faced with uncertain situations [24]. Because of this simplification, heuristics are prone to bias and

error. The three types of bias that occur in the heuristic theory are representativeness, availability, and anchoring bias.

Representativeness bias is defined as a form of bias in which investors tend to associate existing stereotypes or previous experiences with investment decisions, even though the stereotypes or experiences do not necessarily match the characteristics of the specific investment instrument that the investor chooses. Meanwhile, anchoring bias occurs when investors rely too much on the first information received to make a decision. Availability bias itself is defined as a condition where investors do not consider other alternatives and only refer to information that is already available to make investment decisions.

In addition to the three biases, the heuristic factor is also identical to the overconfidence bias. When an investor experiences overconfidence, the investor makes investment decisions based on their personal information and does not refer to public information. In other words, the investor perceives that the information he has is more accurate than publicly available information [24]. The type of assets held in an investment portfolio is an important reflection of the investment experience itself. Studies show that individuals with more investment experience are more likely to invest in more sophisticated investment products [25].

### 3) Prospect

The prospect factor emphasizes that economic actors do not always act rationally. The prospect factor explains how the decision maker (investor) makes a decision based on what he perceives as an advantage versus a loss. With two options, the investor will make a decision that reflects the possibility of profit compared to the possibility of loss [27]. This theory also states that states of mind can influence the decision-making process. This theory also observes how investors mentally "frame" the predicted outcome by considering the risk [28]. There are several aspects of investor behavior in viewing risk, namely:

#### a) Loss aversion

Loss aversion indicates an investor's reluctance to suffer losses. An investor tends to avoid losses rather than make profits.

#### b) Mental Accounting

Mental Accounting is a person's tendency to separate his money into different storage areas based on various subjective criteria, such as based on the source of money and the purpose of each storage place.

#### c) Self-control

Self-control describes the extent to which a person can control himself. This means investors prefer to invest in securities that can be controlled on their own.

#### d) Regret aversion

Regret aversion is a person's tendency to avoid some behavior that can make him uncomfortable afterward, even though the person believes that another option is more profitable. If someone makes the wrong decision, they will feel sick and regret the decision taken.

III. METHODOLOGY

A. Research model

In this study, the research model will be tested on a sample of young investors belonging to the millennials generation (1981-1996) and generation Z (1997 - 2012). Meanwhile, the form of the model used is expressed in the multiple regression model as follows:

$$INV = \beta_0 + \beta_1HERD + \beta_2HEUR + \beta_3PRO + \epsilon$$

- INV : Investment decision
- HERD : Herding
- HEUR : Heuristics
- PRO : Prospect
- $\beta_0$  : Constant
- $\epsilon$  : Error

B. Variable Operationalization

Table 1 summarizes questionnaire questions as indicators that will represent each variable to be studied. These questionnaire questions follow a study conducted by [6] [7] [26] [27]. Investment decisions are reflected in the courage of investors to take risks in the chosen investment or better known as risk-taking behavior [6]. To measure each indicator used a five-point Likert scale measurement method. The lowest scale in the Likert scale is worth 1 with the meaning of strongly disagree, and the highest scale is worth 5 with the meaning of strongly agree.

TABLE I. OPERATIONALIZATION OF VARIABLES

Variable	Items	Variable Operations
<b>Herding Factors</b>	HD1	Other investors' decisions in choosing the type of cryptocurrency affect your investment decisions
	HD2	Other investors' decisions regarding the volume of cryptocurrencies affect your investment decisions
	HD3	Other investors' decisions to buy and sell cryptocurrencies affect your investment decisions
	HD4	You are quick to react to changes in other investors' decisions and follow their reactions to the cryptocurrency market
<b>Heuristics Factors</b>	HR1	You rely on previous investment experience for your next cryptocurrency market investment
	HR2	Your previous investment experience has the same characteristics as the cryptocurrency market
	HR3	You believe that your skills and knowledge of the cryptocurrency market can help you to outperform the market
	HR4	You believe that the first information you hear about the cryptocurrency market can help you outperform the market
	HR5	You believe that the cryptocurrency market is a low risk investment and can make you profitable.
	HR6	You predict future cryptocurrency price changes based on the latest cryptocurrency prices
<b>Prospect Factors</b>	PR1	After getting a profit, you are more willing to take risks than usual
	PR2	Your instincts often help you make good investments

	PR3	You are able to identify the market lows
<b>Investment Decisions</b>	ID1	You will never hang-gliding or bungee jumping in the cryptocurrency market
	ID2	You will stick to the rules
	ID3	You will avoid dangerous situations
	ID4	You will make your investment decisions based on the opinions of other investors

C. Data Collection Methods

In this study, researchers took samples of respondents who were in the geographic areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek). Jabodetabek was chosen because it is a megapolitan area with the largest cryptocurrency investor base in Indonesia. The data is obtained by using a questionnaire compiled on an online platform, namely Google Form, and will be disseminated online.

IV. RESULTS

A. Respondent Profiles

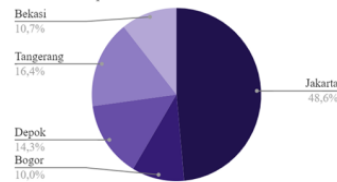


Fig. 1. Respondent's Domicile

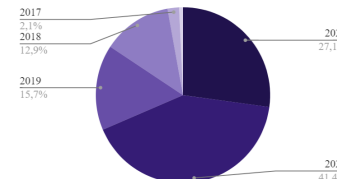


Fig. 2. Initial Year of Investing in Cryptocurrency

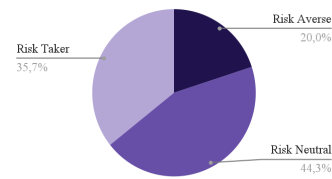


Fig. 3. Risk Profile of Respondent

Authors succeeded in obtaining data from 140 respondents. In this section, authors describe the variety of respondents based on domicile, initial year of investing in cryptocurrency instruments, and risk profile. Based on Fig. 1, it can be seen that the majority of respondents came from Jakarta with the acquisition of 68 (48.6%) respondents, and the other respondents were relatively evenly distributed. In Fig. 2, it is found that almost of 50% respondents started investing in cryptocurrencies in 2020, an interesting fact due to the

relatively short investment period. For the risk profile section, only 28 (20.0%) respondents considered themselves to be risk averse. This fact is in line the argument that the cryptocurrency market is very risky.

### B. Validity and Reliability Test

Table 2 shows the results of the validity and reliability test. All variables are valid with KMO more than 0.5 and all question items are valid with anti-image values more than 0.5. In terms of reliability, the heuristics and herding factors are classified as having high validity with Cronbach-Alpha values above 0.7. While the investment decision and prospect factors have moderate validity with Cronbach-Alpha values in the range 0.50 – 0.70.

TABLE II. VALIDITY AND RELIABILITY TEST RESULTS

Variable	Items	KMO	Anti-image	Conclusion	Cronbach-Alpha	Conclusion
Herding Factors	HD1	0.784	0.777	Valid	0.841	Reliable
	HD2		0.738	Valid		
	HD3		0.799	Valid		
	HD4		0.864	Valid		
Heuristics Factors	HR1	0.709	0.694	Valid	0.759	Reliable
	HR2		0.755	Valid		
	HR3		0.699	Valid		
	HR4		0.695	Valid		
	HR5		0.634	Valid		
	HR6		0.761	Valid		
Prospect Factors	PR1	0.552	0.539	Valid	0.578	Reliable
	PR2		0.537	Valid		
	PR3		0.671	Valid		
Investment Decisions	ID1	0.662	0.633	Valid	0.557	Reliable
	ID2		0.658	Valid		
	ID3		0.717	Valid		
	ID4		0.674	Valid		

### C. Statistics Descriptive

TABLE III. DESCRIPTIVE STATISTICS

	N	Min	Max	mean	Std. Dev
<b>Herding Factors</b>					
HD1	140	1.00	5.00	3.6500	1.0588
HD2	140	1.00	5.00	3.4143	1.1252
HD3	140	1.00	5.00	3.5857	1.1058
HD4	140	1.00	5.00	3.4714	1.1719
<b>Heuristics Factors</b>					
HR1	140	1.00	5.00	4.1786	1.0337
HR2	140	1.00	5.00	3.6214	1.0351
HR3	140	2.00	5.00	4.3500	0.7767
HR4	140	2.00	5.00	3.9357	0.9152
HR5	140	1.00	5.00	2.9214	1.2979
HR6	140	1.00	5.00	3.6786	0.9838
<b>Prospect Factors</b>					
PR1	140	1.00	5.00	4.1571	0.8505
PR2	140	1.00	5.00	3.8286	0.8972
PR3	140	1.00	5.00	3.5000	0.9855
<b>Investment Decisions</b>					
ID1	140	1.00	5.00	3.6643	0.9716
ID2	140	2.00	5.00	4.1786	0.7323
ID3	140	1.00	5.00	4.1957	0.9565
ID4	140	1.00	5.00	3.4286	1.0738

Based on the results in Table 3, the total average of the herding variables is 3.530, heuristics is 3.781, and prospect is 3.829. All of these independent variables are in the high mean category. For the dependent variable, the investment decision, the total average is 3.864 which is also included in the high mean category.

### D. Analysis

Multiple regression analysis is used to see the significant effect of herding, heuristic, and prospect factors on investment decisions in the cryptocurrency market. R square has a value of 33.9% which shows that 33.9% of the variation in the dependent variable (investment decision) can be explained by variations in the independent variables (herding factors, heuristics, and prospects). In addition, the F statistic has a probability of  $0.000 < 0.05$  so we can say that the model is fit.

TABLE IV. REGRESSION RESULT

	Coef	Std Error	t	Sig.
Constant	9.136	1.244	7.345	0.000
Herding	0.339	0.048	7.092	0.000
Heuristics	0.151	0.052	2.889	0.004
Prospect	-0.165	0.106	-1.566	0.120

Table 4 shows that herding and heuristic factors have a significance value of 0.000 and 0.004, so we can say that herding and heuristic factors significantly affect investment decision in the cryptocurrency market. While the prospect factor has a significance value of 0.120, in the other word the prospect factor does not affect investment decisions in the cryptocurrency market.

This result is in line with [7] [10] [23] where the herding factor has a significant and positive influence on investment decisions. This is understandable considering that cryptocurrency investors are young investors who do not have complete knowledge and information. These investors feel that the decisions made by role models are more reliable. This argument is in line with the theory of bandarmology where the market tends to believe in the role of big players to influencing investors to make investment decisions without sufficient literacy [22].

Furthermore, the heuristic factor has a significant positive effect on investment decisions in line with [6] [7] [10] [27]. Most investors believe that their capabilities can exceed market performance, and this ability will influence their decision [27]. This can be seen in the high value of average heuristic factor. In addition, when investors benefit from previous investments, investors will form a portfolio based on their abilities and knowledge so that investors act as speculators in the cryptocurrency market [7].

Unlike other factors, the prospect factor does not affect investment decisions in the cryptocurrency market. These results indicate that investors do not avoid the possibility of other investments even though these investments are not in good condition [27].

## V. CONCLUSION

The authors have collected, processed, and analyzed the data collected by 140 respondents. This study concludes that herding and heuristic factors have a significant influence on investment decisions in the cryptocurrency market. Meanwhile, the prospect factor does not have a significant influence on investment decisions in the cryptocurrency market.

From this study, it can be seen that cryptocurrency investors are not rational investors, because their decision is still influenced by other people and also simplifies the existing information. This fact should to be realized by the cryptocurrency market supervisory authority to educate investors to be more rational so that they can make healthier investment decisions. In addition, the implication of this research is to provide preliminary evidence that the price formed in the cryptocurrency market is not an intrinsic price because it is not in an efficient market (there are noise traders who are not rational investors).

Due to various limitations in this study, further studies can make improvements by adding irrational factors in more detailed financial behavior such as overconfidence, loss aversion, mental accounting, self-control, and regret aversion. Moreover, further studies could focus on the volatility of cryptocurrency prices to see how much noise there is in the cryptocurrency market. The more volatile the cryptocurrency price, the higher the risk that will be borne by the investor, especially for herding investor.

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