DOES INDONESIAN CAPITAL MARKET EFFICIENT ? : A RELATION BETWEEN PRICE-VOLUME

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Abstract: Efficient markets show prices have reflected information. In an efficient market, the pattern of price movements is a random walk, meaning that prices cannot be predicted accurately, so investors do not get abnormal returns. The informations used in this study are: lag-return (r-1); lag return(r-2); trading volume, as well as the synergy between (r-1) and trading volume. This research found that the coefficient was not significant in almost all tests. Investors cannot use past information to get abnormal returns Thus the efficient market hypothesis is proven. This efficient market situation shows that all market participants have equal opportunities in terms of risk-return.
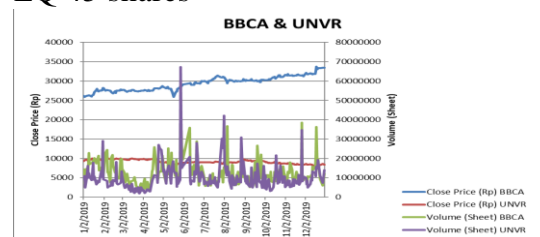
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INTRODUCTION

Price and transaction volume are two critical variables. The Open and close prices can still be the same, but the transaction does not mean zero and can lead to investor profits. For this reason, the return and volume can be an indicator to know about the market. For example, graph 1 shows about price and trading volume of LQ 45 shares. The price is not volatile, but the magnitude of the transaction is very volatile. While illiquid shares, where the price suddenly increases and is followed by transactions. But after that, the trading volume occurs in small amounts (graphics not included). In addition, each stock has a different tick size depending on the stock price. The tick size is Rp1 for stocks with prices below Rp200, and the largest tick size is Rp 25 for stocks with prices above Rp 5,000. In this case, a low-priced stock has a high potential return, caused by two things: a relatively significant change (%) tick size; and less investment capital. Regarding this data, it appears that there is a relationship between volume, previous prices, and current prices, wherein in this technological age, investors will use this data for investment decisions.

Graph 1: Price and Trading Volume of LQ 45 shares

Investing in the capital market has a high return as well as high risk. For this reason, investors need to know many things, both fundamental and technical. Fundamentally, investors need to understand the issuer's data, as well as market price movements. Research on capital market conditions is known as research on market efficiency. A market is said to be efficient if its stock prices fully reflect all the information that enters the market, so that stock price movements are random and unpredictable. The information obtained by investors will

also lose its value because all the information has been reflected in the price.

Although it has been put forward since 1970, this theory is still very relevant to be tested. This is because stock price movements are very dynamic. Still, some investors can beat the market (as if they can predict future movements), which raises questions about the efficiency of the capital market. A market is said to be efficient if several assumptions are met. These assumptions relate to the information and behavior of market participants, including whether information has spread quickly and is easy to obtain. On the other hand, information technology is already sophisticated, so it supports this. The next assumption is that investors/market participants are rational and try to maximize profits. So these investors must reflect all available information to stock prices, then the market can be said to be efficient.

The price movement (and then the return's movement) of shares in the capital market is determined by many things. One thing that is quite close to the price and important in its existence is trading volume because trading volume results from the accumulation of multiplication of the number of shares traded with their respective prices. This trading volume can also be an indicator of the liquidity of a product/service (not only for stocks). Goods/services with a small trading volume mean that the product is less liquid, so the product has a high risk of being difficult to be bought and be sold again. Goods/services with a large trading volume mean that the product has high liquidity, has a crucial role in the market, and is always needed by the community so that the opportunity not to be sold tends to be small. So, it can be said that these high-volume stocks are in great demand by market

traders/investors, so their prices tend to be high as well, and vice versa. This is an exciting thing to study. According to Karpoff (1986), the basis for volume occurrence is that there is a difference in belief (dispersion in belief) between the transacting parties. The bigger the difference, the higher the amount of this transaction will be.

There is some research about the effect of volume on returns; one of them is Sulistyo & Halim (2016) say that stock trading volume partially affects stock returns. Christiana, Setiana, & Mamduch (2016) also conducted research that states there is a positive contemporary relationship between return and trading volume, but only in a bullish market. This is contrary to research from Anggraini (2016), which says that trading volume does not affect returns (the returns were calculated by capital gains), and research from Rostami, Alipour, & Behzadi (2018), which says that there is no bilateral causal relationship between return, volume, and return volatility.

Tests related to efficient markets are usually autoregressive, where the previous price affects the current price. Ball and Bartov's (1986) classic article in Asnawi & Wijaya (2005) tested the NEEM model (nave earning expectation model) where the quarterly abnormal return (AR) was influenced by the previous four lags AR with a +++-relationship pattern. Asnawi and Wijaya (2005) believe that this pattern is a-theory. We propose a study with reference to 2 lag days. The advantage of using daily data (instead of quarterly) further strengthens the influence of information on transactions that day so that the response to prices occurs in an up-to-date manner. Chen (2014) shows that when it comes to issues (news), there are 60% responses on the first day and 20% responses on the second day. Thus the use of 2 lag days has absorbed around 80% of responses to news/news. Regarding

trading volume, there are many studies showing the effect of volume on prices. Theoretically, a bull market is indicated by two things: price and volume increase, while in a bear market, it is indicated by falling prices and not always followed by high volume. Therefore, trading volume has a positive effect on returns, where at high volume will show a high return. As evidenced in the announcement regarding daily transactions (composite index), large-volume trading is usually followed by an increase in the composite index.

Regarding the response above, where after the first day's lag has been responded by 80%, then the change in the first day's price lag becomes a barometer for transactions. Therefore, we propose a price lag interrelation variable, the first day and today's trading volume will moderate (positive effect) on today's prices. We propose this as the novelty of this research. Theoretically, both the previous price and the current volume will have a positive effect on today's price. Thus, it can be stated that if the interaction variable ($Pt-1$-Volume) has a positive coefficient, it can be stated that there has been a moderation between the two variables.

LITERATURE REVIEW

There are various studies that examine market efficiency, especially in the weak or semi-strong form. Zaman (2019) tests the market efficiency of the weak form of the Bangladesh Stock Exchange. The data taken is data from the Dhaka Stock Exchange and Chittagong Stock Exchange from 2013 to 2017. The results show that the Dhaka and Chittagong Stock Exchanges are inefficient in weak form. The results of this study are consistent with the research results of Mubarok & Fadhli (2020). They examined sectoral indices on the Indonesia Stock Exchange from February 1996 to March 2020. The

indices were tested for efficiency using the Variance Ratio test. Rašajski & Rankov (2016) tested market efficiency in Serbia with data from the BELEX15 and BELEXline index from 2005 to 2014. This study concludes that the market in Serbia is not efficient. This is supported by the condition of the capital market in Serbia itself which is still underdeveloped, mainly because the trading volume is still small, the types of securities and turnover traded in the market are still small, as the facts show that the market is still not fully regulated and transparent, and the lack of investors is real.

In addition to using the test with the aim of seeing the relationship of the previous price/return to the next price/return, testing the Efficient Market Hypothesis can also be done with an event study. This event study is related to the semi-strong form of the efficient market. There are several studies regarding this event study, for example, a study from Flostrand & Flogstad (2020). They studied the day of the week effect on the Norwegian securities market; the data was taken from 2000 to 2019. The study found evidence that this anomaly did occur, returns on Monday are lower, and returns on Friday are higher than the returns on other days. This study reports the occurrence of a day-of-the-week effect among stocks with small and medium capitalization, both for raw returns and risk-adjusted returns, but this day-of-the-week effect is not found in large-cap stocks. With the occurrence of these anomalies, it can be said that the market under study is inefficient. Asnawi et al. (2020), with weekend data, showed that there was no difference between negative (Friday, Monday) and positive (Friday, Monday) pairs. Paital & Panda (2018) also investigated the day of the week effect and the weekend effect on index returns and their volatility. The study period spanned from 2005 to 2018. The

study found evidence of a positive weekend effect as well as a negative Tuesday effect across all three indices. The return on Tuesday is lower than the return on Monday. The study also finds a positive weekend effect (except for the Nifty 50) as well as a negative Tuesday effect on return volatility for all three indices. The overall findings of this study indicate that the Indian market is inefficient, and the market is predictable based on historical series. Malini (2019) tested on the Indonesia Stock Exchange and showed that in certain seasonal anomalies, investors were proven to earn abnormal returns, especially in the current month. The existence of seasonal anomalies proves that the LQ45 Index in Indonesia is not efficient because investors can earn profits within a certain time.

Previous research about the relationship between return and trading volume was conducted by Kudryavtsev (2019), who examined the S&P 500 Index. This study suggests that the abnormal trading volume associated with large daily price changes can serve as a useful tool for predicting the direction of the next stock return. In other words, this abnormal trading volume has an effect on the return direction. In addition, large price increases and decreases are accompanied by abnormally high (low) trading volumes followed by significant price reversals on each of the next two trading days and during intervals of five and twenty days after the initial price movement. Kudryavtsev's findings are equivalent to the research of Christiana, Septiana, & Mamduch (2016), which analyzed the relationship between return and volume based on market cycles (bullish and bearish) using data from the Jakarta Composite Index (JCI) from 2010-2014. The findings from the study are there is a positive contemporary relationship between return and volume in bearish and bullish markets, which is only significant in bull markets, and there is also a positive unidirectional/cause-effect relationship of return to trading volume. Rostami, Alipour, & Behzadi (2019) showed that there is no confirmed bilateral causal relationship between return, volume, and return volatility. In other words, return and return volatility can hardly predict volume (influential but not significant).

An efficient market is when prices in the market reflect information. In this study, the information is indicated by the lag-return (-1), lag-return (-2), and trading volume variables. The three variables have a positive effect on the performance (price) of the stock. This is a theoretical necessity and also in accordance with the trend of economic/business data. We propose the interaction variable between lag return (-1) and trading volume as research novelty, where a positive coefficient indicates the occurrence of an 'additional impact' or synergy between the two variables. The synergy of these two variables is important, which shows the attitude of investors in terms of transactions, which can indirectly indicate 'over-react.

METHOD

Data obtained from (idx.co.id) for the 2015-2020 period, which is divided into two periods, namely 2015-2019 and the temporary covid era (2020) as an additional period. The data taken are the price index and daily trading volume (value) of nine sectoral indices from the BEI plus the JCI, LQ45, JII, and the Manufacturing Index. This price index is then processed into daily market/sectoral returns. The analysis was carried out using the regression method as follows:

$$R_{t0} = c_0 + \beta_1 R_{t-1} + \beta_2 R_{t-2} + \beta_3 Vol + \beta_4 Vol * R_{t-1} + e_{it}$$

Annotation:

Rt0 = Today's Return.

β1-4 = Regression Coefficient.

c0 = Constant.

Rt-1 = Lag return (r-1).

Rt-2 = Lag return (r-2).

Vol = Today's trading Volume.

eit = error.

lag return (r-1), lag return (r-2), volume, and interaction volume*lag return (r-1) variables have a positive effect on today's return. Trading volume is said to be successful in moderating the effect of lag return(r-1) if the moderating coefficient is positive. This research is in the form of testing the efficiency of the weak form of the market, where if the coefficient of the independent variable is significantly positive, it means that the market is not efficient. This is because investors can obtain abnormal returns by paying attention to these influential variables.

RESULT AND DISCUSSION

From table 1, it is known that the variable lag return (r-1) gives inconclusive results both from the sign of the coefficient (positive and negative) and the level of significance (significant and insignificant). When compared to the 2015-2019 and 2020 periods, it is found that there are differences in coefficient signs in 3 sectors, namely: agriculture, infrastructure, and trade. The Composite Index found a positive and significant coefficient lag return (r-1) in the two research periods. However, if we look at the sector, we find positive and significant coefficients only in 2020 (covid era), namely at LQ 45; agriculture, mining, and property sectors. This result shows that investors have not been proven to pay attention to yesterday's return/price for today's decision. Thus today's movement is 'random' and unpredictable. Many coefficients are not significant so cannot be used to predict current stock price. In

this case, the Efficient Market Hypothesis test is shown by whether the prediction coefficient is significant or not significant. If the coefficient obtained is not significant, there is actually an efficient market, because the variable cannot be used to predict stock price, or stock price will move randomly. For the variable lag return (r-2) found a negative coefficient for all sectors, some of the coefficients are significant; except in the trade sector (for both periods), positive and insignificant coefficients were found. This result shows that it is not proven that investors pay attention to return-lagged 2 in their decisions in today's trading. The trading volume variable has positive coefficients for all sectors (13 tests) during the Covid period, but in the 2015-2020 period, negative coefficients were found in 4 sectors, namely: Composite Index, LQ 45, Miscellaneous, and Finance. These results show that the overall trading volume has become a consideration for investors in investment decisions, wherein a crowded market situation, it will be followed by an increase in price/index. The moderating variable is stated to strengthen if these three conditions occur: (i) the variable coefficient lag return (r-1) is positive; (ii) positive trading volume variable coefficient; (iii) and the multiplicative variable are both positive. From table 1, in the 2015-2019 period, none of the sectors met the above prerequisites, but in the covid (2020) period, it was found only in the agriculture, finance sector. Thus, in general, there is no 'synergy' between the previous price and today's trading volume.

If we look at the three variables above, the trading volume variable seems to have more influence on today's prices. Thus, investors seem to pay attention to the number of transactions that occur. However, in 2015-2019; Unfortunately, this is not proven in the main sectors, namely the Composite Index and LQ 45 (45 firms with a market capitalization of

around 70% of the total), where a negative coefficient is found. Thus, in general (for large issuers), if the transaction is large, the market situation becomes bearish. The bear market shows the impulse to sell is higher than the impulse to buy. To be a study, (i) which group of investors tend to sell; (ii) what psychological factors influence this selling impulse. However, this situation has changed during the Covid period, where high transactions also occur on the bullish side. This may be due to a pandemic (increasing online trading) and the entry of 'new investors' where some of them are Gen Z. For price variables, lag return (r-1) positively affects today's return transactions. If it is related to Chen (2014), it seems that this result is adequate, where the response to the news is absorbed in the first 2 days. These results indicate, investors prepare their transactions based on information on the previous day. However, surprisingly, the coefficient lag return (r-2) was found to be negative, which is not in accordance with the hypothesis. The hypothesis shows that the coefficient should be positive, because it relates to price trends and also positive economic trends. The trading volume variable shows inconclusive conclusions (some positive and some negative), in fact, it shows that large transactions (high liquidity) can be followed by negative returns or positive returns. So large transactions can occur in a bullish or bearish market. It's as an indication that investors cannot use trading volume variables as a guide to predicting the direction of market movements. As in the Fama and French (1996) article, the focus of analysis is on variable significance, and ignores analysis regarding R2.

The synergy between the variables lag (r-1) and (volume) was only found in 2 sectors out of 26 tests. This situation shows the market has not shown any 'overreaction' or acceleration from the market. In this case, there is no panic buying and or panic selling and or over-reacting.

If seen from the research period, the Covid period provides stronger evidence. Some of the arguments that can be given are as follows: (i) more transactions in the covid era due to the entry of novice investors, even the highest transaction in November 2020, reaching Rp32T ($2.9B); (ii) shorter transaction times, from 5.5 hours/day to 4 hours/day. With a shorter time, the intensity of transactions increases. Attention: after the Covid era is over, is it necessary to bring back the transaction time to its normal time?

If seen from the existing sector, the agriculture sector shows more evidence of the validity of this study. In this sector, we found a positive lag return (r-1) coefficient, trading volume (+), and interactive coefficient (+) in 2020. The agriculture sector can be a special concern for investors regarding the occurrence of an efficient market. The agricultural sector is dominated by palm oil issuers, where these issuers are strongly influenced by seasons, market demand, and high fluctuations in commodity prices. For this, investors are expected to study the company's fundamentals.

From the above description, it seems that the Indonesian capital market is efficient, where the variables 'lag-return' and 'Trading volume' are not proven to affect returns in many sectors. Some of the implications of this result are: first, for investors, this is good news because investors have many sector choices, and because prices move 'randomly,' investors have two common consequences, namely the potential risk and return. Thus, investors need to implement risk management for the sake of optimizing transactions. Second, for issuers, this is also good news, where issuers can focus more on managing the

company (fundamentals) professionally without the need to consider what will happen to the capital market. Thus, issues/rumors in the stock market do not need to be addressed. Third, for the regulator, the Financial Services Authority (FSA), it is necessary to monitor the market so that fairness is carried out so that transactions run well. The FSA needs to give warnings regarding transactions that are deemed inappropriate (UMA) but should not stop transactions as it can reduce market liquidity. Fourth, the covid era (2020) situation shows stronger evidence of the influence of lag-return and trading volume on stock performance. The covid situation is shown by three things, namely: (i) Generation Z participates in stock transactions, (ii) online trading increases, and (iii) reduces transaction operating hours. If the covid era ends, then situation (iii) will be different, so there is potential for the market to be more efficient.

Table 1: Regression results for return Against lagged return and volume (2015-2020)

The symbols *, **, *** indicate significance at α = 1%; α= 5%; a = 10%.

(continuation)

Var	2015 – 2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	-0.112		0.013	0.0065*				-0.053		0.253	0.1265			
r-1	-0.051	-0.0529	0.329	0.1645				0.064	0.064	0.172	0.086**			
r-2	-0.056	-0.056	0.052	0.026**	0.022	6.772	2.008	-0.049	-0.049	0.09	0.045*	0.014	4.389	1.991
Vol	0	0.074	0.01	0.0005*				0	0.059	0.04	0.02			
Vol*r-1	0	0.155	0.003	0.0015*				0	0.034	0.47	0.235			

Basic Industry

Var	2015 – 2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	-0.109		0.435	0.2175				-0.383		0.027	0.0135			
r-1	-1.248	-0.067	0.734	0.367				8.787	-0.038	0.845	0.4225			
r-2	0	0	0.996	0.498	0.004	0.421	1.827	-0.022	-0.023	0.655	0.3275	0.025	2.499	1.734
Vol	0	0.041	0.418	0.209				0.001	0.154	0.002	0.001*			
Vol*r-1	2.927	0.108	0.586	0.293				2.214	0.066	0.737	0.3685			

Consumption

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	0.008		0.846	0.423				-0.144		0.548	0.274			
r-1	-0.079	-0.079	0.02	0.01*				-0.149	-0.149	0.343	0.1715			
r-2	-0.051	-0.051	0.076	0.038**	0.007	2.175	2.007	-0.112	-0.112	0.087	0.0435**	0.019	1.161	1.943
Vol	1.42E-05	0.013	0.652	0.326				1.20E-04	-0.033	0.626	0.313			
Vol*r-1	1.49E-05	0.021	0.544	0.272				8.29E-05	0.081	0.611	0.3055			

Finance

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW

(continuation)

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	0.113		0.0002	0.0001*				-0.394		0.136	0.068**			
r-1	0.045	0.0347		0.1735				0.079	0.0796	0.609	0.3045			
r-2	-0.068	-0.0068	0.017	0.0085**	0.022	6.698	2.012	-0.0557	-0.0557	0.381	0.1905	0.041	2.524	1.999
Vol	-2.88E-05	-0.146	0.004	0.0002*				1.30E-04	-0.157	0.087	0.0435**			
Vol*r-1	2.62E-05	0.086	0.18	0.09***				4.70E-06	-0.022	0.898	0.449			

Infrastructure

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	0.04		0.562	0.281				-0.658		0.018	0.009*			
r-1	0.143	-0.143	0.052	0.026**				0.173	0.173	0.243	0.122			
r-2	0.104	-0.104	0.0001	0.0000*	0.014	4.255	2.002	-0.175	-0.175	0.007	0.0004*	0.055	3.386	1.928
Vol	0.0000052	0.024	0.421	0.211				0.0000477	0.181	0.009	0.0005*			
Vol*r-1	0.0000112	0.125	0.094	0.047***				-0.0000108	-0.169	0.267	0.134			

Mining

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW
C	-0.026		0.582	0.291				-0.308		0.052	0.026**			
r-1	-0.001	0.001	0.988	0.494				0.226	0.226	0.017	0.009*			
r-2	-0.011	-0.011	0.702	0.351	0.007	2.102	1.994	-0.037	0.037	0.567	0.284	0.068	4.299	2.004
Vol	0.0005996	0.037	0.203	0.102				0.0004473	0.268	0.000	0.000*			
Vol*r-1	0.0008577	0.191		0.191				0.0001197	0.291	0.096***	0.004		0.0002*	

Miscellaneous

Var	2015-2019 B	beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW	2020 B	Beta	sign (2-tailed)	Sign (1-tailed)	R²	F	DW

Var	B	beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW	B	Beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW
C	0.021	0.824	0.412					-0.398	0.204	0.102				
r-1	-0.153	0.015	0.0008*					-0.229	0.230	0.118	0.059***			
r-2	-0.084	0.003	0.002*		0.013	3.871	2.005	-0.031	0.031	0.630	0.315	0.029	1.736	1.957
Vol	-0.0002518	0.886	0.443					0.0000968	0.092	0.156	0.078***			
Vol*r-1	0.0000305	0.162	0.013	0.0007*				0.0000585	0.295	0.045	0.023*			

	2015-2019							2020						

Var	B	beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW	B	Beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW
Property														
C	-0.246		0	0*				-0.629		-0.0001	0.00005*			
r-1	0.124	0.124	0.05	0.025***				0.239	0.239	0.025	0.0125**			
r-2	-0.019	-0.019	0.51	0.255	0.02	6.084	1.981	-0.042	-0.042	0.513	0.2565	0.085	5.46	1.966
Vol	2.10E-04	0.126	0	0*				0.001	0.287	0	0*			
Vol*r-1	-6.1E-05	-0.068	0.294	0.147				2.20E-04	-0.176	0.131	0.0655***			

	2015 – 2019							2020						

Var	B	beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW	B	Beta	sign(2-tailed)	Sign(1-tailed)	R²	F	DW
Trade														
C	-0.339		-0.006	0.003*				-0.406		-0.004	0.002*			
r-1	0.116	0.116	0.484	0.242				-0.094	-0.094	0.418	0.209			
r-2	1.016	-0.048	0.34	0.17	0.026	2.585	2.005	1.121	-0.046	0.359	0.1795	0.037	3.671	2.007
Vol	0	0.175	-0.003	0.00015*				0	0.173	-0.001	0.00005*			
Vol*r-1	0	-0.165	0.333	0.1665				-5.642	-0.006	0.956	0.478			

CONCLUSIONS AND SUGGESTIONS

The analysis results show that lag-return (r-1), lag return (r-2), and trading volume have not been proven to have a positive effect on stock performance. Thus the efficient market hypothesis applies. This efficient market situation shows that all market participants have equal opportunities in terms of risk-return. The implication of these findings is the need to obtain equal information for all parties so that transactions run fairly. For this reason, it is advisable for: (i) the FSA, to pay attention to exchanges, especially with regard to equality of information; (ii) the issuer, to provide all information publicly; (iii) investors, to optimize information, so as to obtain higher quality information.

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