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## Investor Herding Behavior in Extreme Conditions During Covid-19: Study On Indonesian Stock Market

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### Abstract

Herding behavior as a financial behavior bias is defined as the tendency of investors to imitate other decisions without prudent consideration. The aim of this paper is to analyze the effect of investor herding behavior in extreme market conditions during Covid-19 pandemic on the Indonesia Stock Market. The data used in this study is cross-sectional absolute deviation of stock return and market return. The samples included in the research criteria were 80 companies. The samples were analyzed using CCK2000 method and robustness test using Tan 2008 method with help of the Eviews 12 application. The empirical results of this study found the effect of investor herding behavior during extreme conditions of Covid-19 pandemic (general model) and during bearish market period. Meanwhile, no effect of herding behavior was found during bullish market period on the Indonesian Stock Market. Two of the four robustness test models are robust.

### INTRODUCTION

In economics and finance, herding or herd behavior is the process where economic agents are imitating each other's actions and/or base their decisions upon the actions of others. For example, it may be a group of market participants who trade in the same direction during the same time, investors who ignore their initial assessment and trade by following the trend in the previous trade, mutual imitation, excessive agreement in analyst predictions, a behavior converge to the average, a form of correlated behavior, a group of investors following each other into or out of the same securities, among other similar descriptions (Spyrou, 2013).

The World Health Organization (WHO) declared Covid-19 as a global pandemic on March 9, 2020. After that, Presidential Decree of the Republic of Indonesia No. 12 of 2020 declared a non-natural disaster spreading Covid-19 as a national disaster on April 13, 2020. According

to Wuryandani (2020), the economic slowdown caused by the Covid-19 pandemic has caused a domino effect from health to social and economic problems. The impact of the world economic crisis resulted in the decline of national economic growth. This condition then affects all sectors of the company and their share prices in Indonesia (Witasari & Cahyaningdyah, 2021).

On the other hand, according to Hsing (2011), which was also agreed by El-Nader and Alraimony (2012), found that GDP has a significant positive correlation with stock index returns. This finding is also supported by Siregar and Diana (2019) in the Indonesian Stock Market. Contrary to these findings, fluctuations in the Jakarta Composite Index (JSX) have a negative correlation throughout the first - fourth quarters of 2020. During the first quarter of 2020, Indonesia's GDP grew positively by 2.97% (YoY), while JSX corrected deeply -38% (stock market crash). Then, during the second - fourth quarter of 2020, Indonesia's GDP contracted negatively (-5.32%;

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-3.49%; -2.19%) (YoY), while JSX grew by 65% (hyper bullish market). From this gap phenomenon, the authors suspect that investors tend to follow market consensus (herding) during extreme market conditions by ignoring prudent considerations including Indonesia's macroeconomic conditions and company fundamentals.

After that, according to Shefrin (2005), behavioral finance is the study of how psychology affects the process of making financial decisions and financial markets. Because psychology explores human judgment, behavior, and well-being, it can also provide important facts about how human action differs from traditional economic assumptions. Then, there are several basic factors that influence investor behavior according to Fischer and Gerhardt (2011), namely: fear, love, greed, optimism, tendency to focus on recent experiences, overreaction in line with the findings of Maharani and Witiastuti (2015), tendency to overestimate oneself and one's knowledge (overconfident) in line with the findings of Fitri and Cahyaningdyah (2021), as well as instinct to follow other investors (herding).

Keynes (1936) which was later confirmed by Akerlof and Shiller (2009), explained the concept of animal spirit to explain naive optimism and confidence in the capital market. Then, from there, humans are defined as social animals who have basic instincts from animals. This inspired the concept of herding behavior, namely a group of people moving in the same direction, where in ancient times there was no truly safe place to take refuge. Therefore, ancient humans had the instinct to create or follow large groups to avoid attacks by predators and wild animals (Barens, 2011).

Then, the cause of herding behavior bias is that investors process the same information, as happened in emerging markets which have limited micro information and focus more on macro information (Chang et al., 2000), as well as the tendency of investment managers to follow others investment manager decisions for maintain their reputation (Suhari et al., 2011).

Lao and Singh (2011) explained that when an investor bases investment decisions on collective information rather than personal information, the fundamental value of shares can be low. Then, several impacts of herding behavior, namely the emergence of various phenomena such as increasing stock price fluctuations, falling prices, calendar effect, differences in stock returns, not forming an equilibrium between prices and stock fundamental variables, making the market go in

a relatively inefficient direction which then confronts the efficient market hypothesis. This is in line with the statement of Cahyaningdyah and Witiastuti (2014) that the efficient market hypothesis is still an interesting debate in the financial sector, there are pros and cons among practitioners and academics in the field.

Then, the pattern of JSX fluctuations is similar to the pattern during the Asian Financial Crisis (AFC) 1998 and the Global Financial Crisis (GFC) 2008, although with different causative factors. There is evidence of investor herding behavior during extreme market conditions on JSX for the AFC 1998 period (Bowe & Domuta, 2004), and on European Stock Market for the GFC 2008 period (Maria et al., 2015), as well as the Covid-19 2020 pandemic period (M'endez & Arias, 2021). Contrary to these findings, no evidence of investor herding behavior was found on Latin American Stock Exchange for the period 1988 to 2009 (Chiang & Zheng, 2010), and on JSX for the 2008 GFC period (Putra et al., 2017).

This study aims to identify and analyze investor herding behavior on the Indonesian Stock Market during extreme conditions Covid-19 pandemic. Based on the phenomenon and the research gap explanation, the research novelty is to conduct research about investor herding behavior in extreme conditions during the Covid-19 pandemic on the Indonesian stock market. Then, analyze the asymmetric effect of herding behavior based on bearish market conditions and bullish market conditions.

### Hypotheses Development

The extreme market conditions period is used to provide a more comprehensive analysis coverage during the stock market crash and hyper-bullish market periods during the Covid-19 pandemic in Indonesia. Then, the extreme market condition pattern has a similar pattern to the JSX pattern that occurred during the AFC 1998 and GFC 2008. In line with this phenomenon, Bowe and Domuta (2004) succeeded in finding indications of investor herding behavior during the AFC 1998 on the Indonesian Stock Market. Furthermore, Ramli et al. (2016) also succeeded in identifying the investors herding behavior during the GFC 2008 on the Indonesian Stock Market. Then, the latest research conducted by M'endez and Arias (2021) has succeeded in finding the investor herding behavior during the market crash Covid-19 2020 period on European Stock Exchanges.

H1: There are indications of investor herding behavior during extreme market conditions Covid-19.

In connection with these findings, global macroeconomic uncertainty, including ASEAN and Indonesia, was contracted by the negative sentiment of the Covid-19 pandemic. Furthermore, it is suspected that the negative sentiment weakened the equilibrium of the global stock market, including Indonesia, so that it was corrected very deeply by minus 38 percent (market crash) during the first quarter of 2020. However, this phenomenon is contrary to Indonesia's economic growth in the first quarter which was still positive at 2.97 percent (YoY). This indicates that investors ignore Indonesia's macroeconomic fundamentals and tend to follow (herding) other investors' decisions based on market consensus in order to secure the risk of their investment portfolio. According to Witiastuti (2013), when investors are faced with making investment decisions, risk is the dominant factor that must be considered because the size of the risk contained in an investment alternative will affect the investment return. After that, Chang et al. (2000) US, Hong Kong, Japan, South Korea, and Taiwan stated that in a stressful market (bearish), investors tend to follow market consensus (herding), this is in line with the findings of Tan et al. (2008) and Mobarek et al. (2014). H2: There are indications of investor herding behavior during bearish market Covid-19.

On the other hand, during the second to fourth quarter of the ASEAN Stock Exchange shot up where the Indonesia Composite Index experienced an appreciation of 65 percent. However, this phenomenon is contrary to the economic condition of the Indonesian country in the second to fourth quarter which contracted successively (-5.32%, -3.49%, -2.19%) (YoY). This indicates that investors ignore the fall in Indonesia's macroeconomic fundamentals and tend to follow (herding) other investors' decisions based on market consensus. This imitating behavior is thought to be to speculate on the potential capital gains of his investment portfolio after the Indonesian Stock Exchange was deeply corrected. Furthermore, Tan et al. (2008) and Mobarek et al. (2014) also found indications of herding behavior during bullish markets in various European, Latin American and Asian countries.

H3: There are indications of investor herding behavior during bullish market Covid-19.

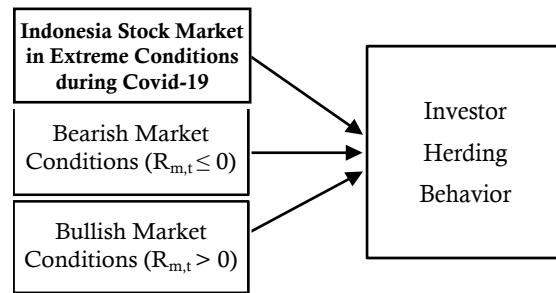


Figure 1. Research Model

## METHOD

The type of research used is associative research with a quantitative approach. This is because this research connects two or more variables where in the research proposal, process, hypothesis, data analysis and data conclusion until the writing uses aspects of measurement, formula calculation, and certainty of numerical data (Sugiyono, 2008).

The research population used are all companies listed on the Indonesia Stock Exchange. The sample used in this study were 80 companies included in the IDX80 index for the February 2020 period. The IDX80 index was chosen because it is an index that measures the stock price performance of 80 issuers with relatively large market capitalization, high liquidity, and good fundamentals. In addition, IDX80 has price fluctuations that are relatively in line with JSX in the extreme market conditions during the Covid-19 pandemic. It is intended that the sample used can describe or represent the movement of JSX. Then the February 2020 period was chosen because it was the right period before the stock market crash and bullish on JSX 2020.

Then, the secondary data used in this study include: closing prices of 80 research samples, JSX closing levels, JSX highs & lows, JSX daily volume. The research data was obtained from observations on [www.idx.co.id](http://www.idx.co.id) and [www.finance.yahoo.co.id](http://www.finance.yahoo.co.id), with the daily data period (t) used is January 2, 2020 to January 29, 2021 (262t).

The general model for detecting investor herding behavior proposed by Chang et al. (2000) is used as a reference for the data analysis methodology of this study. The CCK approach is considered to have a clear and traceable theoretical basis from the CAPM, and can identify investor herding behavior in an aggregative market with good accuracy (Dewan & Dharni, 2019). Then, the CCK approach has been successfully used as an analytical basis for Tan et al.

(2008), Mobarek et al. (2014), Putra et al. (2017) and M'endez and Arias (2021) to detect the presence of investor herding behavior in various market conditions. as well as in various countries including the Indonesia Stock Market.

### Variable Measure

The dependent variable (Y) in this study is the dispersion value of Cross-Sectional Absolute Deviation (CSAD). Then the independent variables used in this research are absolute market portfolio return (X1) and market return squared (X2). Measurement of research variables refers to CCK (2000).

$$R_{i,t} = \frac{P_{i,t} - P_{i(t-1)}}{P_{i(t-1)}}$$

Where is stock return  $t$ , is stock price  $t$ , is stock price  $t-1$ . Then, in measuring JSX return using the formula:

$$R_{m,t} = \frac{P_{m,t} - P_{m(t-1)}}{P_{m(t-1)}}$$

Where is JSX return  $t$ , is JSX closing level  $t$ , is JSX closing level  $t-1$ . After that, in measuring the dispersion value of cross sectional absolute deviation using:

$$CSAD_t = \frac{1}{N} \sum_{i=1}^N |R_{i,t} - R_{m,t}|$$

Where is Cross Sectional Absolute Deviation  $t$ , is number of sample, is stock return  $i,t$ , is JSX Return  $t$ .

### Herding Behavior Identification

The analysis of this research refers to CCK (2000) which is divided into three models, namely: General Model, Bearish Market Model, and Bullish Market Model. Each model tested using regression based on the Ordinary Least Square (OLS) method in Eviews 12 software. Investor herding behavior can be identified if the coefficient of herding behaviour has a negative value, non-linear and significant ( $p < 0.1$ ). Then, General Model is used to analyze the herding behavior of investors over the entire observation period (extreme market conditions). Here is the General Model regression formula:

$$CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$$

Where  $CSAD_t$  is cross sectional absolute deviation  $t$ ,  $\alpha$  is intercept,  $|R_{m,t}|$  is absolute JSX return  $t$ ,  $R_{m,t}^2$  is JSX return squared  $t$ ,  $\varepsilon_t$  is standart error. After that, the Bearish Market Model is used to analyze investors herding behavior in a negative market return condition ( $R_{m,t} < 0$ ). The following is the Bearish Market Model regression formula:

$$CSAD_t^{DOWN} = \alpha + \gamma_1 |R_{m,t}^{DOWN}| + \gamma_2 (R_{m,t}^{DOWN})^2 + \varepsilon_t$$

Where  $CSAD_t^{DOWN}$  is cross sectional absolute deviation  $t$  bearish conditions,  $|R_{m,t}^{DOWN}|$  is absolute JSX return  $t$  bearish conditions,  $(R_{m,t}^{DOWN})^2$  is JSX return squared  $t$  bearish conditions. Furthermore, the Bullish Market Model is used to analyze investors herding behavior in a positive market return condition ( $R_{m,t} > 0$ ). The following is the Bullish Market Model regression formula:

$$CSAD_t^{UP} = \alpha + \gamma_1 |R_{m,t}^{UP}| + \gamma_2 (R_{m,t}^{UP})^2 + \varepsilon_t$$

Where is cross sectional absolute deviation  $t$  bullish conditions,  $|R_{m,t}^{UP}|$  is absolute JSX return  $t$  bullish conditions,  $(R_{m,t}^{UP})^2$  is JSX return squared  $t$  bullish conditions.

### Robustness Test

Robustness test in this study uses a variation test model by changing operation of the research model (Neumayer & Plumper, 2017). Based on Tan et al. (2008) which has also been applied by Mobarek et al. (2014) and M'endez and Arias (2021), modification of the model operation is carried out on period indicators in market conditions which are distinguished into four types of models, including :

High Volume Model ( $V_{m,t} > \frac{1}{15} \sum_{t-15}^{t1} V_{m,t}$ ),  
Low Volume Model ( $V_{m,t} \leq \frac{1}{15} \sum_{t-15}^{t1} V_{m,t}$ ),  
High Volatility Model ( $\sigma > \frac{1}{15} \sum_{t-15}^{t1} \sigma$ ), and  
Low Volatility Model ( $\sigma \leq \frac{1}{15} \sum_{t-15}^{t1} \sigma$ ).

## RESULT AND DISCUSSION

Descriptive analysis was used to describe the data distribution of variables in this study. Descriptive statistical analysis in this study through Eviews 12 software includes number of observations, minimum, maximum, mean, and standard deviation. The results of the descriptive statistical analysis can be seen in Table 1.

Furthermore, Table 2. presents the results of OLS regression test from research hypothesis and robustness test through Eviews 12 software.

Also presented are standard errors in parentheses and classical assumption test results.

Then, according to Ghozali (2017), if the classical assumption test is met, the regression estimation with ordinary least squares (OLS) will be BLUE (Best Linear Unbiased Estimator), meaning that decision making through the F test and T test should not be biased. In this study, there are four classical assumption tests, including: normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. Based on the results of the classical assumption test presented in Table 2, the observation data were normally distributed, free from multicollinearity problems, heteroscedasticity problems, and autocorrelation problems. Furthermore, it can be concluded that the observation data from the three models used in this study have met the classical assumptions.

### General Model Analysis

Based on the results of general model regression test using the ordinary least square (OLS) method, the coefficient of market return squared is -0.54 with a significance level ( $p < 0.05$ ). These results have a negative, non-linear and significant direction of the herding behaviour coefficient that meets the conditions required by the CCK (2000) model, H1 accepted. Therefore, it can be concluded that there is an effect of investor herding behavior on the Indonesia Stock Exchange during the extreme market conditions period of the Covid-19 pandemic. These findings are in line

with the results of research by Bowe and Domuta (2004) during the Asian financial crisis 1997-1998 on the Indonesian Stock Market, and Maria et al. (2015) on the European Stock Market during the 2008-2009 GFC.

The coefficient of determination  $R^2$  general model value is 0.28. This means that the ability of the independent variables variation 72% can be explained by other factors not included in this study. Prob. F-stat. general model value is 0.00, its mean independent variables have a significant simultaneous effect.

Then, Devenow and Welch (1996), revealed herding behavior is a psychological condition in which investors ignore their own abilities and beliefs to follow other investors without prudent considerations. In line with this statement, the negative sentiment of the Covid-19 pandemic has affected the movement of the economy, including the Indonesian Stock Market, with a drastic increase in stock market volatility during extreme market conditions period compared to previous years. The negative sentiment of the Covid-19 pandemic and the increase in stock market volatility affected the preferences and psychology of stock market participants. From there, investors tend to secure their portfolio risks and tend to follow market consensus without considering the company's fundamental analysis. This finding, based on Scharfstein & Stein (1990), can be categorized as an irrational herding investor behavior.

**Tabel 1.** Descriptive Statistic

	Research Variable	No Obs.	Min	Max	Mean	Std. Dev.
General Model	$CSAD_t$	262	0.01	0.07	0.02	0.01
	$ R_{m,t} $		0.00	0.10	0.01	0.01
	$R_{m,t}^2$		0.00	0.01	0.00	0.00
Bearish Market Model ( $R_{m,t} < 0$ )	$CSAD_t^{DOWN}$	126	0.01	0.05	0.02	0.01
	$ R_{m,t}^{DOWN} $		0.00	0.07	0.01	0.01
	$(R_{m,t}^{DOWN})^2$		0.00	0.00	0.00	0.00
Bullish Market Model ( $R_{m,t} > 0$ )	$CSAD_t^{UP}$	136	0.01	0.07	0.02	0.01
	$ R_{m,t}^{UP} $		0.01	0.10	0.01	0.01
	$(R_{m,t}^{UP})^2$		0.00	0.01	0.00	0.00

Tabel 2. Herding Behavior Analysis

	General Model	Bearish Market	Bullish Market	Robustness Test			
				High Volm	Low Volm	High Volt	Low Volt
$\alpha$	0.02 ***	0.02 ***	0.02 ***	0.02 ***	0.01 ***	0.02 ***	0.02 ***
X1 $ R_{m,t} $	0.38 ***	0.41 ***	0.56 ***	0.49 ***	0.58 ***	0.23 *	0.27
X2 $R^2_{m,t}$	-0.54 **	-3.72 *	-1.36	-0.99 *	-7.88 ***	0.94	9.74 *
R-squared	0.28	0.21	0.40	0.33	0.30	0.24	0.36
Prob. F-stat.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prob. J-Bera	0.06 $\alpha$	0.08 $\alpha$	0.08 $\alpha$	-	-	-	-
VIF Value	4.10 $\alpha$	7.51 $\alpha$	3.75 $\alpha$	-	-	-	-
Prob. B-Pagan	0.09 $\alpha$	0.39 $\alpha$	0.09 $\alpha$	-	-	-	-
LM Test	0.07 $\alpha$	0.06 $\alpha$	0.10 $\alpha$	-	-	-	-
Obs.	262	126	136	135	127	114	148

#### Bearish Market Model Analysis

Furthermore, based on the results of bearish market model regression using Ordinary Least Square (OLS) method, the coefficient of market return squared is -3.72 with a significance level ( $p < 0.1$ ). These results have a negative, non-linear and significant direction of the X2 coefficient and meet the conditions required by the CCK (2000) model, H2 accepted. Therefore, it can be concluded that there is an asymmetric effect of investor herding behavior on the Indonesia Stock Exchange during bearish market conditions period of Covid-19 pandemic. These findings are in line with the research results of Chang et al. (2000) on the Stock Markets of Japan, South Korea, Taiwan, and Tan et al. (2008) on China Stock Market, then M'endez and Arias, (2021) on European Stock Markets.

The coefficient of determination  $R^2$  bearish market model value is 0.20. This means that the ability of the independent variables variation 80% can be explained by other factors not included in this study. Prob. F-stat. general model value is 0.00, its mean independent variables have a significant simultaneous effect.

Under the pressure of a risk, there are two types of behavior that appear in individuals, namely rational behavior and irrational behavior (Tversky & Kahneman, 1974). In connection with this statement, the stock market crash that occurred in various stock markets including Indonesia, which was corrected very deeply (minus 38% during Q1 2020) was caused by negative sentiment of Covid-19 pandemic, although Indonesia's GDP still grew positively by 2.97%. Economic uncertainty due to the increase in positive cases of Covid-19, also increases investment risk. The high risk investment in the stock market triggers investors to secure their portfolios which reflected in high selling volume and market volatility. Then, other investors also followed and imitated the selling action until a crash occurred in the Indonesian Stock Market with good fundamentals were also affected by the fall in stock prices. This phenomenon confirms the research findings of the effect of herding behavior where investors tend to ignore prudent analysis and as stated by Chang et al. (2000) that in a stressful (bearish) market condition, investors tend to follow the market consensus. This finding can be categorized as an irrational herding investor behavior.

### Bullish Market Model Analysis

Next, based on the results of bullish market regression test using the Ordinary Least Square (OLS) method, the coefficient of market return squared is -1.364945 with a significance level ( $p > 0.1$ ). These results have a negative X2 coefficient direction, non-linear but not significant so that it doesn't meet the conditions required by the CCK (2000) model, H3 rejected. Therefore, it can be concluded that there is no effect of investor herding behavior on the Indonesia Stock Exchange during bullish market conditions of Covid-19 pandemic. These findings are in line with the results of research from Chang et al. (2000) on the United States Stock Market, Hong Kong, Japan. However, this result contradicts the results of research by Chiang and Zheng (2010) on the Indonesian Stock Market during the Asian financial crisis 1997-1998 and the Global Financial Crisis 2008-2009.

The coefficient of determination R2 bearish market model value is 0.39. This means that the ability of independent variables variation 61% can be explained by other factors not included in this study. Prob. F-stat. general model value is 0.00, its mean independent variables have a significant simultaneous effect.

The stock market crash that occurred during Q1 2020, made most of the companies stock prices corrected very deeply. This triggered an oversold action and a bullish reversal on the Indonesian Stock Market, which began in Q2 2020. This phenomenon triggered massive investor buying actions so that the Indonesian Stock Market shot up to 65% until Q4 2020. From there, investors knew that many issuers were in the market, undervalued position with low risk and began to consider the company's fundamental analysis prudently. The explanation can be concluded that in a period of a bullish stock market, investors tend to behave more rationally than during a period of a bearish stock market.

On the other hand, the stipulation of Presidential Decree No. 7 2020 regarding formation of the task force for handling Corona Virus Disease 2019 acceleration on March 13, 2020, provided positive sentiment for market participants. This step shows readiness and seriousness of the Government of Indonesia in handling Covid-19 pandemic in Indonesia. Although Indonesia's GDP growth was negative during Q2 to Q4 2020, the formation of Covid-19 task force could trigger sentiment of optimism among Indonesian Stock Market investors. This description may explain why the third hypothesis in the study was rejected. Testing the effect of herding behavior on

bullish market conditions should be reworked with a more comprehensive variety of methods.

### Robustness Tests

Based on the results robustness tests regression, it can be concluded that High Volume Model and Low Volume Model succeeded in identifying effect of herding investor behavior on the Indonesia Stock Exchange during extreme market conditions of Covid-19 pandemic, while High Volatility Model and Low Volatility Model did not. In connection with the robustness tests results, the required coefficient of market return squared (X2) is negative and significant ( $p < 0.1$ ), so it can be interpreted that the modeling applied in this study has a robustness level of  $\pm 50\%$ .

### CONCLUSION AND RECOMMENDATION

This study aims to identify and analyze investor herding behavior on the Indonesian Stock Market during extreme conditions Covid-19 pandemic. The effect of investor herding behavior was found on general model and bearish market conditions Covid-19, while on the bullish market conditions it was not. Suggestions for further research, can develop a more comprehensive method to identify investor herding behavior on the stock market. It can also use a sample of companies with bad performance and a more purposive research sampling technique. Then the advice for investors, when there is an indication that the stock market will enter an extreme conditions phase, can immediately secure their investment portfolio to avoid large capital loss. And then, when the stock market has corrected deeply, investors can wait and see (WnS) and conduct prudent fundamental analysis to obtain maximum capital gains if the stock market enters a bullish reversal phase.

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