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STOCK SPLITS AND STOCK DIVIDENDS: IMPLICATIONS FOR BID ASK SPREAD COMPONENTS

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Abstract

Recent theoretical researches in equity market consider enhanced liquidity as the principal motivator for stock splits and stock dividends. However, empirical findings suggest mixed evidence and even a further decline in liquidity after the announcements or the effective dates (ex-dates) of these events. The purpose of this paper is to examine the effect of stock splits and stock dividends on liquidity using bid ask spread measures. The sample is composed of all the stock splits and stock dividends announcements on the Nigerian Stock Exchange (NSE), between 1990 and 2010. Using multiple regression analysis, we test the change of the various indicators of liquidity prior to the announcement period, between announcement and the ex-date, and post 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 indicates an increase in investor transaction cost, a degradation of short-term liquidity and the fall of the market quality. This increase is further explained by order processing costs and inventory holding costs. The study recommends that companies should engage in strategies relating to the use of retained earnings in financing alternative investments rather than outstanding shares expansion through splits and scripts.

Keywords: Stock splits, Stock dividends, Ex-dates, Spread measures, Liquidity.
JEL Code: GO, G10; G12

1.0 Introduction

Stock splits and stock dividends remain one of the popular phenomena in financial markets. Companies use the policies to improve liquidity and to transmit good

information to the market. With the increase in the splitting companies' number, the impact on liquidity became an important subject of research. Prior literature have presented substantial evidence to clarify 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 explanations are based on factors such as liquidity, signaling, capital structure, and ownership structure. This paper focuses on the liquidity hypothesis. A greater portion of listed entities that engage in stock split does so primarily to attract retail investors while for others it is a liquidity improvement strategy (Dennis, 2002). By reducing the stock prices, these operations encourage the access of new shareholder in the market and accelerate the trading activity and subsequently increase liquidity. Market liquidity is the aptitude of the market to absorb investor trading demands rapidly and in size. Several measures have been used to test capital market liquidity both in developed and emerging markets alike: trading volume, depth and the bid ask spread. These include those which measure and compare liquidity proxies after the announcement and the ex-date of stock split dividends (see, for example, Lakonishok and Lev, 1987; Muscarella & Vetsuypens, 1996; Gray & Whaley, 2002; Dennis, 2002; Gorkittisunthorn et al., 2006). However, not much has been explored of the bid ask spread, especially in the Nigerian capital market. In this study, the bid ask spread has been employed to measure liquidity change.

Although, theoretical consensus holds that there is enhanced liquidity after stock splits, empirical studies find divergent results. Accordingly, such strategy might have negative implications for market liquidity (Conroy, Harris & Benet, 1990; Schultz, 2000). Other theoretical and empirical papers have focused on the variation in the bid ask spread after stock splits and stock dividends but there is significant neglect of the effect on spread components. Rare are the studies that examine the effect of stock splits and stock dividends on the spread components. In this study, we test the changes of quoted, relative and effective spreads after the announcement and the effective dates of stock splits and stock dividends, and also consider the effect on the order processing costs, inventory holding costs, and adverse selection costs.

2.0 Stock splits, stock dividends and liquidity change

While some authors consider liquidity improvement as the motivator for stock splits or stock dividends announcements (Easley, O' Hara & Saar, 2001), recent academic literature documents the existence of moderated results after such events (Conroy, Harris & Benet, 1990; Desai, Nimalendran & Venkataraman, 1998). Easley, O' Hara and Saar (2001) reported that corporate leadership often prefer a target price, considered to be optimal, allowing increasing trading volume and liquidity in the market. Conroy, Harris & Benet (1990); Desai, Nimalendran & Venkataraman (1998) also notes that the increase in the relative bid ask spread is not driven by stock splits and stock dividends. Further, Murray (1985) did not find any impact of this event on the spread. Michayluk and Kofman (2001) calculate 31 liquidity measures around stock splits. The authors classify the proxies into two: friction measures and activities measures. Their conclusions are that the determinants of stock splits are market structure and size.

They also find, post-split, a decline in the market liquidity. They conclude, that on the 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 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 announcement dates whereas the turnover remains unchanged. Conroy et. al., (1990) and 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 absolute spread and an increase in the relative spread. Guo *et al.* (2008) reported the effect of stock splits and dividends in the Tokyo stock market. They compared the evolution of trading activity, liquidity, asymmetric information and the probability of informed trading carried out before and after the ex-date. Their results support the assumption that stock splits transmit favorable information to investors. The results reported by Afego (2011) for a sample of 16 firms listed on the NSE find support for the information content hypothesis. Additionally, the study failed to provide evidence of efficient adjustment of stock prices to information contained in earnings announcements, 20 days after the announcement of results. This finding is consistent with the observation that stock prices drift in lieu of liquidity in the post announcement period and offers some support for behavioural finance theory.

3.0 Bid ask spread measures in the Nigerian Stock Exchange

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 Nigerian Stock Exchange (hereafter, NSE) between 1990 and 2010, our sample is composed of 40 stocks dividends and 20 stock splits selected based on data availability.

The NSE was founded in 1960 as the Lagos Stock Exchange. As of December 31 2013, it has about 200 companies listed with a total market capitalization of about N12.88 trillion (about $80.8 billion). The market has in place a tested network of Stock brokerage firms, Issuing Houses (Merchant Banks), Pension Funds, practicing corporate law firms and several quality firms of auditors and reporting accountants. Orders are placed by investors through brokers. The NSE is a pure order driven market with a number of market makers. Securities are traded with computer assistance, by fixing or on a continuous basis. Overall market regulation is well designed through considerable corporate governance. The bourse has recently recognized an alternative market with relaxed regulation in order to attract listings.

3.1 The liquidities measures:

In this section, we seek to examine whether stock dividends and stock splits in our selected observation improve or deteriorate 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 quoted asks 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 investors have sometimes the possibility to trade within 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 of the trading at prices different from quoted spread, represents a better measure of 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.

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

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.

3.2 Empirical result

Table1.1: spread measurements changes after stock dividends

	Absolute spread in TD			Absolute spread in %			Relative spread		
	Before annoucement	Announce/ ex date	After ex date	Before annoucement	Announce/ ex date	After ex date	Before annoucement	Announce/ ex date	After ex date
Mean	9,476	9,554	8,651	0,343	0,349	0,356	0,352	0,352	0,348
Median	4,000	3,460	4,640	0,253	0,249	0,276	0,245	0,237	0,274
Max	163,800	147,180	113,500	1,844	1,714	1,663	2,000	2,000	2,000
Min	0,180	0,110	0,100	0,100	0,112	0,111	0,111	0,111	0,111
Std.dev	15,852	17,695	11,247	0,249	0,272	0,240	0,301	0,302	0,260

	Effective spread in TD			Effective spread in %		
	Before annoucement	Announce/ ex date	After ex date	Before annoucement	Announce/ ex date	After ex date
Mean	4,319	4,171	4,659	0,377	0,410	0,409
Median	1,800	1,410	2,100	0,267	0,357	0,298
Max	73,700	44,000	96,800	1,000	0,996	1,498
Min	0,110	0,110	0,110	0,100	0,113	0,112
Std.dev	7,018	7,677	7,868	0,258	0,260	0,265

Table 1.2: spread measurements changes after stock splits.

	absolute spread in TD			absolute spread in %			Relative spread		
	Before annoucement	Announce/ ex date	After ex date	Before annoucement	Announce/ ex date	After ex date	Before annoucement	Announce/ ex date	After ex date
Mean	15,717	16,413	14,611	0,338	0,463	0,412	0,338	0,458	0,409
Median	9,880	11,100	8,160	0,274	0,385	0,334	0,258	0,392	0,300
Max	159,600	62,900	127,200	2,379	0,978	1,222	1,965	1,640	2,000
Min	0,380	0,200	0,400	0,111	0,184	0,112	0,113	0,179	0,112
Std.dev	19,261	17,992	19,637	0,245	0,264	0,252	0,259	0,314	0,306

	Effective spread in TD			Effective spread in %		
	Befor annoucement	Announce/ ex date	After ex date	Befor annoucement	Announce/ ex date	After ex date
Mean	8,101	10,738	6,256	0,345	0,387	0,349
Median	4,200	3,655	2,440	0,223	0,385	0,270
Max	141,400	48,100	89,100	2,340	0,832	0,996
Min	0,110	0,210	0,110	0,100	0,113	0,112
Std.dev	12,439	13,676	9,952	0,267	0,196	0,221

Table 2.1: Spread changes after the announcement and the ex dates stock dividends

	Absolute spread in TD		*Absolute spread in %*		*Relative spread*		*Effective spread in TD*		*Effective spread in %*	
	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev
Before annoucement	9,47606	15,8524	0,34321	0,24866	0,35153	0,30094	4,3193	7,0180	0,25766	0,37652
Announcement/ Ex date	9,55425	17,6946	0,34889	0,27158	0,35187	0,30181	4,17051	7,67655	0,25974	0,41025
After ex date	8,6509	11,247	0,3560	0,2395	0,3478	0,2600	4,65879	7,867805	0,265249	0,409463
(1)Δrelative/announcement in%	0,825	11,620	1,653	9,216	0,097	0,288	-3,446	9,383	0,807	8,958
T-test	0,056		0,265		0,014		-0,246		0,064	
(2)Δrelative/ex date in%	-8,708	-29,051	3,731	-3,662	-1,047	-13,595	7,858	12,109	2,944	8,747
T-test	-1,123		0,981		-0,245		0,852		0,361	

(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.

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

	Absolute spread in TD		*Absolute spread in %*		*Relative spread*		*Effective spread in TD*		*Effective spread in %*	
	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev
Before annoucement	15,717	19,261	0,338	0,245	0,338	0,259	8,101	12,439	0,345	0,267
Announcement/ Ex date	16,413	17,992	0,463	0,264	0,458	0,314	10,738	13,676	0,387	0,196
After ex date	14,611	19,637	0,412	0,252	0,409	0,306	6,256	9,952	0,349	0,221
(1)Δrelative/announcement in%	4,424	-6,586	36,857	7,579	35,594	21,086	32,551	9,943	12,034	-26,824
T-test	0,215		2,680**		2,195*		1,096		1,137	
(2)Δrelative/ex date in%	-7,038	1,951	21,685	2,617	21,165	18,020	-22,773	-19,994	1,175	-17,339
T-test	-0,650		3,372**		2,877**		-1,871		0,189	

** significative at 1%

* significative 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.

Tables (1.1) and (2.1) 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. In addition, the results provided by tables (1.2) and (2.2) 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 findings 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.

4.0 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 begin 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 these components explain the spread reaction after stock splits ex-dates.

4.1- Model specification

To identify an appropriate regression structure, we consult the studies 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. These 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, computer and information service. Many authors consider these costs as fixed and non-proportional to trading volume.
In this study, we estimate that the effect on these 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 for 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 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 do not affect ownership structure;
(ii) Inexistence of a suitably proxy representing the adverse selection cost

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

The competition aptitude role in the spread reduction depends on 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 select a proxy calculated as the value of the outstanding shares. We consider that when the company is large, diffuse more information to the market and in consequent 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 this costs. To calculate this risk we use the standard deviation of the stock price changes.

Our final model is as follows:

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

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 change of spread and transaction costs

Prior studies investigating 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:

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

(-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.

4.3 Findings

In this paper we study the effect of stock splits and stock dividends on bid ask spread and their components in the Nigerian Stock Exchange (NSE). 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 stock dividends. In order to explain the causes of this spread reaction, we decompose the bid ask spreads in order processing costs, inventory holding costs, and adverse selection costs. We analyze the variation of theses 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.

5.0 Conclusion and Recommendations

One major determinant of increased investor trading cost, degradation of liquidity and fall of market liquidity is the use of stock splits and stock dividends by quoted firms. As a result of an increase from original floating shares of participating companies, there are tendencies for bid ask spreads to deviate from initial stands. This represents, often in active markets, the presence of over-bloated outstanding shares available for trading. Thus, the market is forced to reprice securities as market agents react to the over-bloated outstanding securities. Essentially, companies stock dividend policy is driven by illiquidity positions and availability of investment alternatives. First, when a company is illiquid, one way to reward stockholders in the current year is to declare stock scripts (i.e. bonus) in place of cash dividends. Second, the objective of any stock split is to decrease the nominal value of quoted shares. This subsequently causes an increase in the outstanding shares and a deep in the bid ask spread. Further, the availability of alternative investment outlets appraised by management of generating returns in excess of shareholders minimum cost of capital also encourage managers to decide on bonus issues rather than cash dividends. In reaction to such strategies after the shares are marked for bonus, is an increase in the bid ask spreads due. Subsequently, in the absence of any

alternative, this study recommends that companies should engage in strategies relating to the use of retained earnings in financing alternative investments rather than outstanding shares expansion through splits and scripts. Finally, the use of debt securities is also recommended as long as the ROA and ROE are in excess of nominal interest rates.

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