



FACTORS AFFECTING ON THE STOCK PRICE INDEX IN VIETNAM

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Abstract

This study measures the influence of macroeconomic factors including consumer price index, exchange rate, Vietnam bond interest rate, world oil price and world gold price on stock price index (VNI) in the period from October 2017 to October 2022. By quantitative research method, the study shows that the exchange rate has a negative impact on the stock price index; the world gold price and the world oil price have the same impact on VNI.

Keywords

Stock price index, exchange rate, world oil price, world gold price

1. Introduction

After being formed and put into operation, Vietnam's stock market has become one of the important capital mobilization channels and Vietnam's stock price index is considered as a mirror reflecting the strength of the economy. Therefore, stock price indexes receive special attention from investors and are an important factor affecting investment decisions. However, after the hot growth period, the market often fell into an unbalanced state, the stock price index continuously dropped. In addition, economic shocks and Black Swan phenomena such as the bankruptcy of Lehman Brothers bank (2008), the Covid-19 pandemic (2020), etc. also caused a lot of damage to investors and the stock market. Thereby, it can be seen that the negative information about the macroeconomy has had a significant impact on the decline of the stock price index. As a result, is there really a correlation between macroeconomic factors and stock price index in Vietnam?

2. Theoretical basis and related research

According to Gan, Lee and Zhang (2006), Mukhejee and Naka (1995), Rahman, Sidek and Tafri (2009), Narayan, K.P. and Narayan, S. (2010) states that macro factors have an influence on stock price index fluctuations.

- **Stock price index:** According to the General Statistics Office (2010), "A stock price index is a relative number (expressed in points), the comparative relationship between the average stock price of the research period (currently) with the selected base period average price (usually 100 or 1000). A stock index is composed of two elements, namely the type of security (weighted) and the price of each constituent security. In Vietnam, the VNI is a stock price index of the Ho Chi Minh City Stock Exchange (HOSE), showing the trend of price movements of all stocks listed on the HOSE.

- **Consumer Price Index:** The consumer price index is used to measure the average price of a basket of goods and services that a typical consumer charges. This is an index that reflects the relative change in the prices of consumer products over time, which represents the inflation index. The consumer price index is expressed in percent (%). The negative relationship between inflation and stock price index was demonstrated through the studies of Jamaludin et al. (2017), Prieto and Lee (2019), Liu and Sharestha (2008) in which they analyzed the China's stock market and found a negative correlation between the stock price index and the inflation rate, in other words, the consumer price index.

- **Exchange rate:** An exchange rate is the rate at which one currency will be exchanged for another. It is also considered as the monetary value of a country expressed in another country's currency. Compared with other currencies, USD is popular and used by most businesses in international payment contracts. Following the approach of Dornbusch and Fisher (1980); Hanif and Bahatti (2019), the relationship between stock price index and exchange rate is positive. Dornbusch and Fisher (1980) argue that when the domestic currency is undervalued, domestic firms become more competitive. As a result, international trade activities increase, their exports are cheaper when going to the international market. This causes the share prices of these businesses to increase. Meanwhile, Brason (1983) proved that the exchange rate has a negative effect on stock prices. Pham Dinh Long and Ngo Thi Thu Hanh (2019) measure the short-term and long-term impact of the exchange rate on Vietnam's stock market by applying Johansen co-integration test and VECM model, the Granger causality test also demonstrates that exchange rates have a negative effect on stock prices. According to the studies of Akbar, Rauf and Chaudhry (2019), Wei et al. (2019) and Sadeghi (2018), exchange rate negatively affects stock price index.

- **Government bond yield:** The government is one of the biggest investors in the economy, and bond yield can be a useful metric in assessing the health of the economy. Government bond yields are often used by economists to gauge the trajectory of an economy. Therefore, the study of the correlation between bonds and stocks to serve the purpose of making portfolio selection and minimizing investment risks is always of interest to investors and financial institutions. On the other hand, studying the impact between bond yields and stock prices provides legislators with a better understanding of market movements, thereby making policies to control the market in the right direction.

The correlation between bond yields and stock prices is said to be negatively correlated through the Fed model developed by Yardeni (1997, 1999). Specifically, the Fed Model is a theory of equity valuation that has wide application in the investment community. The model compares stock market earnings-price ratio (E/P) with long-term government bond yields. According to that formula, the yield on a 10-year government bond is inversely proportional to the stock's market price.

According to market psychology, specifically when bond interest rates are low, investors tend not to invest in bonds but often invest in stocks. The negative relationship between bond interest rates and stock price indexes is demonstrated through the studies of Chang et al (2019), Nguyen Thi Nhu Quynh and Vo Thi Huong Linh (2019), Pham Dinh Long and Ngo Thi Thu Hanh (2019). In addition, Fama and Schwert (1977) and Campbell and Ammer (1993) support this argument in their research on the market of developed countries mainly in the UK and USA.

However, according to some studies by Gulko (2002) and Ilmanen (2003) in the developing country market, it shows that the positive correlation between stock investment returns and bond yields occurs mainly around the world financial crises. This phenomenon is often referred to as the investment shift in quality or 'Flight to Quality' in English. Flight to Quality is a phenomenon in which investors make their capital move away from risky investments to safer investments. Therefore, during the economic crisis, the government adopted loose monetary policies, resulting in relatively low bond yields. However, with the risk aversion in the stock market, investors still choose bonds, safer objects to invest, rather than stocks. Since there are still many theoretical debates about the correlation between bond yields and stock prices, it is necessary to study this correlation in the Vietnamese market to determine the market trend. The purpose is to serve investors, financial institutions and legislators.

- **World oil price:** Oil price is usually the spot price of a barrel of crude oil reference price for buyers and sellers of crude oil such as West Texas Middle (WTI), Brent Crude, Dubai Crude, OPEC Reference Basket, Tapis crude, Bonny Light, Urals Oil, Isthmus and Western Canada Select (WCS). There is a difference in the price of a barrel of oil based on its grade as determined by factors such as specific gravity or API gravity and its sulfur content and its location, such as near to a seaport and oil refinery or not. Heavier, more acidic crude grades where access is unavailable near a seaport, such as Western Canada Select, are cheaper than lighter, sweeter oils like WTI. Barrel is a unit used to measure the volume of crude oil in trading. One barrel can hold 42 US gallons ~158.9873 liters, 07 barrels of oil ~1.113 tons, 1 US gallon ~3.785cm³ ~3.785 liters. Collected data on world oil prices are based on the monthly average of WTI crude oil traded on the NYSE.

For developing countries, energy demand is always considered a top priority for the overall development of the economy. Moreover, oil is one of the main fuels used in most industries. Theoretically, an increase in world oil prices leads to an increase in input costs, making business activities of enterprises affected. The expected return of the business and the investors' expectation about the future growth of business's fiscal space decreased, leading to a decrease in the stock price. The positive relationship between world oil price and stock price index is demonstrated through the studies of Chittedi (2012), Kumar and Narayan (2010) and Tursoy and Faisal (2017). However, the negative relationship between the world oil price and the stock price index is demonstrated through the studies of Gokmenoglu (2015), Pham Dinh Long and Ngo Thi Thu Hanh (2019), GIRI A. K, JOSHI Pooja (2017).

Theoretically, an increase in the world oil price leads to an increase in input costs, making the expansion investment activities of enterprises affected, the expected returns of enterprises and investors' belief in the future enterprise value declines, leading to a decrease in stock prices. The negative relationship between world oil price and stock price index is proven through the studies of Pham Dinh Long and Ngo Thi Thu Hanh (2019), GIRI A. K, JOSHI Pooja (2017).

- **World gold price:** Research by Bhunia and Mukhuti (2013), Yahyazadehfar and Babaie (2012) and Bhunia (2013) show that the world gold price has a negative impact on the stock price index. Research by Garefalakis, Dimitras, Koemtzopoulos and Spinthiopoulos (2011) shows that the fluctuation of gold prices negatively affects investment returns on the Hong Kong stock market. According to Truong (2014), the fluctuation of gold price is negatively correlated with the profitability of stocks. Quantitatively, when the price of gold increases or decreases by 1%, the return on stocks will decrease or increase by 0.72%. By the VAR model, Akbar et al. (2019) prove that gold price and stock price have mutual influence and it is the reverse effect. Meanwhile, the study of Kaliyamoorthy and Parithi (2012) and Buyuksalvarci (2010) concluded that, there is no relationship between world gold price and stock price index.

3. Research data and methods

The data of the study include stock price index and macroeconomic factors such as consumer price index, exchange rate, government bond yield, world oil price and world gold price collected from the International Monetary Fund (IMF), the General Statistics Office of Vietnam (GSO) and Finance Vietstock. The data in the study consisted of 60 observations collected on a monthly basis, between October 2017 and October 2022.

On the basis of theory and previous studies, the author proposes a research model in Vietnam to re-examine the impact of macroeconomic variables on Vietnam's stock index.

$$VNI = \beta_0 + \beta_1 * CPI + \beta_2 * EX + \beta_3 * IR + \beta_4 * OP + \beta_5 * GP + \epsilon t$$

In which: The dependent variable VNI is taken from the method of calculating the average closing price of the days per month on HOSE. The independent variables in the model such as CPI, EX, IR, OP, GP are calculated by month in the period from October 2017 to October 2022.

Variable	Acronym	Calculation	Expectation	Experimental studies	Unit	Data sources
VN-Index	VNI	(Current capitalized value/ Basic capitalized value) *100	Up and down	Gan, Lee and Zhang (2006), Mukhejee and Naka (1995), Rahman, Sidek and Tafri (2009), Narayan, KP and Narayan, S. (2010)	Point	https://FinanceVietstock.vn
Consumer price index	CPI	(Cost of the market basket in year t/Cost of the same market basket in the base year) *100	Inverse	Jamaludin et al. (2017), Prieto and Lee (2019), Liu and Sharestha (2008)	%	https://FinanceVietstock.vn
Exchange rate	EX	Exchange rate VND/USD	Inverse	Pham Dinh Long and Ngo Thi Thu Hanh (2019), Akbar, Rauf and Chaudhry (2019), Wei et al. (2019) and Sadeghi (2018)	USD /VND	https://Investing.com
Government bond yield	IR	Government bond yield	Inverse	Chang et al. (2019), Nguyen Thi Nhu Quynh and Vo Thi Huong Linh (2019), Pham Dinh Long and Ngo Thi Thu Hanh (2019), Schwert (1977) and Campbell and Ammer (1993)	%	https://FinanceVietstock.vn
World oil price	OP	WTI oil price	Inverse	Gokmenoglu (2015), Pham Dinh Long and Ngo Thi Thu Hanh (2019), GIRI A. K, JOSHI Pooja (2017)	USD /Barrel	https://Investing.com
World gold price	GP	World gold price	Inverse	Bhunja and Mukhuti (2013), Yahyazadehfar and Babaie (2012) and Bhunia (2013), Garefalakis, Dimitras, Koemtzopoulos and Spinthiopoulos (2011)	USD /Ounce	https://FinanceVietstock.vn

Table 1. Variables and Expectations

The article uses the OLS regression model and the model's defect tests to build a model to determine the factors and the degree of influence of each factor on VNI.

4. Research results and discussion

- **Data description:** Through data statistics, the minimum, maximum, average value and standard deviation of the variables in the model are shown in Table 2.

Variable	Number of observations	Minimum value	Maximum value	Average value	Standard deviation
VNI	61	662.53	1498.28	1079.12	207.17
CPI	61	98.46	101.52	100.25	0.49
IR	60	-0.19	0.36	0.00	0.08
GP	61	1187.25	1964.90	1585.96	251.43
OP	61	10.51	115.21	62.48	22.27
EX	61	22676.05	24326.90	23106.33	283.29

Table 2. Descriptive statistics of research data

(Source: Extracted from SPSS)

- **Pearson correlation test:** The Pearson correlation coefficient measures the degree of linear correlation between the independent variable and the dependent variable. The higher the absolute value of the Pearson correlation coefficient, the greater the correlation between the two variables (Chu Thi Tuyet Loan, 2017). If Sig value < 0.05, the pair of variables is correlated, if Sig value > 0.05: the pair of variables has no correlation. The results in Table 3 show that there are 4 out of 5 independent variables that are correlated with the dependent variable and have statistical significance (Sig value < 0.05), including: Exchange rate (EX), Government bond yield (IR), World gold price (GP), World oil price (OP). In which, the variables IR, GP and OP have a positive correlation with the dependent variable, the EX variable has a negative correlation with the dependent variable. The variable Consumer Price Index (CPI) was excluded from the model because it was not statistically significant (Sig > 0.05).

		VNI	CPI	IR	GP	OP	EX
VNI	Pearson Correlation	1	,128	,384**	,469**	,720**	-,435**
	Sig. (2-tailed)		,326	,002	,000	,000	,000
	N	61	61	60	61	61	61
CPI	Pearson Correlation	,128	1	,002	,017	,119	-,078
	Sig. (2-tailed)	,326		,985	,897	,362	,549
	N	61	61	60	61	61	61
IR	Pearson Correlation	,384**	,002	1	,158	,460**	-,035
	Sig. (2-tailed)	,002	,985		,228	,000	,789
	N	60	60	60	60	60	60
GP	Pearson Correlation	,469**	,017	,158	1	,074	-,015
	Sig. (2-tailed)	,000	,897	,228		,570	,909
	N	61	61	60	61	61	61
OP	Pearson Correlation	,720**	,119	,460**	,074	first	-,142
	Sig. (2-tailed)	,000	,362	,000	,570		,275
	N	61	61	60	61	61	61
EX	Pearson Correlation	-,435**	-,078	-,035	-,015	-,142	1
	Sig. (2-tailed)	,000	,549	,789	,909	,275	
	N	61	61	60	61	61	61

** Correlation is significant at the 0.01 level (2-tailed).

Table 3. Pearson correlation test results

(Source: Extracted from SPSS)

After correcting the model from the results of the correlation test in Table 3, we conducted a linear regression analysis of the research data.

- **Regression analysis:** We test the overall linear regression model by the F test to test the linear relationship between the dependent variable and the independent variables. The results show that the independent variables can explain the change of the dependent variable through the F value of 58,100 with significance level Sig = 0.000 (satisfying condition < 0.05). Therefore, the regression model is fit to the overall.

The results also show that the independent variables included in the model are suitable and have the coefficient $R^2 = 0.809$, that is, independent variables such as EX, OP, GP affects 80.9% of the variation of the dependent variable VNI and they are strongly correlated with each other. Furthermore, the correction coefficient R^2

= 0.795 means the independent variables explain 79.5% of the change of the dependent variable. In other words, in this study, the factors EX, OP, GP affect VNI with an accuracy of 79.5%.

Regression estimation results in Table 4 show that there are 3 factors: EX, OP and GP have statistical significance (Sig < 0.05), while variables GP and OP have positive regression coefficients, variable EX has a negative regression coefficient. The variable IR is excluded from the model because it has a value of Sig = 0.653 > 0.05, so there is no statistical significance in this research model.

Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error			Tolerance	VIF
(Constant)	6753,687	1275,272	5,296	,000		
GP	,339	,049	6,876	,000	,974	1,027
OP	5,658	,652	8,674	,000	,722	1,385
EX	-,284	,054	-5,217	,000	,914	1,094
IR	76,401	169,159	,452	,653	,763	1,310

Table 4. Results of regression model estimation

(Source: Extracted from SPSS)

In addition, Le Chau Phu and Dao Duy Huan (2019) argue that to test the phenomenon of multi-collinearity, it is necessary to consider the Variance Inflation Factors (VIF) and the Tolerance. Comparing with the results in Table 4, we see that the VIF index of the independent variables are all less than 10, even less than 2 and the Tolerance of the variables are all less than 2,

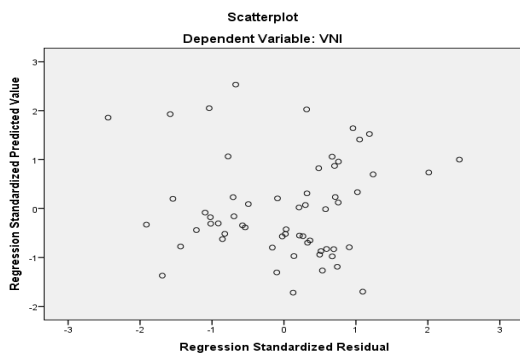


Figure 1. ScatterPlot frequency graph (Source: Extracted from SPSS)

so there is no multi-collinearity in the model. According to Figure 1, it can be seen that the percentiles are randomly scattered and concentrated around the zero axis and are in the range from -2 to +2, we can conclude that the assumption of a linear relationship between the independent variable and the dependent variable is not violated.

Based on the Histogram frequency chart shown in Figure 2, the mean is close to 0 (Mean = -6.59E-16) and the standard deviation is gradually approaching 1 (Std.Dev. = 0.966). Moreover, the graph is bell-shaped, the values are also mostly concentrated from -2 to +2 and most converge on the zero axis. Therefore, the author can conclude that the residuals have an approximate normal distribution.

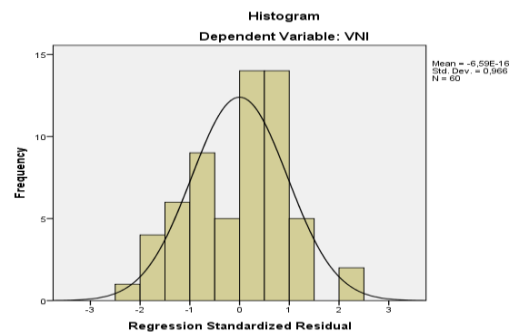


Figure 2. Histogram frequency graph (Source: extracted from SPSS)

Normal P-P Plot of Regression Standardized Residual. The plot shows the observed cumulative probability of residuals plotted against the expected cumulative probability. The points closely follow the diagonal line, indicating that the residuals are normally distributed.

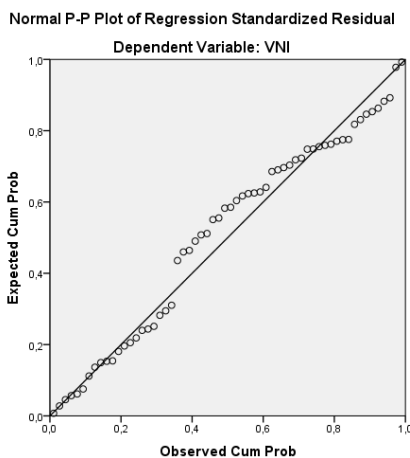


Figure 3. P-Plot graph (Source: Extracted from SPSS)

Regard to the P-Plot chart in Figure 3, it can be seen that the percentiles are close or not too far from the expected line, so the author concludes that the hypothesis of residual distribution is not violated.

- *Discussing the research results:* Based on the regression results and the presented tests, the results show that there are 3 variables that affect the VNI index, namely the exchange rate (EX), the world oil price (OP) and the world gold price (GP). In which the world gold price and the world oil price impact the VNI in the same direction, the exchange rate is inverse. Therefore, the regression model has the following form:

$$VNI = 6753,687 - 0,284*EX + 5,658*OP + 0,339*GP + \epsilon$$

Estimated coefficient (β) of the independent variables has a positive sign showing the positive correlation between the independent variables and the dependent variable, it means when the independent variable increases/decreases by one unit, the

dependent variable will increase/decrease β unit. Similar to the estimated coefficient with negative sign, it will show the negative correlation between the independent and dependent variables, specifically:

- Research results show that there is a negative relationship between the exchange rate and VNI, specifically: if the exchange rate increases by 1 unit, the VNI will decrease by 0.284 unit. The results of this study are consistent with the view of Brason (1983) that an increase in domestic equity will lead to an appreciation of the domestic currency to buy domestic stocks, as investors' demand for the domestic currency increases (exchange rate decreases).

- Research results show that if world oil price increases by 1 USD/barrel, VNI will increase by 5.658 points with other conditions unchanged. This is contrary to the original hypothesis that the world oil price and Vietnam stock index have inverse influence. Theoretically, an increase in world oil price leads to an increase in input costs, which affects the expansion of investment activities of enterprises, the expected profits of enterprises and investor's belief in the enterprises value in the future declines lead to a fall in stock prices. The negative relationship between world oil price and stock price index is demonstrated through the study of Pham Dinh Long and Ngo Thi Thu Hanh (2019). The results of this study open up new issues for further studies.

- With other conditions unchanged, if the world gold price increases by 1 USD/barrel, the VNI will increase by 0.339 points. The results of this study are contrary to the initial expectation that the world gold price has a negative impact on the stock price index with the argument that an increase in gold price means that investors tend to sell a large amount of stocks to invest in the gold market. The stock supply was then more than the demand, causing the stock indexes to decline, market unstable and therefore the VNI would decrease. However, during the research period, most of the time was during the outbreak of the Covid-19 pandemic, so there may be a lot of idle money left. While investors increase the amount of gold to buy as a form of safety, because gold is considered a safe investment channel, the reason that the price of gold and stocks move in the same direction can also explain a portion comes from opportunity cost. Over the past several months, the central banking system around the world has tried to squeeze interest rates to the bottom to stimulate demand (there are times when interest rates even go negative like in the US and some other countries). At that moment, people who invest in gold will not suffer losses due to benefits from bonds, and people are also focus on investing in stocks with the expectation that the market will recover strongly after the pandemic.

5. Conclusions and policy implications

Conclusion: This study shows that the exchange rate, the world oil price and the world gold price are three factors that strongly affect the stock price index in Vietnam. In which, the world gold price and the world oil price have a positive impact on VNI, while the exchange rate has the negative effect. In addition, the oil price is the most influential factor on the VNI. Variables Consumer Price Index and Vietnam Bond Yield are not statistically significant, that is, have no impact on the stock price index. The removal of the influence of the consumer price index and Vietnam Bond Yield on the stock price index is consistent with the tests.

Policy implications: The study results show that the exchange rate has the strongest impact on Vietnam's stock price index in the long-term. The exchange rate plays an important role in the activities of the economy. Especially in the current period, Vietnam is having policies to attract investment capital from abroad, especially for Foreign Portfolio Investment. When implementing solutions on exchange rate better, it will help boost economic potential and have enough tools to maintain stability for the foreign exchange market, against external shocks to help stabilize the macro-economy, limit the negative impact of the exchange rate on the Vietnamese stock market. When seeing a strong increase in the exchange rate, investors should have a strategy to manage their securities portfolio better, be able to take profits or cut losses in time to minimize the loss of the investment portfolio.

World oil prices have a strong impact on Vietnam's stock market, thereby actively exploiting the positive effects of falling gasoline prices. The government needs to be proactive in making national budget revenue and expenditure plans, structure the state budget revenue appropriately, and develop economic development plans with low-priced petroleum as input. As a result, the opportunity from the sharp drop in oil prices can be taken advantage of. Moreover, the actual situation shows signs that the stock is on the way to recover. It can be seen that in the past period, the government is trying to stimulate economic growth with policies to encourage public investment and restore production after the pandemic. To do that, the government has focused on operating and stabilizing domestic gasoline prices. However, despite the administration and stabilization policies, domestic gasoline prices have continued to increase due to the impact of the Russia-Ukraine war in the early of 2022. This led to panic and concern on the phenomenon of hyperinflation among some investors, triggered a wave of sell-offs, so the Vietnamese stock market has witnessed a sharp correction since reaching a historic peak at the end of 2021. Therefore, in addition to the operating policies and stabilizing prices, policy makers also need to develop appropriate scenarios and measures to respond to unexpected events affecting global petroleum supply such as the

Russia-Ukraine conflict, the Covid 19 pandemic, etc. Thereby step by step plans to limit the influence of world oil prices on the stock market.

The gold price also has a strong impact on the stock index, so the government needs to have specific policies to control the gold price and avoid inflation. Gold is also a factor that is affected by many internal and external factors, but the biggest impact on gold price today is still the Government's policies in managing the gold market. In the future, the Central Bank needs to issue more detailed documents including specific regulations as well as fines in order to more closely control gold-related business activities in general as well as strengthen control activities of gold trading organizations in particular. The central bank needs to strictly manage and intervene strongly in the gold market to prevent gold speculation, limit gold bar trading, but still ensure the right to hoard gold, buy and sell gold of the people as well as other investors, closely monitor the use of gold bars purchased from auctions. The Government needs to have regulations to eliminate the habit of hoarding gold bars of the people to reduce the gold rush and at the same time bring the domestic gold price close to the world gold price and keep it at a stable level to limit its influence on other markets in general and the stock market in particular.

In addition, from the above three factors, it can be seen that the domestic stock market is also influenced by psychological factors and investors' behavior. Therefore, investors need to pay attention to domestic policies as well as monitor external fluctuations. The Government needs to build and develop Vietnam's stock market in a manner consistent with international practices and gradually perfect the legal system for the stock market.

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