

IPO Volume, Initial Return, and Market Condition in the Malaysian Stock Market

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Abstract This paper examines the variability in initial returns, IPO volumes, and market conditions of the IPO listed in Bursa Malaysia during the period from January 2000 to December 2010. The IPO volume is highly auto correlated at low lags and decreases during the high lags. Examining the interrelation between IPOs volume, initial return, and market condition shows that market volatility causes the initial return, the initial return causes IPO volume, intraday volatility causes aftermarket volatility, and aftermarket volatility causes market volatility. These suggest that, over the sample period, issuers depend on the information in the initial return while taking the decision to go public. The results also document that the past quarter's initial return and market condition highly influence the number of IPO issued the following month. The evidence over the periods of study shows that the initial return and market condition are related to the variability of IPO volume. Therefore the information on the initial return and market condition is important to both issuers and investors in making the decisions.

Keywords Initial Return, IPO Volume, Market Condition

1. Introduction

It has been empirically documented that a cycle of the IPO market in terms of volume issuance often can represent hot and cold markets. The most well-known identification is that the hot market has a high number of new listed companies and that there is low new issuance in the cold market. Another definition for hot and cold markets that has received a large number of academic attention is based on the initial return and market-adjusted initial return. The recent research by Low and Yong, using 368 IPOs listed in Bursa Malaysia from year 2000 to 2007, identifies the hot market with the number of new issues and high initial return[1].

Recently, Chong and Puah examine the pricing behavior of the initial return as well as an economic indicator and IPO volume from 1993 to 2006. They find initial return and economic indicator have a positive relationship with volume of IPOs that are listed on the Main Board of Bursa Malaysia. Based on this finding, they concludes that "windows of opportunity" exist either in under pricing or positive economic environment[2]. Most prior theoretical and empirical studies on the behavior of IPOs are carried

out by looking at the initial return, IPO volume and market return[3][2]. There are still few studies that look into the relationship between IPO initial return, IPO volume and market volatility.

There are some studies that analyze how initial return is related to IPO volume[3][4][5]. Lowry and Schwert find that positive information will result in high initial returns and soon following that, there will be more new IPOs filings[3]. Ritter (1998) explains the volume of IPOs tends to be high following the periods of high stock market return[4]. In contrast, Lowry finds there is no relationship between the IPO returns and IPO volume. However, the results of the study also show a negative relationship between IPO volume and post issue market returns[6].

Schill finds that when the market is experiencing an increase in volatility, the number of new issues tends to reduce[7]. The finding also shows that the monthly IPO volume drops by 13% when the market volatility increases above the normal market volatility. However, market volatility does not affect the IPO under pricing particularly among small firms[7]. In this study, the finding shows that market volatility has little effect on IPOs initial return and this is inconsistent with the legal liability and reputational hypothesis[8]. Studies on the causal relationship between the market volatility and IPO volume and initial returns in Malaysia IPOs are still scarce[9]. Therefore, the impact of market condition (volatility) on IPO volume needs to be examined as the pattern is puzzling.

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The motivation of this paper is to fill the gap in literature by looking at the predictability of quarterly IPO initial return, IPO volume, and market condition (proxied using market volatility), intraday volatility, and aftermarket volatility to test the autocorrelation in a different phase. Secondly, this paper will examine the Granger causality relationship among quarterly IPO volume, initial return, and market condition. Thirdly, this study proposes a new definition for the hot and the cold markets which are classified on the basis of the market volatility. The “hot market” refers to the period with a high market volatility, whereas the “cold market” refers to a condition with a low market volatility. To be robust, this study will also classify the hot and cold period using the aftermarket volatility. The hot and cold classification will be represented using a dummy variable. We use both classifications as we want to examine which better explains the IPO volume.

The remainder of the paper is organized as follows. Section 2 contains a literature review. Section 3 discusses the data and methodology that are used for this study. Section 4 presents the empirical results and findings. Finally, section 5 summarizes the findings and concludes the study.

2. Literature Review

There are a few theoretical explanations and factors that influence the relationship between the return, IPO volume, and market condition. Prior empirical results show that there is a relationship between IPOs initial return and IPO volume. However, this study is still puzzled by the relationship between IPOs volume, initial return, and market condition especially in the context of Malaysian capital market.

2.1. Initial Return

Lowry and Schwert note that there are few factors that can influence average initial return[3], one of which is market condition. When investors are optimistic about the market, it will result in high initial returns. Particularly, when return on the market is high, it tends to increase the IPO initial return. Thus, there is also a possibility that, if the market volatility is high or low, such condition will affect the underpricing as well. Lowry and Schwert's findings show that firms tend to go public whenever the average initial return is high and that there is a serial correlation in aggregate initial return. Thus, these results are consistent with the asymmetric information hypothesis and prospect theory whereby the information is incorporated into the offer price. In contrast, Ritter and Welch argue that asymmetric information is not the primary driver of IPOs activities (the number of firms that are going public)[10]. They believe the non-rational investors and agency conflict play a role in IPO activity.

Abdullah and Mohd state that IPO underpricing in Malaysian listed companies are among the highest in the Southeast Asian region[11]. They examine the factors that might influence the underpricing in new issues and find that

Malaysian companies are highly underpriced because of the superior prospects. They further mention that if the market (it was then known as KLSE) is efficient, it might increase the company's value, and it appears to have a significant impact on IPOs initial return. On the contrary, if the market is not efficient and more volatile, there is a chance that it might also explain the initial return or underpricing. Accordingly, this study predicts the existence of the relationship between the market volatility with IPO volume and initial return.

A recent study by Lowry et al. look at the volatility of IPO initial return, and they find that IPO activity fluctuates over time and that initial return is high during the hot market, especially for firms that are more difficult to value because of the information asymmetry[12]. The mean and volatility of initial returns seems to have a positive correlation. Moreover, Lowry et al. find the aftermarket price is believed to be a true reflection of the market value which is based on the closing price on the 21 days of trading. This study also finds that both IPO initial return and standard deviations tend to be positively correlated.

In this paper, the initial return is calculated based on the first day closing price. Furthermore, this paper will look at the aftermarket volatility by using the 21-day after listing closing price to examine the volatility of the IPO firm.

2.2. IPO Volume

Lowry and Schwert and Ritter find that IPO volume and average initial returns is highly auto correlated[3][13]. They find that positive information results in the lead lag relation such that higher initial returns result in more new issues. However, there is a question about whether the information from the market can influence the lead lag relation between market volatility and initial return as well the IPOs volume. Therefore, this study will examine whether information that is represented by market volatility tends to lead to more new companies issue. According to Lowry and Schwert, the positive information can be measured by the positive initial return[3]. Their findings also show that current initial return and past IPO volume are negatively correlated, while current initial return and future IPO volatility are positively correlated.

In contrast with other prior literature, Walker and Lin find that IPO volume causes higher initial returns but not vice versa[14]. They use two stages and three stages least square to estimate the dynamic relationship between IPO volume and initial return. Their findings indicate underpricing not only affected by the number of issues at concurrent time but also in prior periods.

2.3. Market Condition

Ritter finds that risk compositions in initial public offerings do not have a relationship with the average initial return, especially during a hot market[13]. However there is a positive relation between risk and initial return. Furthermore, Ritter argues that the greater the uncertainty about the issue of IPOs, the greater the compensations

required by the investor. In other words, based on Rock's model used by Ritter, high risk firms will have higher initial return than low risk firms. This reasoning leads to a positive relation between initial return, risk, and number of IPO issues.

In his study, Ritter associates risk with sales performance; higher risk leads to low sales [13]. He also uses standard deviation of returns in the aftermarket using the first 20-day return after listing as a proxy of risk. The study finds that high average initial return is strong positive relation with high risk. However, it also finds that the relationship tends to disappear when it is tested in different periods of time. Therefore, the finding is seemingly not stable and most probably may differ in a different market. Therefore, this paper will carry on looking at the relationship between IPO volumes with average initial return, aftermarket volatility, and market volatility in the Malaysian market.

Ritter states that, during a hot market, the risk will increase, and there is a positive equilibrium between risk and expected return [13]. He further mentions that there is a positive relation between initial return and market risk. Therefore, there are possibilities that market risk is one of the factors that determines the IPO volume and initial return. Thus, this study would like to fill the gap since only a few have studied this relationship.

We also employ the method as Barry and Jennings who use the intraday return to measure the intraday volatility [15]. This method is introduced by Parkinson who uses the natural log of the first-day high price divided by the first-day low price for the proxy of the intraday volatility [16]. Thus, this study will use the proxy for the measurement of risk utilizing market volatility, which is the average market standard deviation on a quarterly basis. Meanwhile, the aftermarket volatility will be estimated using Lowry et al. method which refers to the aftermarket standard deviation of returns over 21 days after listing [12]. Finally, we adopt Parkinson's intraday volatility measurement. Thus, the objective of this paper is to study the behavior of IPO volume, initial return, and market condition which is proxied by the IPO aftermarket volatility, intraday volatility, and market volatility. In short, the paper addresses the following questions:

1. Do past behavior influence the IPO average initial return, IPO volume, IPO aftermarket volatility, intraday volatility, and market volatility?
2. Do the initial return, aftermarket volatility, intraday volatility, IPO volume, and market volatility have correlation during hot and cold periods?
3. Do the initial return, aftermarket volatility, intraday volatility, IPO volume, and market volatility show a causal relation?
4. Do the market volatility, average initial return, aftermarket volatility, and intraday volatility convey any information to IPO volume?

3. Data and Methodology

To examine the behavior of the IPO volume, initial return, aftermarket volatility, intraday volatility, and market volatility, this study uses a sample of 443 IPOs that are listed from January 2000 up to December 2010. The study period starts in 2000 as this year represents the recovery period after the Asian economies are struck by the 1997/98 financial crisis. This study excludes incomplete data in the final selection of the IPOs. The data are in the quarterly frequency and contain the average initial return, the aftermarket volatility, the IPO volume, the intraday volatility, and the market volatility. The data is compiled from Bursa Malaysia website (<http://www.bursamalaysia.com>), the Star Online website (<http://bizthestar.com.my/marketwatch/ipo>) and the DataStream.

We employ the autocorrelation test between each series to look at the pattern of the past and the future interrelationships. Then, we test the correlation to look at how strong the relationship between the variables. Granger causality is used to determine at the causal relationship between variables. Finally, we run a regression analysis to examine the variations in the exogenous variables that will influence the variation in IPO volume.

The OLS regression analysis between IPO volume and six determining variable is performed using the following linear regression:

$$IPOVOL = C_1 + C_2 INTRADAYVOL + C_3 INITIALRET + C_4 AFTERVOL + C_5 MARKETVOL + C_6 MARKETVOL DMY + C_7 VOLDMY + e \quad (1)$$

where:

$IPOVOL$ = number of IPOs that has been listed in Bursa Malaysia

$INTRADAYVOL$ = $\text{Log} (\text{First day High Price} / \text{First day Low Price})$

$INITIALRET$ = Percentage difference (First-day closing price - offer price)

$AFTERVOL$ = Return over 21-day closing price after listing $(Pt - Pt - 1) / (Pt - 1) \times 100$

$MARKETVOL$ = Monthly standard deviation of market return

$Marketvoldmy$ = A dummy variable that takes a value of '1' if the market volatility is high (hot) and 0 if low (cold) than the average of the market index standard deviation.

$Voldmy$ = A dummy variable that takes a value of '1' if the aftermarket volatility is high (hot) and 0 if low (cold) than the average of the aftermarket return standard deviation.

4. Findings

The sample is based on quarterly average values for the 10 year period. There are two quarters (2000:Q3 and 2009:Q1) that are excluded in this study because there is no IPO issued during these periods. Table 1 shows the summary of descriptive statistics of the variables. The average initial return is about 22%, ranging from a minimum quarterly average of -34.52% to a maximum of 136%.

The average number of IPOs that have been issued on a quarterly basis for the 10 year period is 10 issues, with a

maximum of 24 and a minimum of 1. With respect to the volatility measurement, this study uses the Parkinson extreme value, in which the mean intraday volatility is 1.35, the market volatility using KLSE (based on monthly closing price) shows about 4%, and finally, the aftermarket volatility using the volatility measurement 21-day closing price after listing is 60%. Aftermarket liquidity seems to have higher volatility than the market (KLSE). These results imply that the listed IPOs are not only risky in long run but also risky a few weeks after the listing.

Table 1. Descriptive statistics of initial return, IPO volume, intraday volume, market volatility and aftermarket volume for the period January 2000 to December 2010

	Initial Ret	Ipovol	Intra Vol	Market Vol	Aftervol
Mean	22.66	10.55	1.35	4.09	60.53
Median	18.34	8.50	1.19	3.86	41.60
Maximum	136.36	24.00	5.99	11.05	344.98
Minimum	-34.52	1.00	0.48	0.79	11.62
Std. Dev.	33.71	5.67	0.91	2.32	72.25

Table 2 demonstrates the correlations that clearly show that all variables are positively correlated, including between initial return and aftermarket volatility, and initial return and intraday volatility. Positive correlation indicates that the higher intraday volatility and aftermarket volatility are, the higher the initial return will be. In addition, intraday volatility and market volatility are significantly correlated at one percent level. In this study, weak correlations are detected between IPO volume and market volatility with initial return. This finding shows that market volatility and IPO volume might not be a significant factor to explain the initial return. From the results, we can also conclude that intraday volatility shows a high correlation with initial return. Thus, the result shows that market condition does influence the variability in IPO initial return.

This finding is in line with Lowry et al. where they find average initial return and volatility of initial return (which is based on the aftermarket 21 day return volatility) is high when Nasdaq market volatility is high[12]. However, in this study, we do not find a positive correlation between the market volatility and initial return. Furthermore, the weak relationship between market volatility and initial return is also consistent with the findings in Lowry et al.[12]. Using cross section time series, they find that there is a weak relationship between initial return and market volatility. Our findings are with contrast with Lowry et al.[12] in that the IPO volume and initial return does not have any significant relation. The findings in Table 2 reveal that secondary market activities are closely related to the IPO initial return. Schill also finds similar correlation with this study where the market volatility has little effect on initial return[7].

The results in Table 3 show that the first order autocorrelation coefficients from quarter one to quarter four from year 2000 to 2010. The autocorrelation is highly significant when we are looking at the IPO volume. However, the coefficient is weak when the lag increases, followed by a

decrease in the coefficient. For the market volatility, the coefficient is high during first five lags, and then the pattern is weak. While the IPO volume is highly significant over the early few lags, the pattern decreases after lag seven.

Table 2. Correlations between initial return, IPO volume, market volatility, aftermarket volume, and intraday volume

	Initialret	ipovol	marketvol	aftervol	Intradayvol
Initialret	1.00	0.18 (0.13)	0.08 (0.32)	0.30 (0.03)*	0.56 (0.00)**
ipovol		1.00	-0.10 (0.25)	0.07 (0.34)	-0.19 (0.11)
marketvol			1.00	0.12 (0.22)	0.39 (0.01)**
aftervol				1.00	0.10 (0.27)
Intradayvol					1.00

Notes: * and ** correlation is significant at the 5% and 1% level

Table 3. Autocorrelation in market volatility, IPO volume, intraday volume, initial return and aftermarket volatility

	Marketvol	Ipovol	Initialret	Intradayvol	Aftervol
Lag	AC	AC	AC	AC	AC
1	0.245	0.641	0.401	0.316	0.208
2	0.386	0.413	0.146	0.142	0.019
3	0.204	0.423	-0.017	0.062	-0.093
4	0.201	0.392	-0.09	-0.01	0.011
5	0.314	0.385	0.075	0.072	0.138
6	-0.002	0.418	0.271	0.117	0.079
7	-0.007	0.217	0.122	0.007	-0.021
8	0.042	-0.049	0.05	0.027	-0.062
9	-0.005	-0.079	0.059	0.024	-0.085
10	0.034	-0.11	-0.044	-0.041	0.334

However, in the initial return and intraday volatility series, only the first lag is highly significant, which illustrates a future pattern of the initial return that does not depend on the past initial return. For the aftermarket volatility, there is no significant autocorrelation except it is only significant during lag 10. Therefore, the analysis shows that the pattern of the autocorrelation is mixed. This finding is quite interesting as it in lines with Gosh's study, in which he finds the autocorrelation among IPO volume is the highest of about 62%[17]. Furthermore, using the cross autocorrelation he finds initial return and IPO volume are autocorrelated[3][13]. Therefore, the finding shows that the past pattern can be used to predict the future IPOs.

Besides the autocorrelation, this paper attempts to examine the causal relationship between the initial return, IPO volume and volatility measurement. Before looking into the causality test, one must ensure that the series are stationary. The Augmented Dickey Fuller test is used in this study and all the series are found to be stationary.

Table 4 reports the Granger F-statistics for the two lags that are selected. Table 4 shows that initial return Granger causes the IPO volume, but there is no reverse causality. It means that the initial return leads the movement in the future IPO volume. In contrast with this study, Walker and Lin (2007) find that IPO volume causes higher initial return but not vice versa[14]. Meanwhile, Gosh (2004) and Lowry and

Schwert (2002) each find that there is no significant causal relationship between IPO volume and initial return[17][3].

Table 4. Granger causality between initial return, IPO volume, market volatility, intraday volatility and aftermarket volatility

Null Hypothesis:	F-Statistic	Prob.
INTRADAYVOL does not Granger Cause INITIALRET	0.52874	0.594
INITIALRET does not Granger Cause INTRADAYVOL	0.26445	0.7691
IPOVOL does not Granger Cause INITIALRET	0.31181	0.7341
INITIALRET does not Granger Cause IPOVOL	2.48945	*0.0975
MARKETVOL does not Granger Cause INITIALRET	4.32150	*0.0210
INITIALRET does not Granger Cause MARKETVOL	1.50600	0.2358
AFTERVOL does not Granger Cause INITIALRET	0.78823	0.4626
INITIALRET does not Granger Cause AFTERVOL	1.23488	0.3032
IPOVOL does not Granger Cause INTRADAYVOL	0.97327	0.3878
INTRADAYVOL does not Granger Cause IPOVOL	0.53670	0.5894
MARKETVOL does not Granger Cause INTRADAYVOL	1.24587	0.3001
INTRADAYVOL does not Granger Cause MARKETVOL	0.03329	0.9673
AFTERVOL does not Granger Cause INTRADAYVOL	0.54715	0.5835
INTRADAYVOL does not Granger Cause AFTERVOL	5.42706	*0.0089
MARKETVOL does not Granger Cause IPOVOL	0.44416	0.6449
IPOVOL does not Granger Cause MARKETVOL	0.26908	0.7657
AFTERVOL does not Granger Cause IPOVOL	1.09039	0.3472
IPOVOL does not Granger Cause AFTERVOL	0.89803	0.4165
AFTERVOL does not Granger Cause MARKETVOL	6.23718	*0.0048
MARKETVOL does not Granger Cause AFTERVOL	0.83773	0.4412

Note: *Significant at 10% level

Table 4 also shows that market volatility significantly Granger causes the initial return. The finding suggests that high risk in the market tends to increase the initial returns. However, because there is no reverse causality, we can only conclude that the market volatility influences the decision to go public. The next finding shows that intraday volatility using the Parkinson extreme value also Granger causes the aftermarket volatility. It reveals that first day high and low price leads to volatility of the price for the 21 days after the listing. Finally, the aftermarket volatility also Granger causes the market volatility. It shows that price volatility after the 21-day listing influences the market volatility. The rest of the variables show no causality relationships.

One interesting finding from the causality tests is about initial return leading the IPO volume. This is most probably because the higher initial returns give an indication to the

companies that market sentiment is high and therefore, investors are more receptive to investment opportunities. Moreover, the high volatility in the market also pulls up the initial return to be as high as it possibly can to compensate for the risk. Perhaps the intraday volatility shocks also cause the aftermarket volatility to be high over 21 days after the listing. It is also possible that the market volatility is just reflecting the activity (as opposed to passivity) of the investors. Therefore, it can be summarized that investor optimism during the high market volatility influences the issuers to issue more IPOs during the hot period.

In Table 5 we use a model to investigate the variations in IPO volume, which is number of IPOs that have been issued. The results show that the market volatility, market volatility dummy, and volatility dummy are significant to explain the IPO volume. The goodness of fit (adjusted R^2) is 33%, indicating that 33% of the variation of IPO volume is related to the variation of the independent variables, collectively. Other variables including initial returns, intraday volatility, and market volatility are not significant in explaining IPO volume.

Table 5. Regression Analysis current IPO volume from 2000:Q1 to 2010:Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.347683	5.069822	-0.068579	0.9458
Intradayvol	-2.759451	2.089669	-1.32052	0.1982
Initialret	0.94481	1.198159	0.788552	0.4375
Aftervol	1.839017	1.30668	1.407397	0.1712
Marketvol	7.141248	2.286169	3.123675	*0.0044
Marketvol Dmy	-4.763011	2.532712	-1.880597	**0.0713
Voldmy	-8.139201	2.270597	-3.584608	*0.0014
R-squared	0.459129			
Adj. R-squared	0.334313			
F-statistic	3.678442			
Prob(F-statistic)	0.008866			

Notes: **Significant at 10% level and * 5% level

Table 6. Regression analysis of future IPO volume from 2000:Q1 to 2010:Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-6.519219	4.494945	-1.45034	0.1594
Intradayvol(-1)	-4.308761	2.005146	-2.14885	**0.0415
Initialret(-1)	2.347609	1.137045	2.064657	**0.0495
Aftervol(-1)	2.003763	1.138084	1.760646	*0.0905
Marketvol(-1)	8.379827	1.961442	4.27228	**0.0002
Marketvol Dmy(-1)	-6.257662	2.194222	-2.85188	**0.0086
Voldmy(-1)	-7.07148	2.002329	-3.53162	**0.0016
R-squared	0.598143			
Adj. R-squared	0.501697			
F-statistic	6.201867			
Prob(F-statistic)	0.000435			

Notes: **Significant at 10% level and * 5% level

In Table 6, we report results on the prediction of future IPO volume. Note also that the results here are from the transformation of the variables by using the log, except the

IPO volume which is normally distributed to make the residual normally distributed. The positive relation between initial return and the future IPO volume is in line with Lowry and Schwert who reveal that the initial return and future IPO volume have a significantly positive relation. This result is also consistent with that from the Granger causality test and the discussion that the likelihood of firms to go for listing is partly driven by the high initial return[3]. Comparing the adjusted R^2 , we find that the model in Table 6 better explains the IPO volume fluctuation.

The negative coefficient on market volatility measure suggests that, during the period of high volatility (using the Parkinson extreme value), most firms will decide not to go public. The strong significant level between market volatility and future IPO volume shows that the past quarter's market condition does impact a high portion of variation in IPO volume compared to current market condition. The high significant value of market condition shows that it is an important factor to be considered for the future IPO issuance. Furthermore, the market condition using the dummy variable volatility, which utilizes the classification from the average of aftermarket volatility, also seems highly significant to explain the future IPO volume compared to market volatility dummy.

The results also contrast with Schill who find that IPO volume tends to drop during the high market volatility[7], while Lowry and Schwert find that the positive information measured by the positive initial return[3]. Their findings also show that the current initial return and the future IPO volatility are positively correlated. Furthermore, in this paper we find the past initial return is positive and significantly related to the future IPO volume. This result indicates that past initial return should be taken as a good signal for the issuers to raise new equity capital through the IPOs.

5. Conclusions

The movement of IPO volume can be predicted based on initial return and market condition. Based on the Granger causality test, initial returns convey information about the future IPO volume. Therefore, the initial return reveals a signal of the IPO volume. Additionally, the decision to go public over the entire period of study shows that the variability of IPO volume depends on the past pattern of the initial return and market condition. Market condition here is proxied by intraday volatility, aftermarket volatility, and market volatility. This finding suggests that issuers can rely on the past market condition in making the decision to go public. The empirical results support Ibbotson and McKenzie who find that IPO activities, underpricing, and stock market indicators do have explanatory power over IPO volume[18][19].

The empirical analysis provides evidence that positive and significant correlations between the initial return with intraday volatility and the aftermarket volatility arises because stock prices are affecting them after the listing improves the forecasts of initial return. Our study has several

implications. First, our findings further confirm Ritter and Welch's findings that the market condition does influence firms' decision to go public[10]. Secondly, we further find that IPOs are not only risky in the long run but also as soon as the first few weeks after the listing. Finally, market volatility is highly significant and the most important factor that companies should rely to make a decision to go public. In summary, the results suggest that all of the proxies for market conditions are positive related to the variability of IPO volume.

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