

Stock Splits and Stock Dividends: Implications for Bid Ask Spread Components

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Abstract:

Recent theoretical researches in equity market consider that the enhanced liquidity is the principal motivation for stock splits and stock dividends, however, empirical studies find different results and even a decline in liquidity after the announcements or the effective dates (ex dates) of these events. In this paper, we analyze the stock splits and stock dividends effects on liquidity using bid ask spread measures. The sample is composed of all the stock splits and stock dividends announcements on Tunisia Stock Exchange (TSE), between 1990 and 2010. We test the change of the various indicators liquidity before the announcement period, between the announcement and the ex date, and after the ex date. The results show an increase in the absolute and relative spread after the ex date of stock splits. This increase in the spread involves an increase in the investor transaction cost, a degradation of the short-term liquidity and the fall of the market quality. This increase is explained by order processing costs and inventory holding costs.

Key words: bid ask spread, order processing costs, inventory holding costs, and adverse selection costs.

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Introduction:

Stock splits and stock dividends remain one of the popular phenomena in financial market, companies use these events to improve liquidity and to transmit a good information to the market. With the increase in the splitting companies' number, the impact on liquidity became an important subject of research.

Several hypotheses have been presented to clarify the stock splits and stock dividends reactions after the announcement and the ex date, academics and practitioners continue to be intrigued by the effect of these events and tend to explain their cause. These explaining are based on the liquidity, signaling, capital structure, ownership structure...., This paper focuses on the liquidity hypothesis.

Baker and Gallagher (1980) find that 65% of companies split their stock to attract small investors and 32% to improve liquidity. By reducing the stock prices, these operations encourage the access of new shareholder in the market and accelerate the trading activity and then increase liquidity.

Market liquidity is the aptitude of the market to absorb investor trading demands rapidly and in size. Several measures are used to test the market liquidity: trading volume, depth and the bid ask spread. In this paper, we use the bid ask spread to measure the liquidity change.

Many studies (Lakonishok and Lev (1987) Muscarella and Vetsuypens (1996), Gray Smith and Whaley (2002), Dennis and Virginia (2002), Gorkittisunthorn et al. (2006) measure and compare the liquidity proxies after the announcement and the ex date of stock splits and stock dividends.

If a theoretical consensus confirms the enhanced liquidity following the stock splits, the empirical studies find divergent results. This event can have, according to several researchers (Conroy, Harris and

Benet (1990), Schultz (2000)), a negative effect on the liquidity.

Other theoretical and empirical papers have focused on the variation in the bid ask spread after stock splits and stock dividends but they ignored the effect on spread components. Rare are the papers that analyze the effect of the stock splits and stock dividends on the spread components. In this paper, we test the changes of quoted, relative and effective spreads after the announcement and the effective dates of stock splits and stock dividends and then we analyze the effect on the order processing costs, inventory holding costs, and adverse selection costs.

The rest of this paper is organized as follows. In section 2, we review the literature related to the effect of the stock splits and stock dividends on liquidity, in the section 3 we present the bid ask spread measurements used to calculate the liquidity changes around these events, the section 4 test the components spread change and we conclude in the section 5.

Stock splits, stock dividends and liquidity change:

Some authors consider that the liquidity improvement is the principal motivation to announce stock splits or stock dividends, the recent academic literature documents the existence of mitigated results after these events. According to these authors, we can find an absence or even a negative effect on the stock liquidity.

Easley, O' Hara and the Saar (2001) stipulate that the leaders can prefer a target price, considered to be optimal, allowing increasing trading volume and liquidity in the market.

Conroy, Harris and Benet (1990) and Desai, Nimalendran and Venkataraman (1998) note the

increase in the relative bid ask spread, Murray (1985) does not find any impact of this event on the spread.

Michayluk and Kofman (2001) calculate 31 liquidity measures around the stock splits, these measures are classified in two categories: frictions measures and activities measures. They conclude that the effect of the stock splits on the market can be explained by the market structure and size. They find also a decline in the market liquidity after this event.

They conclude, that in NYSE, the decline of liquidity is more significant for friction measurements and particularly bid ask spread and that the relationship between size and liquidity is negative. Dennis and Virginia (2002) examine the liquidity change after stock splits in the NASDAQ (National Association of Securities Dealers Automated Quotation System). They find an increase in the relative spread after the announcements dates whereas the turnover remain unchanged. Conroy, harris and benet (1990), Muscarella and vetsuypens (1996) test the spread reaction after stock splits and conclude that relative bid ask spread change after the ex date. They found a decrease in the absolute spread and an increase in the relative spread. Guo et al. (2008) studied the effect of the stock splits and dividends in Tokyo stock market. They compared the evolution of the trading activity, the liquidity, the asymmetry information and the probability of the informed trading carried out before and after the ex date. Their results support the assumption that the stock splits transmit favorable information to the investors.

Using a sample of Chinese stock dividends, Nhut H. Nguyen and David Y. Wang (2012) find an abnormal return after the announcement date. This market reaction can be explained by liquidity hypothesis, they find an increase in proportional spreads, depth, and the number of trades and decreases in average trade size, and price impact suggest greater participation of

liquidity and small investors following the announcement date.

Khamis Hamed Al-Yahyaee (2014) analyze the microstructure market reaction after the announcement and the ex-day of stock dividends in Muscat Securities Market, he find an abnormal return after this event explained by the microstructure factor's like dividend and stock price.

Gow-Cheng Huang, Kartono Liano, Ming-Shiun Pan (2014) test the effects of stock splits and stock dividends on stock liquidity, they find the drop of liquidity after the announcement date of stock split, this change is short-lived and can explain the market reaction at the announcement date. These results corroborate the signalling and the attention-grabbing hypothesis.

Bid ask spread measures in TSE:

We use several liquid's measures related directly to the bid ask spread, we analyze their variations around stock splits and stock dividends announcements and ex dates. The analysis was carried out on all the stock splits and stock dividends operations in the Tunisians stock exchange between 1990 and 2010, our sample is composed by 40 stocks dividends and 20 stock splits. Tunis stock exchange (TSE) was founded in 1969 and it was privatized in 1994. Since 1996, the TSE has been an electronic pure order driven market. Orders are placed by investors through brokers.

The Tunisian Stock Exchange is a pure order driven market without market makers. The securities are traded, with computer assistance, by fixing or on a continuous basis. Overall market regulation is well designed through considerable French assistance and corporate governance. The bourse has recently recognized an alternative market with relaxed regulation in order to attract listings.

The liquidities measures:

In this section, we seek to examine whether the stock dividends and stock splits improve or deteriorate the liquidity, and consequently, the quality of the market. We use the following spread measures: - The absolute spread in TD (Tunisian dinars) : This variable is the difference between the quoted ask price and the quoted bid price.

$$Absoluespread(inTD) = BestAsk - BestBid$$

- The absolute bid ask spread in % : this spread is calculated by dividing the absolute value of the bid ask spread by the stock price.

$$FourchetteAbsolue(en\%) = (BestAsk - BestBid) / P_t$$

- The relative spread: is calculated by dividing the absolute value of the bid ask spread by the median stock price.

$$Relativespread(in\%) = (Askprice - Bidprice) / PriceMédian$$

On the markets where the investors have sometimes the possibility to trade within the quoted spread, the absolute spread does not constitute a good indicator of the implicit costs really supported by the investors or the market makers. Under these conditions, the effective spread, which takes account the trading at prices different from quoted spread, represents a better measure of the investor trading costs. -The effective spread in DT : The effective spread is defined as twice the absolute difference between the trade price and the midpoint of the quoted spread.

$$EffectiveSpread(inDT) = 2 \left| C_t - \left(\frac{Bid\ Price + Ask\ Price}{2} \right) \right|$$

- The effective spread in % : The effective spread is defined as twice the absolute difference between the trade price and the midpoint of the quoted spread divided by the stock price.

$$EffectiveSpread(in\%) = 2 \left| \left(C_t - \left(\frac{Bid\ Price + Ask\ Price}{2} \right) \right) / C_t \right|$$

To test the bid ask spread variation, we use the t-test that analyze the spread evolution before the announcement date, between announcement and ex date and after the ex date.

3.3 : Empirical result :

Tables (1.1) and (1.3) present the result of various measures of bid ask spread For stock dividends, the result seem to reveal the inexistence of a significant effect of this event on the bid ask spread. Thus, the stock dividends announcement do not affect the bid ask spread.

The results provided by tables (1.2) and (1.4) prove that the stock splits seem to positively affect the bid ask spread and then the investor trading costs. Initially, the average value of the absolute spreads records a significant increase, respectively of 36, 85% and 21, 68%, as well after the announcement or the ex dates. In the same way, the relative spread writes the same spring and the increase is about 2,19% and 2,87% compared to the before announcement period. Consistent with any prior studies, we find an increase in the spread and then a decrease in liquidity after the stock splits announcement. The increase in both the relative and effective spreads is statistically significant at 5%.

Our results are in line with Dennis and Virginia (2003) that conclude the decrease in liquidity after stock splits but they consider the improved liquidity for the smaller trades.

4. Spread components change after stock splits and stock dividends:

In the previous section, we found a positive reaction of the quoted and relative spreads after the stock splits announcements and ex dates. In order to explain this reaction, we decompose the investor transaction costs in three components. We started by describing, in a preceding section, the bid ask spread components, which represent also the investor structure cost in the market.

We seek to model the investors bid ask spread and to test if theses components explain the spread reaction after the stock splits ex dates.

4.1- Model specification:

To identify an appropriate regression structure, we consult the papers of Copeland, Galai (1983) , Conroy, Harris and benet (1990) and Gay, Smith, whaley (2002).

The investor structure cost is composed by three components: order processing costs, inventory holding costs, and adverse selection costs.

Theses authors show, in their theories, that the bid-ask spread is associated with variables reflecting the characteristics of the transaction costs, stock prices, trading volume or stock price volatility.

To test the investor structure cost we use proxies to calculate variables relating to order processing costs, inventory holding costs, and adverse selection costs.

Order processing costs are the direct costs of the services provided by the market maker and paid by investors, including the cost of exchange seat; the rent of surface, the computer and information service. Many authors consider these costs as fixed and non proportional to the trading volume.

In this paper, we estimate that the effect on theses components should be conversely related to the trading activities. For this reason we use, the reverse of the trading volume calculated by the total number of the stock trading during the day, as proxy of the order processing costs.

The inventory holding costs are related to the stock detention. They include the opportunity cost of the funds tied up and the risk of prices decreases. The opportunity cost is presented by the investors or market makers strategies that consist to hold a minimal stock at the end of trading day; they seek to reduce this cost to the minimum.

The risk of price decline in the inventory of securities generates very high costs, the investor or the market makers must be compensated by supporting this risk. The most used measurement of this risk is the standard deviation of the stock (volatility of the stock trading).

The adverse selection cost is another component of the spread. The adverse selection costs are explained to the risk to make transaction with more informed investors.

Many research, as Gay, Smith and whaley (2002), do not include a variable representing the adverse selection cost, they explain this choice by two reasons:

- (i) Stock dividends don't affect the ownership structure;
- (ii) Inexistence of a suitably proxy representing the adverse selection cost.

Gay, Smith and Whaley (2002) decide to substitute the variable reflecting the adverse selection cost by another variable presenting the quality of the market; they include competition as an explanatory variable. According to these authors, the investors transaction cost can also depend by the level of the competition in the market.

The competition aptitude to play a role in the spread reduction depends by market authority's capacity to reinforce the competition of the services provided by the market.

Empirical research examining the spread components generally ignores competition as explanatory variable. The reason of this choice is the absence of the empirical data relating to this variable on the market.

In our model, we refuse the assumptions of Gay, Smith, Whaley (2002) relating to the exclusion of adverse selection cost for two reasons:

- (i) The non existence of good proxy does not justify the elimination of this variable
- (ii) This event (stock split or stock dividend) can transmit favorable information to the market which can modify the asymmetry information structure of investors. Consequently, we decide to include a variable representing selection adverse cost in our model.

To measure the selection adverse cost, we use a proxy calculated as the value of the outstanding shares. We consider that when the company is large, it diffuses more information to the market and in consequence the selection adverse cost will decrease.

In short, we consider that the bid ask spread is a function of order processing costs, inventory holding costs, and adverse selection costs.

We use the reverse of total number of shares traded per day as proxy of the order processing costs, the stock price volatility is the best indicator to measure these costs. To calculate this risk we use the standard deviation of the stock price changes.

The model is as follows:

$$\Delta FR_i = \alpha_0 + \alpha_1 \Delta \left(\frac{1}{V_i} \right) + \alpha_2 \Delta \sigma_{\Delta s_i} + \alpha_3 \Delta P_i + \varepsilon_i$$

Δ : Variation between thirty days before the announcement and thirty days after the effective day (ex day). FR_{it} :

Relative bid ask spread for the share i ; V_{it} : Total number of shares traded per day t for share i ; P_i : Stock price of the share i ; σ_i : Stock price volatility of the share i ;

Regression model is estimated across the average daily values of the variables of each stock between thirty days before the announcement and thirty days after the ex date. We exclude the period which follows the announcement date of our analysis aims to avoid incorporating the abnormal and unexpected behavior of some investors at the announcement date.

Each variable of our model is regressed using the difference between thirty days before the announcement and thirty days after the effective day (ex day).

4.2: Factors explaining the change of the spread and the transaction costs:

The previous research studying the changes of the bid ask spread after the stock splits announcements led to mitigated results, a theoretical consensus seems to take place and confirm that the spread is negatively associated to the stock prices, trading volumes and it is positively related to the stock price volatility. Ho and Stoll (1981), Copeland and Galai (1983) show that the bid ask spread is related to the transaction characteristics including the price, volume and volatility.

The results confirm these observations and are presented as follows:

$$\Delta FR_i = -0.0093 - 1.149 \Delta \left(\frac{1}{V_i} \right) + 0.032 \Delta \sigma_i - 0.058 \Delta P_i + \varepsilon$$

(-0.333) (-2.969) (2.176) (-0.85) $R^2=0.5367$

All the coefficients of regression appear with the signs envisaged. The spread decreases with the reverse of the trading volume and increases with the stock price volatility, the significant coefficients are respectively about (-1.149) and (0.032).

We thus note that the spread fluctuation is explained by order processing costs, inventory holding costs.

Order processing costs are the direct costs of the services provided by the exchange market and paid by the investor; the effect of these costs on the spread is conversely related to the trading activity. The bid ask spread is more high when the Order processing costs are eminent and the trading activity is important.

The inventory holding cost, which is an opportunity cost of the funds, includes the risk of an unfavorable variation of the prices. Investors, which seek to reduce their inventory, hold a minimal stock at the end of the day. The adverse

movements of the prices generate very high costs and investors must compensate this risk by elevate the bid ask spread.

5. Conclusion:

In this paper we studied the effect of the stock splits and stock dividends on the bid ask spread and their components in Tunisian stock exchange. We then test the stock market liquidity after the announcement and the effective dates of these events.

We use multiple measurements to test the change in the bid/ask spread before the announcement period, between the announcement and the effective dates, and after ex date.

The results show an increase in the absolute and relative spread after the effective day of the stock splits. This increase in the spread involves an increase in investor trading cost, a degradation of the short-term liquidity and the fall of the market quality. No reaction is recorded for the stock dividends.

In order to explain the causes of this spread reaction, we decompose the bid ask spread in order processing costs, inventory holding costs, and adverse selection costs. We analyze the variation of the these variables in the event period; we tested the evolution of the spread and its determinants before and after effective day of stock splits.

The modeling of the spread bid/ask and the regression of this variable made it possible to conclude that the increase in the bid/ask spread can be explained by the order processing costs, inventory holding costs after the ex-date of the stock splits

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	Absolute spread in TD			Absolute spread in %		
	Before announcement	Announce/ ex date	After ex date	Before announcement	Announce/ ex date	After ex date
Mean	9,476	9,554	8,651	0,343	0,349	0,356
Median	4,000	3,460	4,640	0,253	0,249	0,276
Max	163,800	147,180	113,500	1,844	1,714	1,663
Min	0,180	0,110	0,100	0,100	0,112	0,111
Std.dev	15,852	17,695	11,247	0,249	0,272	0,240

	Relative spread			Effective spread in TD		
	Before announcement	Announce/ ex date	After ex date	Before announcement	Announce/ ex date	After ex date
Mean	0,352	0,352	0,348	4,319	4,171	4,65
Median	0,245	0,237	0,274	1,800	1,410	2,10
Max	2,000	2,000	2,000	73,70	44,00	96,8
Min	0,111	0,111	0,111	0,110	0,110	0,11
Std.dev	0,301	0,302	0,260	7,018	7,677	7,86

	Effective spread in %		
	Before announcement	Announce/ ex date	After ex date
Mean	0,377	0,410	0,409
Median	0,267	0,357	0,298
Max	1,000	0,996	1,498
Min	0,100	0,113	0,112
Std.dev	0,258	0,260	0,265

Table1.1 : spread measurements changes after stock dividends.

	Absolute spread in TD			Absolute spread in %		
	Before announcement	Announce/ ex date	After ex date	Before announcement	Announce/ ex date	After ex date
Mean	15,717	16,413	14,611	0,338	0,463	0,412
Median	9,880	11,100	8,160	0,274	0,385	0,334
Max	159,600	62,900	127,200	2,379	0,978	1,222
Min	0,380	0,200	0,400	0,111	0,184	0,112
Std.dev	19,261	17,992	19,637	0,245	0,264	0,252

	Relative spread			Effective spread in TD		
	Before announcement	Announce/ ex date	After ex date	Before announcement	Announce/ ex date	After ex date
Mean	0,338	0,458	0,409	8,10	10,73	6,256
Median	0,258	0,392	0,300	4,200	3,655	2,440
Max	1,965	1,640	2,000	141,40	48,10	89,10
Min	0,113	0,179	0,112	0,110	0,210	0,110
Std.dev	0,259	0,314	0,306	12,439	13,67	9,952

	Effective spread in %		
	Before announcement	Announce/ ex date	After ex date
Mean	0,345	0,387	0,349
Median	0,223	0,385	0,270
Max	2,340	0,832	0,996
Min	0,100	0,113	0,112
Std.dev	0,267	0,196	0,221

Table 1.2 : spread measurements changes after stock splits.

	Absolute spread in TD		Absolute spread in %		Relative spread	
	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev
Before announcement	9,47606	15,8524	0,34321	0,24866	0,35153	0,30094
Announcement/ Ex date	9,55425	17,6946	0,34889	0,27158	0,35187	0,30181
After ex date	8,6509	11,247	0,3560	0,2395	0,3478	0,2600
(1) Δ relative/announcement in%	0,825	11,620	1,653	9,216	0,097	0,288
T-test	0,056		0,265		0,014	
(2) Δ relative/ex date in%	-8,708	-29,051	3,731	-3,662	-1,047	-13,595
T-test	-1,123		0,981		-0,245	

	Effective spread in TD		Effective spread in %	
	Mean	Std.dev	Mean	Std.dev
Before announcement	4,3193	7,018	0,257	0,376
Announcement/ Ex date	4,17051	7,676	0,259	0,410
After ex date	4,65879	7,867	0,265	0,409
(1) Δ relative/announcement in%	-3,446	9,383	0,807	8,958
T-test	-0,246		0,064	
(2) Δ relative/ex date in%	7,858	12,109	2,944	8,747
T-test	0,852		0,361	

Table2.1: Spread changes after the announcement and the ex dates stock dividends

(1) Change in the mean spread 30 days before the announcement compared to the mean spread between the announcement and the ex days.

(2) Change in the mean spread 30 days before the announcement compared to the mean spread 30 days after the ex dates.

	Absolute spread in TD		Absolute spread in %		Relative spread	
	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev
Before announcement	15,717	19,261	0,338	0,245	0,338	0,259
Announcement/Ex date	16,413	17,992	0,463	0,264	0,458	0,314
After ex date	14,611	19,637	0,412	0,252	0,409	0,306
(1) Δ relative/announcement in%	4,424	-6,586	36,857	7,579	35,594	21,086
T-test	0,215		2,680**		2,195*	
(2) Δ relative/ex date in%	-7,038	1,951	21,685	2,617	21,165	18,020
T-test	-0,650		3,372**		2,877**	

	<i>Effective spread in TD</i>		<i>Effective spread in %</i>	
	Mean	Std.dev	Mean	Std.dev
Before announcement	8,101	12,439	0,345	0,267
Announcement/Ex date	10,738	13,676	0,387	0,196
After ex date	6,256	9,952	0,349	0,221
⁽¹⁾ Δ relative/announcement in%	32,551	9,943	12,034	-26,824
T-test	1,096		1,137	
⁽²⁾ Δ relative/ex date in%	-22,773	-19,994	1,175	-17,339
T-test	-1,871		0,189	

Table 2.2: Spread changes after the announcement and the ex date stock dividends.

** significant at 1%

* significant at 5%

- 1) Change in the mean spread 30 days before the announcement compared to the mean spread between the announcement and the ex dates.
- 2) Change in the mean spread 30 days before the announcement compared to the mean spread 30 days after the ex dates.