



## The Unconditional and Conditional Methods to Examine the Weekend Effect of Stock Returns

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### ABSTRACT

This paper examines the weekend effect on stock market returns by using the unconditional method and the conditional method. This paper uses daily closing prices of firms listed in Indonesian stock exchange by using LQ-45 index from January 2006 to December 2013 in three subperiods: All months, non-January months and January month. Independent sample t-test is applied to examine the significance of the weekend effect. Results support the weekend effect in three subperiods by using the unconditional method. But when using the conditional method, the weekend effect only exists in down market for all months period and non-January months period. There's no weekend effect in January month period by using the conditional method, both in up and down market. This paper presents new evidences and supplements the finance literature on the weekend effect for the case in Indonesian stock exchange, and also help investors to develop a good investment strategy.

**Keywords:** Weekend Effect, The Conditional Method, The Unconditional Method, Return of Stock

**JEL Classifications:** E44, G1

### 1. INTRODUCTION

Information is one of the key factor for an investor in the capital market. Efficient market is defined as one in which the prices of securities quickly and fully reflect all available information about the assets (Jones, 2004). According to the efficient market, prices of securities are assumed random, not patterned, and unpredictable. Market anomalies are in contrast to what would be expected in a totally efficient market. Numerous empirical studies have indicated persistent and potentially exploitable weekend effect and January effect in stock returns in many countries.

The first study of weekend effects in security markets appeared in the Journal of Business in 1931, written by Fields (1931). Fields didn't use statistical tests, but many researchers interested in the same field of research. French (1980) continued this direction of research and was the first author to employ statistical methods in order to test for the existence of the calendar effects. There're

many other studies about weekend effect anomaly, which referred to the negative Monday returns and the positive Friday returns (Chen et al, 2008; Cinko and Afcı, 2009; and Kamath and Liu, 2011). However, various studies on market anomalies not occurred only on Monday and Friday, but also occurred on other days. There're negative returns on Tuesday (Raj and Kumari, 2006). Elango and Al Macki (2008) found the lowest returns were on Monday and Friday, whereas the highest returns were on Wednesday. Tachiwou (2010) found the lowest returns were on the middle of the week, Tuesday and Wednesday, and a higher pattern towards the end of the week, Thursday and then Friday. Derbali and Khadraoui (2011) found negative returns on Wednesday and positive returns on Friday. Darrat et al., 2013 found Monday effect and Tuesday effect, whereby the returns on Monday and Tuesday were significantly lower than the return on the benchmark day of Wednesday.

Market anomaly also appears on January month, it's called January effect. Wachtel (1942) was the first to examine January

effect. Since this discovery, many studies that examined this market anomaly. Other researchers that supported the existence of January effect were Kato and Challhei (1985); Choudhry (2001); Al-Rjoub and Alwaked (2010); and Guler (2013). Market anomalies also appear on other months. Ahsan and Sarkar (2013) found June Effect in Bangladesh, whereby there were significant positive returns on June. However, in contrast to the findings from Nageswari et al., 2013, they found the highest returns were on December and the lowest returns were on January. Ogiewa et al., 2013 found negative returns were on February, March, April, May and December. Whereas positive returns were on January, August, September, October and November.

Stock prices in the stock market will always fluctuate. Fluctuations in market can occur whether in up or down market. For a rational investor, that fluctuations must be faced with a good investment strategy to obtain the optimal returns at a certain level of risk that is able to be carried. This study will also test the weekend effect without differentiated market (the unconditional method) and differentiated market (the conditional method). So far, no studies have examined more comprehensively about the capital market anomalies, namely weekend effect, with three subperiods for the test: All months, non-January months and January month, using the unconditional method and the conditional method in companies listed in the LQ-45 index in Indonesian stock exchange.

## 2. LITERATURE REVIEW

Weekend effect is used to describe the phenomenon in financial markets in which stock returns on Monday are often significantly lower than those of the immediately preceding Friday (Singhal and Bahure, 2009). Weekend effect anomaly is contrary to the theory of market efficiency. This anomaly is appealing to be examined because the presence of weekend effect can be useful as a trading strategy that can gain profits for investors. Investors could buy stocks on days with abnormally low returns and sell stocks on days with abnormally high returns (Tachiwou, 2010). Fields (1931) examined the pattern of the Dow Jones Industrial Average (DJIA) for the period 1915-1930. He compared the closing price of the DJIA for Saturday with the mean of the closing prices on Friday and Monday. For the 717 weekends he studied, the Saturday prices were more than \$10 higher than the Friday-Monday mean. French (1980) continued this direction of research and was the first author to employ statistical methods in order to test for the existence of the calendar effects. He used the S and P 500 index to study daily returns and obtained similar results. He studied the period 1953-1977 and found that the mean Monday returns were negative for the full period and also for every 5 year sub-period. The mean returns were positive for all other days of the week, with Wednesdays and Fridays having the highest returns. Lin and Chen (2008) found the weekend effect in the Taiwan mutual fund market in period January 1986 to June 2006. The results revealed significantly negative Monday returns and positive Friday returns. This weekend effect did not vary greatly between the early and later periods of the month. Cinko and Afcı (2009) used the data in Istanbul stock exchange from ISE-100 index. The data set was composed of daily returns for 324 stocks traded in ISE and market capitalization based portfolio returns during 1995-2008. By the

use of regression model, they found significant negative Monday returns and significant positive Thursday and Friday returns. Kamath and Liu (2011) examined the daily return data on the market index, IPSA, of the Santiago stock exchange of Chile. By using the regression model, in the first sub-period (January, 2003-October, 2005), there was the traditional Monday-Friday pattern, in the second sub-period (November 2005–August 2008), the anomaly effect was attributable to the significantly positive Wednesday returns.

However, various studies on market anomalies were occurred on other days. Raj and Kumari (2006) investigated the presence of seasonal effects in the Indian stock market by the two major indices, the Bombay Stock Exchange Index and the National stock exchange Index. By using the multiple regression model, the results found returns on Monday were positive, returns on Tuesday were negative and January effect was not found in India. Elango and Al Macki (2008) used the real-time data of the National Stock Exchange of India (NSE) for 1999-2007 period of three of the major indices, S and P CNX Nifty, S and P CNX Defty, and CNX Nifty Junior. Results indicated lower returns on Monday and Friday. Surprisingly, Wednesdays have yielded the maximum returns across indices. Tachiwou (2010) investigated daily stock market anomalies by using daily opening and closing values for the two stock Index of West African regional markets from September 1998 to December 2007. The two indexes were Brvm-10 index and Brvm-composite index. A pattern of lower returns around the middle of the week, Tuesday and then Wednesday; and a higher pattern towards the end of the week, Thursday and then Friday, were observed. Derbali and Khadraoui (2011) used the data of Morocco Exchange Market for 74 companies. The results showed that Friday was a statistically significant positive return on assets. While that on Wednesday was a statistically significant negative return on assets. Darrat et al., (2013) examined seasonal anomalies in Johannesburg daily stock returns from January 1973 to September 2012. They found no compelling evidence for either a January or December effect in the South African market. Returns on Monday and Tuesday were significantly lower than their returns on the benchmark day of Wednesday. Nevertheless, these strong seasonal effects disappeared in the post-2008 period following the global financial crisis.

Market anomalies also occur in January month, whereby stock prices tend to fall towards the end of December and then recuperate quickly in the 1<sup>st</sup> month of the New Year, January (Ahsan and Sarkar, 2013). Wachtel (1942) was the first to examine January effect in the Dow Jones Industrial Average (DJIA) Index from 1927 to 1942. He found that the returns in January were higher than other months. Since this discovery, many studies that examined this market anomaly. Researchers who supported the existence of January effect were Kato and Schallheim (1985). Kato and Schallheim (1985) used the data for the 29 year period of 1952 to 1980 in the Japanese stock market in two market indices, value weighted index and equally weighted index. This study examined stock returns on the TSE for the presence of January and size effects. Both of these anomalous effects appeared in the Japanese data. Choudhry (2001) investigated seasonal anomalies in the mean stock returns of Germany, the UK, and the US during pre-World

War I period using the data from January 1870 to December 1913 in Germany and the UK and from January 1871 to December 1913 for the US. The empirical research was conducted using a non-linear GARCH-t model. Results obtained provide evidence of the January effect and the month of the year effect on the UK and US returns. There was month of the year anomaly, but there was no January effect in German returns. Al-Rjoub and Alwaked (2010) used the data from the DJIA, the Standard and Poors 500 (S and P 500) and the National Association of Securities Dealers Automated Quotations indices by using ordinary least square regression, this paper found that the average January returns were consistently negative during crises. They also found that average loss in returns of January during crises were much smaller than average loss in returns during other months of the crises. Guler (2013) found January effect in China, Argentina and Turkey returns. However no evidence of a January effect was found at Brazil and India stock markets.

Market anomalies also occur in other months. Ahsan and Sarkar (2013) examined the existence of January effect in Dhaka Stock Exchange (DSE) in Bangladesh. Regression model combined with dummy variables and monthly DSE All Share price index from January 1987 to November 2012 has been used to test January effect in the stock return in DSE. It was empirically found that, although January anomaly didn't exist in DSE, there was significant positive return in June. Nageswari et al. (2013) found that the highest mean return was earned in December and the lowest/negative mean return earned in January month for S and PCNX Nifty index. The S and PCNX 500 index recorded the highest mean return in the month of March and the highest negative mean returns in the month of January. The analytical results of seasonality indicated the absence of January anomaly during the study period. Ogieva et al., (2013) examined the calendar effect in the Nigerian Stock Market from 19 April 2005 to 30 September 2010. Using the multiple ordinary least square regression, they found negative returns on Monday, Thursday and Friday. They also found positive returns on Tuesday and Wednesday. Returns in February, March, April, May and December were negative significant. Whereas the positive returns appeared in January, August, September, October and November. In the case of June and July there were mixed signs.

### 3. THE METHODOLOGY

This paper uses weekly data, every Monday and Friday in period 2006-2013 and it is divided into 3 subperiods: All months, non-January months and January month. By using purposive sampling, this paper has 12 firms that continued listing in LQ-45 Index in Indonesian stock exchange.

Dependent variable in this paper is return of stock, calculated as:

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

Where  $R_{i(t)}$  is return on stock  $i$  at time  $t$ ;  $P_{i(t)}$  is price on stock  $i$  at time  $t$ ;  $P_{i(t-1)}$  is price on stock  $i$  at time  $t-1$ . Independent variables

in this paper are weekend effect. Weekend effect refers to the abnormally high returns to common stocks on Friday and negative returns on Monday. This paper uses the unconditional method and the conditional method (Pettengill et al., 1995). The unconditional method is a method without dividing the market conditions, whereas the conditional method is a method with dividing the market conditions, up and down market. Up market is when there is a positive risk premium ( $R_m - R_f > 0$ ) and down market is when there is a negative risk premium ( $R_m - R_f < 0$ ). Where  $R_m$  refers to return of market and  $R_f$  refers to return of risk free rate. The hypotheses in this paper are:

Ho: The average return on Monday is the same to the average return on Friday.

Ha: The average return on Monday is different to the average return on Friday.

Before testing the significance of differences between return on Monday and return on Friday, first it can be found if there is weekend effect in each of the subperiods, where the mean return on Monday is lower than the mean return on Friday. Next, the significance of differences should be investigated. In testing the hypothesis, this study will use the independent sample t-test. If the probability of significance  $\leq 0.05$ , Ho is rejected, that means the average return on Monday is different to the average return on Friday. If the probability of significance  $> 0.05$ , Ho is accepted, that means the average return on Monday is the same to the average return on Friday.

## 4. RESULTS AND DISCUSSIONS

### 4.1. All Months Period by Using the Unconditional Method

Table 1 shows that the average return on Monday is  $-0.0015$ , lower than the average return on Friday,  $0.0011$ .

The probability of significance in Levene's test for equality of variances is  $0.000 \leq 0.05$ , that means the variance is different. Thus the t-test analysis is using equal variances not assumed. The probability of significance in equal variances not assumed is  $0.001$  (two-tailed). So it can be concluded that there is weekend effect, whereas the average return on Monday is lower than the average return on Friday, and the average difference on Monday and Friday is significant different (the probability of significance  $0.001 \leq 0.05$ ) (Table 2).

### 4.2. All Months Period by Using the Conditional Method (up Market)

Table 3 shows that the average return on Monday is  $0.0137$ , higher than the average return on Friday,  $0.0104$ .

The probability of significance in Levene's test for equality of variances is  $0.005 \leq 0.05$ , that means the variance is different. Thus the t-test analysis is using equal variances not assumed. The probability of significance in equal variances not assumed is  $0.000$  (two-tailed). So it can be concluded that there is no weekend effect, whereas the average return on Monday is higher than the average

return on Friday, eventhough the average difference on Monday and Friday is significant different (the probability of significance  $0.000 \leq 0.05$ ) (Table 4).

### 4.3. All Months Period by using the Conditional Method (down Market)

Table 5 shows that the average return on Monday is  $-0.0149$ , lower than the average return on Friday,  $-0.0116$ , or in other words, the average loss in return of Monday is bigger than Friday.

The probability of significance in Levene's test for equality of variances is  $0.033 \leq 0.05$ , that means the variance is different. Thus the t-test analysis is using equal variances not assumed. The probability of significance in equal variances not assumed is  $0.000$  (two-tailed). So it can be concluded that there is weekend effect, whereas the average return on Monday is lower than the average return on Friday, and the average difference on Monday

and Friday is significant different (the probability of significance  $0.000 \leq 0.05$ ) (Table 6).

### 4.4. Non-January Months Period by Using the Unconditional Method

Table 7 shows that the average return on Monday is  $-0.0007$ , lower than the average return on Friday,  $0.0011$ .

The probability of significance in Levene's test for equality of variances is  $0.000 \leq 0.05$ , that means the variance is different. Thus the t-test analysis is using equal variances not assumed. The probability of significance in equal variances not assumed is  $0.009$  (two-tailed). So it can be concluded that there is weekend effect, whereas the average return on Monday is lower than the average return on Friday, and the average difference on Monday and Friday is significant different (the probability of significance  $0.009 \leq 0.05$ ) (Table 8).

**Table 1: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday	4677	-0.0015	-0.04593	-0.00067
Friday	4500	-0.0011	-0.02800	-0.00042

SD: Standard deviation, SER: Standard error mean

**Table 2: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	35.124	0.000	-3.277	9175	0.001	-0.00261	0.00080	-0.00418	-0.00105
Equal variances not assumed			-3.306	7779.361	0.001	-0.00261	0.00079	-0.00416	-0.00106

CI: Confidence interval

**Table 3: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday up	2299	0.0137	0.03599	0.00075
Friday up	2601	0.0104	0.02635	0.00052

SD: Standard deviation, SER: Standard error mean

**Table 4: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	7.817	0.005	3.639	4898	0.000	0.00325	0.00089	0.00150	0.00501
Equal variances not assumed			3.571	4164.844	0.000	0.00325	0.00091	0.00147	0.00504

CI: Confidence interval

**Table 5: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday down	2367	-0.0149	0.03281	0.00067
Friday down	1899	-0.0116	0.02507	0.00058

SD: Standard deviation, SEM: Standard error mean

#### 4.5. Non-January Months by Using the Conditional Method (up Market)

Table 9 shows that the average return on Monday is 0.0135, higher than the average return on Friday, 0.0103.

The probability of significance in Levene's test for equality of variances is  $0.051 > 0.05$ , that means the variance is the same. Thus the t-test analysis should use equal variances assumed. The probability of significance in equal variances assumed is 0.000 (two-tailed). So it can be concluded that there is no weekend effect, whereas the average return on Monday is higher than the average return on Friday, eventhough the average difference on Monday and Friday is significant different (the probability of significance  $0.000 \leq 0.05$ ) (Table 10).

#### 4.6. Non-January Months Period by Using the Conditional Method (down market)

Table 11 shows that the average return on Monday is  $-0.0147$ , lower than the average return on Friday,  $-0.0116$ , or in other words, average loss in returns of Monday is bigger than Friday.

The probability of significance in Levene's test for equality of variances is  $0.050 \leq 0.05$ , that means the variance is different. Thus the t-test analysis should use equal variances not assumed. The probability of significance in equal variances not assumed is 0.001 (two tailed). So it can be concluded that there is weekend effect, whereas the average return on Monday is lower than the average return on Friday, and the average difference on Monday

**Table 6: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	4.540	0.033	-3.719	4264	0.000	-0.00339	0.00091	-0.00518	-0.00160
Equal variances not assumed			-3.828	4254.106	0.000	-0.00339	0.00089	-0.00513	-0.00165

CI: Confidence interval

**Table 7: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January	3791	-0.0007	0.03383	0.00055
Friday non-January	4140	0.0011	0.02798	0.00043

SD: Standard deviation, SEM: Standard error mean

**Table 8: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	13.936	0.000	-2.643	7929	0.008	-0.00184	0.00069	-0.00320	-0.00047
Equal variances not assumed			-2.621	7374.977	0.009	-0.00184	0.00070	-0.00321	-0.00046

CI: Confidence interval

**Table 9: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January up	2154	0.0135	0.02819	0.00061
Friday non-January up	2410	0.0103	0.02641	0.00054

SD: Standard deviation, SEM: Standard error mean

**Table 10: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	3.805	0.051	3.959	4562	0.000	0.00320	0.00081	0.00162	0.00479
Equal variances not assumed			3.945	4423.468	0.000	0.00320	0.00081	0.00161	0.00479

CI: Confidence interval

and Friday is significant different (the probability of significance  $0.001 \leq 0.05$ ) (Table 12).

#### 4.7. January Months Period by Using the Unconditional Method

Table 13 shows that the average return on Monday is  $-0.0116$ , lower than the average return on Friday,  $0.0012$ .

The probability of significance in Levene's test for equality of variances is  $0.000 \leq 0.05$ , that means the variance is different. Thus the t-test analysis should use equal variances not assumed. The probability of significance in equal variances not assumed is  $0.031$  (two-tailed). So it can be concluded that there is weekend effect although in January month, whereas the average return on Monday is lower than the average return on Friday, and the average difference on Monday and Friday

is significant different (the probability of significance  $0.031 \leq 0.05$ ) (Table 14).

#### 4.8. January Months Period by Using the Conditional Method (up market)

Table 15 shows that the average return on Monday is  $0.0166$ , higher than the average return on Friday,  $0.0122$ .

The probability of significance in Levene's test for equality of variances is  $0.032 \leq 0.05$ , that means the variance is different. Thus the t-test analysis should use equal variances not assumed. The probability of significance in equal variances not assumed is  $0.586$  (two tailed). So it can be concluded that there is no weekend effect, whereas the average return on Monday is higher than the average return on Friday, and the average difference on Monday and Friday is not significant different (the probability of significance  $0.586 > 0.05$ ) (Table 16).

**Table 11: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January down	2129	-0.0147	0.03211	0.00070
Friday non-January down	1730	-0.0116	0.02497	0.00060

SD: Standard deviation, SEM: Standard error mean

**Table 12: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	3.840	0.050	-3.327	3857	0.001	-0.00314	0.00094	-0.00499	-0.00129
Equal variances not assumed			-3.413	3849.810	0.001	-0.00314	0.00092	-0.00494	-0.00133

CI: Confidence interval

**Table 13: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January	394	-0.0116	0.11353	0.00572
Friday non-January	360	0.0012	0.02828	0.00149

SD: Standard deviation, SEM: Standard error mean

**Table 14: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	16.491	0.000	-2.075	752	0.038	-0.01277	0.00615	-0.02484	-0.00069
Equal variances not assumed			-2.160	445.939	0.031	-0.01277	0.00591	-0.02438	-0.00115

CI: Confidence interval

**Table 15: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January up	145	0.0166	0.09371	0.00778
Friday non-January up	191	0.0122	0.02550	0.00184

SD: Standard deviation, SEM: Standard error mean

**Table 16: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	4.626	0.032	0.615	334	0.539	0.00437	0.00710	-0.00960	0.01833
Equal variances not assumed			0.546	160.260	0.586	0.00437	0.00800	-0.01143	0.02016

CI: Confidence interval

**Table 17: Group statistics**

Day	N	Mean	SD	SEM
Return				
Monday non-January down	238	-0.0170	0.03853	0.00250
Friday non-January down	169	-0.0113	0.02606	0.00200

SD: Standard deviation, SEM: Standard error mean

**Table 18: Independent samples test**

t-test for	Levene's test for equality of variances		t-test for equality of means						
	F	Significant	t	df	Significant (two-tailed)	Mean difference	Standard error difference	95% CI of the difference	
								Lower	Upper
Return									
Equal variances assumed	0.771	0.380	-1.674	405	0.095	-0.00571	0.00341	-0.01242	0.00099
Equal variances not assumed			-1.784	404.124	0.075	-0.00571	0.00320	-0.01201	0.00058

CI: Confidence interval

**4.9. January Months Period by using the Conditional Method (down Market)**

Table 17 shows that the average return on Monday is -0.0170 lower than the average return on Friday, -0.0113, or in other words, average loss in returns of Monday is bigger than Friday.

The probability of significance in Levene's test for equality of variances is 0.380 > 0.05, that means the variance is the same. Thus the t-test analysis should use equal variances assumed. The probability of significance in equal variances not assumed is 0.095 (two tailed). So it can be concluded that there is no weekend effect, because the average difference on Monday and Friday is not significant different (the probability of significance 0.095 > 0.05) (Table 18).

**5. CONCLUSIONS AND RECOMMENDATIONS**

Results support the weekend effect in three subperiods by using the unconditional method. But when using the conditional method, the weekend effect only appears in down market in all months period and non-January months period. There's no weekend effect in January month period when using the conditional method, both in up market and down market. This paper presents new evidences and supplements the finance literature on the weekend effect for the case in Indonesian stock exchange, and also help investors to develop a good investment strategy. Investors could buy stocks on Monday with abnormally low returns and sell stocks on Friday with abnormally high returns in three subperiods by using the unconditional method. Investors could also buy stocks on Monday, because the prices on Monday are lower than the prices on Friday in all months period and non-January months period by using the

conditional method in down market, and then sell stocks on Friday in three subperiods by using the unconditional method.

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