Determinants of Share Price Dispersion in Capital Markets: A Case of Nigerian Stock Exchange

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Abstract

Market prices of shares (SP) are rarely the same with their intrinsic value; the difference being share price dispersion (SPD). The effect of SPD, either overvaluation or undervaluation is suboptimal allocation of resources. Therefore, this study seeks to identify the causes of SPD in capital markets for policy attention. Regression model, estimated at 5% level of significance using generalized least squares (GLS) and stepwise estimation techniques, was employed to ascertain relevant determinants of SPD. The sample consists of seventy-two dividend-paying firms listed on the Nigeria Stock Exchange (NSE) between 2000 and 2011[i]. Based on theories and empirical literature, the explanatory variables were accounting variables and disclosure indices derived from annual reports as well as macroeconomic variables extracted from 2012 edition of Statistical Bulletin of CBN. Intrinsic values (INTVAL) were estimated using Dividend Share Valuation Model while SP data were collected from Daily Official Listings of NSE. The findings suggest that the level of economic activities, exchange and interest rates in the economy, firm performance as well as information disclosure are factors that could make SP to be substantially different from its INTVAL. Therefore, regulatory authorities should address the identified determinants to prevent economic wastage of scarce resources.

Keywords: Market Price; Intrinsic Value; Share Price Dispersion; Dividend Share Valuation Model; NSE.

Introduction

Traditionally, uncertainty about stock prices leads ultimately to underinvestment, overinvestment, or both at microeconomic level of the economy. Hayek (1941) argues that such microeconomic misallocation of capital is pervasive and constitutes a serious economic problem even when there is no aggregate overinvestment or underinvestment. Stock price valuation influences investment through an equity-issuance channel. When stock prices are above the intrinsic values, the manager as a rational economic agent will issue shares because it is attractive to do so and will have access to liquid resources to undertake available investment and if care is not taken, overinvestment will be the result. In the same vein, when stock prices are below the intrinsic values, the manager naturally will not invest. This is because raising fund for investment will require issuance of equity at a low price which is unattractive, especially if the firm is an equity-dependent one. Therefore, as substantiated by Baker, Stein, and Wurgler (2003), overinvestment results from overvaluation while undervaluation leads to underinvestment. This sub-optimality and misallocation of resources are tantamount to economic wastage. Therefore, there is the need to trace the significant causes of share price dispersion with a view to recommend ways of addressing the problems.

Divergence between share price and its intrinsic value referred to as share price dispersion in this study and issues related to it have not really been explored by researchers. While various studies have been carried out on the capital market, this area still remains uninvestigated.

McGrattan and Prescott (2003) was of the opinion that economist should convey the degree of overvaluation and undervaluation in stock market to the public. They believed that if the public has such information and act on it, the issue of incorrect stock market valuation will be addressed. The inference from this statement is that lack of information is a major cause of share price dispersion and that adequate information will correct overvaluation and undervaluation in stock markets. This is an issue that required empirical verification; what then are the causes of share price dispersion? Can we completely eliminate share price dispersion in the market and how can this be achieved? This paper is an attempt to find answers to some of these questions by assessing the relevance of various determinants identified in the literature. The paper is divided into five sections. The next section reviews relevant literature on causes of share price dispersion and its measurement. The third section is on the methodology adopted in the study while the empirical results are discussed in section four with concluding remarks and recommendations in the last section.

Literature Review

Stock prices are usually volatile and they are never the same with their intrinsic values no matter how the latter is calculated; resulting in pricing gap which has been described in different ways by different authors. Possible names or descriptions in the literature are: pricing error, valuation error, market inefficiency in pricing or share price dispersion (Stigler, 1961; Baumol, 1965; Singhvi and Desai, 1971 and Shiller, 2000). This study adopts the word share price dispersion. The stock market is a specialized market and according to Sunde and Sanderson (2009), the factors that traditionally influence price in the market include (a) the available information (b) uncertainty (c) psychological factors such as fear and greed as well as (d) supply and demand factors. The factors 'a' to 'c' may be seen as separate but eventually they affect either the demand or supply sides. Psychological factors such as fear and greed play significant roles in stock markets and reflect in a number of speculative activities in the market. There could also be a wide gap between the market price of a share and its intrinsic value depending on the economic situation, whether there is a general market downturn or not; presence or otherwise of information asymmetry; macroeconomic view about a particular industry or geographic area; whether the company pays dividend regularly or not; etc. According to Shiller (2000), share price dispersion is a manifestation and measure of ignorance in the market.

The insinuation from this statement is that share price dispersion results from lack of adequate information. If market operators are adequately informed with relevant information, prices will be very close to their economic value; hence, the pricing gap will be narrow. Share price dispersion could be in form of overvaluation or undervaluation; any price below the intrinsic value is considered to be undervaluation and any price above it is considered to be overvaluation. It is essential to identify the causes of these different forms of share price dispersion to be able to reach a conclusion as to whether share price dispersion could be eliminated completely in capital markets or not. A company's share may be undervalued for deliberate and non-deliberate reasons. Many companies will issue their initial public offering (IPO) at a low rate to make it attractive to investors. Also, a company's share may be undervalued if it fails to meet earnings expectations. Publicly traded companies usually announce their sales and earnings expectations for the upcoming year. If such expectations were not met, it could result in loss of investors' confidence and hence undervaluation of the shares of such company. A stock could be undervalued because they're not popular with the investors at that moment. Other factors that could lead to undervaluation include: irregularity in dividend payment, information asymmetry, little or no analysts following a company, general market recession and/or poor macroeconomic view about a particular industry or geographic area. Overvaluation may result from an emotional buying spurt and investors' overconfidence or

over-reaction, which inflate the stock's market price. For example, Chen, Hong, and Stein (2002) analysed market overvaluation caused by the investors' overconfidence. Overvaluations may also result from an imitative process between investors and their crowd behaviours. According to Sornette (2003), stimulated by initially well-established economic fundamentals, investors build up a self-fulfilling enthusiasm by imitation or herding behaviour that causes overvaluation. Also, deterioration in a company's financial performance or position may eventually make an already valued company to be overvalued.

Therefore, determinants of share price dispersion identified in the literature are qualitative and quantitative factors which include: ability or inability to meet earnings expectations, level of economy activity and whether there is a downturn or not in the market generally, whether the company pays dividend regularly or not, the financial strength of the company observed generally (firm fundamentals), investors' overconfidence or over-reaction, lack of financial knowledge, inadequate information, share price volatility, slow development/poor institutional infrastructure, lack of accountability and transparency of market transactions, poor corporate governance, imitative process among investors and herding behaviours, etc. (Chen, Hong, and Stein,2002, Chowudhury and Abdullah, 2011). Attempt was made to capture these distinctive factors as much as possible using proxies where necessary and avoiding overlapping as some of the factors are interwoven.

Methodology

Share price dispersion is a measure of the level of ignorance in the market; If enough information is available as input into investment decision making process, the price of a firm's share will not be too far from its intrinsic value, whichever direction price moves whether upward or downward. Therefore, the higher the disclosure indices, the lower will be the share price dispersion (Stigler, (1961), Baumol, (1965); Singhvi and Desai 1971). The conceptualized relationship between share price dispersion, SPD, and Disclosure Indices (Mandatory and Voluntary), according to Singhvi and Desai 1971 is expressed as:

$$SPD_{it} = \alpha + \beta_1 MDI_{it} + \beta_2 VDI_{it} \quad (1)$$

Where: SPD_{it} is share price dispersion i.e. the difference between market price and calculated intrinsic value for firm i at time t

MDI_{it}= Mandatory Disclosure Index for firm i at time t

VDI_{it}= Voluntary Disclosure Index for firm i at time t

α= constant term

'$\beta_1$and β_2' are the regression coefficients

The level of information disclosure represented by disclosure indices are not the only factors responsible for share price dispersion. Therefore, other factors identified in the literature such as macroeconomic conditions as well as financial strength of the company as enumerated on page 6 were included, thus:

$$SPD_{it} = \alpha + \beta_1 MDI_{it} + \beta_2 VDI_{it} + \beta_3 LRGDP_t + \beta_4 IR_t + \beta_5 ER_t + \beta_6 PE_{it} + \beta_7 EPS_{it} + \beta_8 ROE_{it} + \beta_9 GR_{it} + \beta_{10} NAPS_{it} + \beta_{11} DPS_{it} + \varepsilon_{it} \quad (2)$$

Where: $LRGDP_t$, is log of real GDP in period t

IR_t is interest rates in period t

ER_t, is exchange rate in period t

PE_{it} is price earnings ratio for firm i in period t

EPS_{it} is earnings per share for firm i in period t

DPS_{it} is dividend per share for firm i in period t

ROE_{it} is return on equity for firm i in period t

GR_{it}, is gearing ratio for firm i in period t

$NAPS_{it}$, is net assets per share for firm i in period t

'$\beta_1$toβ_{11}' are the regression coefficients

ε_{it} is the residual error term of the regression

All other variables are as defined earlier.

Data Source and Estimation Technique

Disclosure indices (mandatory and voluntary) were used to capture adequacy of available information, accounting ratios such as Dividend Per Share (DPS), Earnings Per Share (EPS), Gearing Ratio (GR), Return on Equity (RoE), Net Asset Per Share (NAPS) and Price Earnings (PE) were used as to evaluate firm's performance, financial strength and ability to pay dividend. The indices and the ratios were not available from secondary sources but computed from firms' fundamentals such as earnings, net assets, total debts, total assets, share capital and number of shares issued extracted from the annual reports of companies from 2000 to 2011. Full definitions of these variables and how they are computed is presented in Appendix 1.

Macroeconomic variables: real GDP, exchange and interest rates were used to capture the level of economic activity and macroeconomic conditions and they were obtained from 2012 edition of Statistical Bulletin of the Central Bank of Nigeria while Share Price data were collected

from the Daily Official Listings of NSE. The exchange rate is the month-end bilateral naira-US dollar exchange rate[1] while the interest rate is the fixed deposit rate[2].

Different firms at different time horizons were considered; panel data were involved, with seventy-two dividend paying firms studied for twelve years, the number of observations is eight hundred and sixty-four. Both random and fixed effect models were estimated with Generalized Least Squares (GLS) which incorporates unequal variability in the dependent variable. With the aid of Hausman specification test, a choice was made between fixed effect and random effect models. The model was further estimated on stepwise basis and the standardised coefficients which indicate relative importance of the explanatory variables were obtained with changes in coefficient of determination, R^2, and F-statistics as the variables are added in turn.

Results and Discussion

The descriptive statistics and correlation test for the variables used as well as the results of the estimated equation are presented in this section.

[1]This is used because the country's international transactions are usually invoiced in US dollars.

[2] This stands for price of substitute as fixed deposit is the alternative investment opportunity to shares.

Table 1: Descriptive Statistics

	SP	INTVAL	SPD	IR	EPS	NAPS	GR	ROE	PE	RGDP	LRGDP	ER	DPS	MDI	VDI
Mean	21.26	8.23	14.62	0.1	1.47	6.84	4.21	0.2	38.71	576433	5.75	129.86	0.82	0.79	0.44
Median	5.68	1.18	4.27	0.1	0.47	3.86	1.38	0.15	20.33	578877	5.77	130.06	0.12	0.78	0.4
Maximum	407.29	231.31	383.23	0.16	59.76	111.18	789.08	16.92	2339.39	834001	5.92	153.86	15.23	0.92	0.6
Minimum	0.5	0	0.01	0.06	-20.83	-19.01	-23.54	-20.88	-1144.03	329179	5.52	102.11	0.01	0.62	0.1
Std. Dev.	41.64	21.12	30.29	0.03	3.9	9.36	28.2	1.27	107.47	153214	0.12	14.77	2.01	0.06	0.1
Skewness	4.06	4.66	5.75	0.34	6.12	4.1	25.34	-2.43	11.14	0	-0.43	-0.06	4.05	0.18	-0.68
Kurtosis	24.18	30.6	52.11	2.58	77.22	32.87	697.62	164.49	269.23	2	2.11	2.3	21.15	2.64	4.09
Jarque-Bera	18527	30550	91481	23	203708	34552	17462390	939707	2569530	38	55	18	14220	9	108
Probability	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0
Sum	18369	7112	12615	89	1266	5913	3641	172	33445	498000000	4964	112203	705	682	382
Sum Sq. Dev.	1496081	385106	790738	1	13114	75671	686282	1389	9967067		13	188227	3480	3	8

Source: Author's Computation

Table 2: Correlation Test

	SPD	DPS	EPS	ER	GR	INTVAL	IR	LRGDP	MDI	NAPS	PE	RGDP	ROE	VDI	SP
SPD	1														
DPS	0.46	1													
EPS	0.48	0.67	1												
ER	0.12	-0.01	0.03	1											
GR	0.03	0	-0.01	-0.04	1										
INTVAL	0.46	0.97	0.67	0.03	0	1									
IR	-0.05	0.02	-0.07	-0.29	0	-0.07	1								
LRGDP	0.18	0	0.02	0.88	-0.02	0.04	-0.4	1							
MDI	0.13	0.06	0.07	0.06	-0.01	0.05	-0.03	0.08	1						
NAPS	0.43	0.47	0.48	0.07	-0.03	0.47	-0.05	0.09	0.21	1					
PE	-0.08	-0.1	-0.1	-0.07	0.77	-0.1	0.02	-0.05	-0.11	-0.19	1				
RGDP	0.18	-0.01	0.03	0.88	-0.02	0.04	-0.46	0.99	0.07	0.09	-0.05	1			
ROE	0.06	0.16	0.37	-0.03	-0.52	0.15	0.03	-0.06	0.01	0.01	-0.47	-0.06	1		
VDI	-0.02	0.01	0.02	-0.02	-0.02	-0.01	0	-0.02	0.03	0.04	0.03	-0.02	0.02	1	
SP	0.9	0.68	0.56	0.12	0.02	0.69	-0.07	0.17	0.12	0.41	-0.1	0.17	0.11	-0.04	1

Source: Author's Computation

Determinants of Share Price Dispersion

Regression equation 2 was estimated to evaluate the relevance of different categories of the variables in explaining share price dispersion. The result is presented here below in Table 3.

TABLE 3: The Effect of Explanatory Variables on Share Price Dispersion

Dependent Variable SPD		GLS ESMATION	
Variable Category	EXPLANATORY VARIABLES	FIXED EFFECT	RANDOM EFFECT
	C	-430.7026*	-446.7446*
Financial Variables	DPS	-4.017926*	1.220756*
	EPS	1.092970*	1.870244*
	GR	-0.073113*	-0.030638
	NAPS	0.776217*	0.625655*
	ROE	-3.435186*	-2.467851*
Macroeconomic variables	ER	-0.403240*	-0.383226*
	IR	70.21101*	68.85450*
	LRGDP	84.70726*	83.39203*
Disclosure Indices	MDI	10.09189	26.95339
	VDI	-15.42746	-8.530110
	ADJ R^2	0.537450	0.219980
	DW	1.286167	1.162090
	F-STAT	13.36521*	25.31003*

* indicates variables that are significant at the chosen α- level of 5%.

Source: Author's Computation

The results as presented in Table 3 show that the explanatory power of equation 2 is approximately 54% with a significant F-statistics of 13.37 at 1%. It is shown that dividend per share, net assets per share, interest rates, and earnings per share, exchange rate and return on equity as well as real RGDP are all significant determinants of share price dispersion on the NSE. The relationship is such that as net assets per share, earnings per share, real RGDP and interest rates increase, there will be increase in share price dispersion and share price will be substantially different from its intrinsic value. This is reflected in positive coefficients of these variables. Also, as dividend per share, gearing ratio, return on equity and exchange rate increase in the market, there will be a reduction in share price dispersion; the quoted market price will be close to its intrinsic value. The negative coefficients of DPS, GR, ROE and ER are indicative of this fact.

Table 4a presents the summary of the estimation for share price dispersion equation on stepwise basis. The significant variables included at 5% level of statistical significance were, earnings per share, real GDP, exchange rate and level of mandatory disclosure (EPS, LRGDP, ER, and MDI) in that order. The explanatory power of the equation as the variables are added with the changes in adjusted R^2 and F-statistics are all indicated in the table.

Table 4a: Results Showing Relative Importance of AID to SPD

Model	Predictors of SPD	R-Square	Adjusted R-Square	R-Square Change	F Change	Durbin-Watson
1	Constant, EPS	0.089	0.088	0.089	84.516	
2	Constant, EPS, LRGDP	0.129	0.127	0.039	38.997	
3	Constant, EPS, LRGDP, ER	0.138	0.135	0.009	8.992	
4	Constant, EPS, LRGDP. ER, MDI	0.145	0.141	0.008	7.746	0.991

*

The chosen α- level is 5%. Source: author's computation

These four variables explained 14.1% of variations in SPD as indicated by adjusted R- square. Earnings Per Share explained about 9% of variations in SPD, LRGDP explained about 4% (movement in adjusted R square from about 9% in model 1 to about 13% in model 2) of variations in SPD while ER and MDI explained less than 1% each of variations in SPD (marginal movement in adjusted R square from about 13% in model 2 to 14.1% in model 4).

From Table 4b, the standardized coefficients, showing the relative importance of the determinants of share price dispersion are given. Earnings per share has the standardized coefficient of 29%, real GDP is having the largest standardized coefficient of 36.4%, exchange rate has standardized coefficient of 19.5% and level of mandatory disclosure has the lowest standardized coefficient of 8.8%. Share price dispersion is positively related to all these variables except exchange rate. Therefore, increases in EPS, RGDP and MDI will increase share price dispersion making share price to be substantially different from its intrinsic value. On the other hand, increases in exchange rate will cause a decline in share price dispersion.

Table 4b: Regression Result for Share Price Dispersion

Model	Predictors of SPD	Unstandardised Coefficients B	Std Error	Standardised Coefficients Beta	t-statistics	Significance

1	Constant	9.549	1.075		8.879	0.000
	EPS	2.375	0.258	0.299	9.193	0.000
2	Constant	-278.228	46.095		-6.036	0.000
	EPS	2.338	0.253	0.294	9.244	0.000
	LRGDP	50.108	8.024	0.199	6.245	0.000
3	Constant	-478.066	80.910		-5.909	0.000
	EPS	2.357	0.252	0.297	9.359	0.000
	LRGDP	94.359	16-780	0.374	5.623	0.000
	ER	-0.419	0.140	-0.200	-2.999	0.003
4	Constant	-502.609	81.075		-6.199	0.000
	EPS	2.306	0.252	0.290	9.170	0.000
	LRGDP	91.763	16.740	0.364	5.482	0.000
	ER	-0.410	0.139	-0.195	-2.945	0.003
	MDI	48.583	17.456	0.088	2.783	0.006

* The chosen α- level is 5%. Source: author's computation

The study reveals that mandatory disclosure index is positively and significantly related to share price dispersion while voluntary disclosure exhibits a negative non-significant relationship with share price dispersion. The *a priori* expectation for the coefficient of the two indices is to be negative. Voluntary disclosure index fulfils this expectation but it is not significant. Mandatory disclosure index did not meet this expectation but it is significant. The positive coefficient is indicative of the fact that improvement in a company's quality of disclosure will lead to a wide gap in share price as the price of share moves farther from its intrinsic value. This signifies a change in investors' response to disclosure of information on NSE. Increased disclosure or compliance by firms to disclosure regulation could be interpreted to mean that the firm is acting on better or more information or it could signal a firm preparing for equity issue or other major announcement in the future as inadequate disclosure may be interpreted to mean low firm quality or being perceived to be a "lemon".

The negative relationship between voluntary disclosure and share price dispersion is suggestive of the fact that as the quality of information improves, ignorance in the market is minimized and share price dispersion is reduced as share price moves towards its intrinsic value. Although the relationship between VDI and share price dispersion is not significant, however, the net benefit of the two indices may lead to a reduction in share price dispersion as shown by the coefficient of voluntary disclosure.

This lack of statistical significance of voluntary disclosure is not strange as previous studies have shown similar positive but non-significant association between share price and disclosure (Hassan, *et.al* 2009). These findings may be supporting the fact that there is a complex interplay of different factors determining the relationship between disclosure and firm value. Whether there will be an increase (positive relation) or a decrease (negative relation) in share price as more information is available to market participants depends on a lot of other factors apart from these two variables which the present model cannot account for. This may be supporting the view of Wagenhofer (2004) that shareholders might perceive increased disclosure as the company acting on "superior" information. This perception might lead to a change in behaviour to avoid being exploited. Hassan, *et.al* 2009 also posits that such a puzzling deviation from the traditional perspective may occur in an environment where noncompliance costs are limited or nonexistence. This will result in the cost of compliance with disclosure law being higher than the benefit of disclosure.

Conclusions and Recommendations

Overvaluation and undervaluation of shares lead ultimately to underinvestment, overinvestment, or both. This sub-optimal allocation of resources has a serious economic implication for the aggregate economy. Hence, the need to identify the causes of divergence between share price and its intrinsic value in order to prevent wastage of economy's scarce resources.

The study discovered that as the real GDP and exchange rate increase, indicating increase in level of economic activity in the economy, share price may move farther and farther away from its intrinsic value, deepening share price dispersion. Also, as we have improvements in firms' financial strength as indicated by such ratios as earnings per share and net asset per share price, dispersion increases. However, as dividend per share and return on equity as well as the gearing ratio increase, the price of share moves towards its intrinsic value. This study documents the fact that mandatory disclosure index is positively and significantly related to share price dispersion while voluntary disclosure index exhibits a negative non-significant relationship with share price dispersion.

Thus, we conclude that the levels of information in the stock market, macroeconomic conditions as well as financial strength of the company are the major causes of share price dispersion. Therefore, regulatory authorities should address the identified determinants to prevent economic wastage of scarce resources.

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