

Empirical Analysis of the Risk-Return Characteristics of the Quoted Firms in the Nigerian Stock Market

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Received: 20 June 2011 Accepted: 18 July 2011 Published: 28 July 2011

Abstract

This study empirically investigates the risk-return dynamics of the Nigerian quoted firms for the period of 2000 - 2004 as monthly. The objective of study is to establish what determines the systematic risk (beta) of firms, the magnitude of such risk (beta) associated with returns in the Nigerian Stock Market. This study employed Ordinary Least Squares (OLS) procedure to estimate the regression in order to obtain the systematic risk (beta) of each of the firm. In addition, market model was used to estimate returns of the firms. This study revealed that the sizes of risks (betas) are different in firms studied; they varied positively with the sizes of returns. In addition, 65

Index terms— Risk-Return Characteristics, the Quoted Firms and the Nigerian Stock Market.

1 INTRODUCTION

tock investment is essentially a long-term investment. Embarking on any human endeavour is tantamount to plunging into some kind of risk, which is of various degrees. Every investment carries one risk or the other. This existential reality is more pronounced in the quest for wealth through investment in stock markets. The stock market offer investors the opportunity to invest in securities of quoted firms such investment could be in fixed income security e.g. preference shares, debentures, etc. or they could be in equities. Each of these securities offer returns to investors, depending on firms' risk and the nature of the stock invested on. Generally, the higher the risk, the higher the return, all things being equal. The risk and return of security in the stock market may differ because of different factors affecting securities, such as differences in structure and managerial capacity of different firms, different sectors in which they operate, the state of the economy, government policies as well as internal corporate policies, themselves (Oludoyi, 2003).

Most individuals and institutional investors invest and stocks in anticipation of returns (Monetary benefits). This anticipation of returns could occasionally lead to massive rate of subscription of several public offers. With limited amount of resources at the disposal of these investors, the major problem confronting them will be where to place their limited resources that will maximize their future benefits. In addition, most investors in the Nigerian stock market do not probably possess the adequate analytical skills to evaluate the performance of the quoted firms in terms of risk characteristics associated with the returns. Probably most of the investment decisions taken by these investors are done without recourse to the risk level of the quoted firms operating in the stock market. At best their decisions are usually based on either the rule of thumbs or the earning power or even the size of the firm. But studies have shown that the magnitude of risk does not depend on the earnings power of the firm or the size of the firm, but based on the sensitivity of happenings in the economy (see Oludoyi, 2003; ??onathan & Lovie, 2007; ??irad & Sinha, 2008, and Abdullahi 2011). It is against this background, this study investigates the riskreturn characteristics of the quoted firms in the Nigeria stock market.

The structure of this paper is as follows: section II presents literature review section II presents methodology and data selection. Section IV discusses empirical results. Section V concludes.

2 II.

3 LITERATURE REVIEW

A lot of studies have been carried out on the risk and return characteristics in different markets (frontier, emerging and developed). Oludoyi, 2003;Goriaev, 2004; ??eter & Kanaryan, 2005;Yamaguchi, 2005; ??attilosi & Hoopt, 2006; ??eggen, 2007;Mayanja & Legesi, 2007; ??kingunola, 2007; ??nd Givard & Sinha, 2008;Oludoyi 2003) examined the risk characteristics of the Nigerian quoted firms. He found that the covariance of most of the firms with the market portfolio is positive as that the returns on the firms' shares tend to move in the same direction with return on the marked portfolio. The economic implication of the majority of firms in a portfolio having positive beta is that there is limited scope for portfolio diversification. Goriaev (2004) studied the risk factors in the Russian Stock Market. He came out with findings that the return difference between the companies sensitive to the country risk and those whose profit are stable in any macro-economic environment is about 59% premium. Also, that corporate governance factor accounted for 25% risk premium, while the traditional size and dollar factor accounted for premium in the range between 33% to 39% per annum in the Russian marked.

Petev & Kanaryan (2005) tried to model and forecast the volatility using Bulgaria as case study. They found that Bulgaria stock market has basic characteristics of most of the emerging stock markets, namely: high risk, significant autocorrelation caused by nonsynchronous trading, non-normality, volatility clustering and leptokurtosis. These findings on Bulgaria Stock Market coincided with those typical for emerging stock markets documented by Harvey (1995) and Bekert et al ??1998). Yamaguchi (2005) studied the supply-side estimate of expected equity return in Japan. He however, found that in Japanese economy, a supplyside estimate of equity risk premium was almost zero over the last three decades since the 1970s. He discovered also that the primary causes for this low risk premium were declining return on equity (ROE) over time and, more importantly, the excessively high corporate income tax rate imposed by the Japanese government on shareholders' earnings. He concluded that in order to supply sufficiently high return to investors for shouldering risk, not only has the corporate sector made efforts to raise ROE, but the government also had to adopt a tax policy to lower the corporate tax burden so that it does not unreasonably hurt share holders.

Battilossi & Houpt (2006) examined risk, return and volume in an emerging stock market, using Bilbao Stock Exchange, Spain as the case study. They found strong evidence in favour of auto correlation and GARCH effects, but no evidence of risk-return relationship. They equally found a weak evidence of a contemporaneous impact of trading volumes on returns. Menggen (2007) studied the risk-return relationship in Chinese emerging stock markets with sample of daily, weekly and monthly market return series, using a class of variant GARCH-M model. Menggen found that the dynamic risk-relationship is quite different between Shanghai and Shenghen Stock Markets. A positive and statistically significant risk-return relationship is only found for daily returns in Shenghen Stock Exchange. He discovered also that this positive relationship became insignificant for the lower frequency returns, contrary to these findings in Shenghen Stock Exchange, Monggen discovered that the conditional mean of the stock return is negatively but insignificantly related to its conditional variance in Shanghai Stock Exchange in most cases except for a positive and insignificant relationship in the C-GARCH-M model for the daily returns. Meggen concluded the C-GARCH-M Model seems to describe the dynamic behaviour of the stock returns better than other GARCH type models.

Mayanja & Legesi (2007) studied cost of equity capital and risk on Uganda securities Exchange to determine the cheaper source of finance between equity finance and bank finance. They found that the assumption often made by stock brokers that all stocks have the same risk is erroneous. This implies that valuations of companies listed on the stock exchange have been wrongly valued. They also found that equity finance is much cheaper than commercial bank finance. Mayanja and Legesi concluded that it would be good idea for companies seeking long term funds to get listed as this turn out cheaper than relying on short oriented commercial banks loan. ??kingunola (2007) studied capital Asset Pricing Model (CAPM) and shares value in the Nigerian Stock Market. His findings confirmed the importance of reward volatility analysis in security investment decision and management. Also that correlation test between market beta and systematic risk at 1% level affirmed that the assessment of securities beta as their contribution to the portfolio is undeniable therefore it provided the necessary measure of the systematic risk to be compensated by the market. Further more, he also discovered that beta impinges on expected return in responses to changes in the macro-economic environment. Thus, the recent reforms in Nigeria economy significantly affected firms' performance, the stock returns variability, beta instability as well as the presence of high diversifiable risk in holding individual assets.

Girard & Sinha (2008) studied risk and return in the next frontiers. A frontier Market is a market with a class of small, illiquid, less accessible and less known emerging market that has escaped the attention of many researchers. They found that small and valued stocks are less risky investment avenues than large and growth stocks. They also found that political, economic and financial risk factors have the greatest impact on risk premiums. Girard & Sinha concluded that some factors that influence the return generating process in developed markets may behave differently in frontier markets.

4 III.

5 METHODOLOGY AND DATA SELECTION

The most viable estimation procedure used in this study is ordinary least square (OLS). OLS is used August existence of autocorrelation and where such exists, some techniques could be used to remove such autocorrelation. According to Oludoyi, 1998; and Martinez, M.A. Nieto, B., Rubio, G., & Tapia, M. (2005), where the assumptions of non-autocorrelation and constant variance of the error term (u) break down, the errors of the regression of each firm are serially correlated. And similarly the variances of the errors are no longer constant; therefore giving rise to heteroscedasticity. This study used E-view software 7.0, 2009 for the analysis.

We collected data on firms' share prices, dividends paid and date of payments, as well as data on trading activities i.e. volume, frequency of trading and trading days. Monthly data were collected from the Nigerian Stock Exchange (NSE); we collected data from January 2000 to December 2004.

For firms to be included in the sample they must have December fiscal year. Thus, firms with other months' fiscal year were not included in the sample. We considered it appropriate to include only firms with common fiscal year in order to ensure reasonable comparability of beta estimates. It was established in the study carried by Oludoyi 1998 that volatility occurred more regularly around scheduled announcements. Thus, combining firms with different fiscal years in this study may not allow easy comparability of their betas. This is because the volatility arising from regularly scheduled announcements may differ among firms with different fiscal year, thereby, introducing complexity in the analysis.

Another Parameter for including firms in this study is their consistent listing on the Nigerian Stock Exchange between January 1999 and December 2004, inclusive. Such firms must also have data on earnings, share prices, dividend, and trading activities. Monthly data is used in this study, therefore, Friday closing share prices were collected. Where Friday was a public holiday, we used Thursday closing prices. If Friday and Thursday were public holidays, then we used Wednesday closing prices. A total of 181 firms were quoted in the Nigeria stock market as at December 1999. However, after applying the stated criteria above, 60 firms qualified for inclusions in our sample.

6 The Returns Model Specification

The returns of firms' shares can be obtained by using both share pricing and dividends as: $R_{jt} = P_{jt} + D_{jt} - P_{jt-1}$

$$(1) P_{jt-1}$$

Where; R_{jt} = actual return on firm at period t P_{jt} = Price of firm j at in period t P_{jt-1} = Price of firm j at in period $t-1$. D_{jt} = dividend paid on each share of firm j at period t If we take the natural log of the series we obtain returns in (1) above by subtracting in period $t-1$ from those in period t , plus dividend to arrive at i . $\ln R_{jt} = \ln (P_{jt} + D_{jt} - P_{jt-1}) - \ln (P_{jt-1})$

$$(2)$$

The return on market portfolio is proxy by the Nigerian Stock Exchange (NSE) index in this study, Market return is obtained by: $R_{mt} = \ln NSE_{it} - \ln NSE_{it-1}$ (3) NSE_{it-1} Transforming (3) into its natural log, it becomes $\ln R_{mt} = \ln NSE_{it} - \ln NSE_{it-1}$ (4) $R_{jt} = \alpha_j + \beta_j R_{mt} + u_{jt}$ (5)

Equation (5) is the market model that was used for the regression of firms' returns against market portfolio return, given the assumption that $E(u) = 0$, we have.

$E(R_{jt} / R_{mt}) = \alpha_j + \beta_j R_{mt}$ (6) Equation (5) allows for the influence of market movements on recognition that the sensitivity of firms' share prices to the market portfolio varies from one firm to another. The sensitivity is reflected in the value β_j for each firm. The systematic risk (Beta), β_j can be obtained by considering the extent to which security j covaries with market portfolio. This extent of co variation is divided by the variance on the market portfolio. The beta of each firm is calculated as: $\beta_j = \text{Cov}(R_j, R_m) / \text{Var}(R_m)$ (7)

$$\text{Var}(R_{mt})$$

Both the α and β are the unknown intercept and slope parameters of the market model respectively to be estimated. 1 shows that the α which is the estimated intercept of the regression model is largely negative nearly in all the 60 firms covered in this study. This suggests that the regression of most of the firms probably have negative intercepts. For instance, 13 of the firms have intercepts statistically significant at the 5% level, while 14 firms have intercepts and are statistically significant at the 1% level.

7 REGRESSION RESULTS AND INTERPRETATION

The results for the beta (β) which is the estimated systematic risk of the firms is shown in columns of table 1. 21 of the firms have statistically significant betas at the 5% level, while 18 of the firms have statistically significant betas at the 1% level. In all, 39 firms have statistically significant betas at both 5% and 1% levels. This represents 65% of the firms having statistically significant betas.

The R^2 of the regression is generally low. The regression having the highest R^2 is Flour Mills Mg. Plc with 23%. Some regressions even have zero R^2 Oludoyi (1998) and Abdullahi (2011) that in spite of the possibility of having low R^2 in the regressions the model is still very much in use.

The Durbin-Watson of this study revealed that 35 firms out of 60 firms covered have a value slightly higher than 2. Similarly 21 firms have values between 1.87 and 1.98 which are quite close to 2. The high value of the Durbin Watson statistics of the regression shows that serial correlation of the error term is not a problem. The betas of the firms in table 1 ranges from 0.01 to 1.43. Thus, DN mayer and Neimeth int' Pharm have the lowest beta of -0.01, while Wapic Insurance Plc cimpany has the highest beta of 1.43. Generally, the betas of the firms in the Nigerian stock market are positive. Out of the 60 firms covered in the study, only 5 firms have negative betas. These are DN mayer Plc., A.G., Leventis Nig. Plc., Neimeth Int' Pharm Plc., Aluminium Extrusion Nig. Plc., and Vono Products Plc. Out of these 5 firms, only the beta of Alluminium Extrusion Nig. Plc is statistically significant at 5% level. The economic implication of the majority of the firms' beta being positive is that there is limited scope for diversification. This implies that the covariance of most of the firms with the market portfolio is positive, and the return on the firms' shares will tend to move in the same direction with returns on the market portfolio. An important component of the covariance is the correlation coefficient. For beta of a firm to have a negative value, it means that the correlation coefficient must be negative. Thus the more the number of firms in a portfolio that have positive betas, the less the scope for diversification in that market.

It is important to note that a value of beta greater than unity, suggest that the firm's shares are riskier than the market portfolio, which if efficient should have a value of 1. In this study; the following firms have values greater than unity. These include United Bank for Africa, Asaka Cement Plc., West Africa Portland Cement, Nigerian Wire and Cable Flour Mill Nig. Plc., Northern Nigerian Flour Mill Plc., Marison Industries Plc., First Alluminium, Wapic Insurance Plc. Beta Glass Plc., Texaco Nig. Plc., and United Nig. Textile Plc.

In Table ??I, We further examine the relationship between risk and return of the firms. ^{1 2 3}

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IV.						
Company		?	?	R 2	Dw	
1 Okumo Oil-Palm Company Plc.		-0.80	0.89	0.096	1.9	
		(-216)	(2.46)			
2 Dunlop Nig Plc.		-0.782	0.77	0.13	2.1	
		(-2.84)	(2.88)			
August 3 R.T. Brisco Plc. Access Bank Plc.		-0.777 (-1.52) -0.449	0.84 (1.68) 0.61	0.04	1.92	
		(-1.38)	(1.96)*	0.06	2.21	
5 Afri Bank Nig. Plc.		-0.449	0.48	0.04	2.32	
		(-1.38)	(1.51)			
6 EIB International Bank		-0.551	0.61	0.03	1.93	
		(-1.25)	(1.42)			
7 First Bank of Nigeria Plc.		-0.842	0.89	0.16	2.12	
		(-3.09)	(3.38)			
8 Guaranty Trust Bank		-0.466	0.57	0.08	1.91	
		(-1.79)	(2.27)			
9 United for Africa		-1.163	1.18	0.21	2.06	
		(-3.80)	(3.97)			
10 Union Bank Plc		-0.805	0.82	0.16	1.98	
		(-3.22)	(3.39)			
11 Wema Bank Plc		-0.826	0.88	0.06	2.53	
		(1.86)	(2.05)			
12 Asaka Cement Plc		-1.084	1.08	0.08	2.05	
		(-2.23)	(2.30)			
13 West Africa Portland Cement		-1.045	1.01	0.16	2.17	
		(-3.40)	(3.41)			
14 Guinness Nig Plc		-0.827	0.91	0.21	2.11	
		(-3.44)	(3.89)			
15 Nigerian Breweries		-0.837	0.89	0.11	2.27	
		*(2.47)	(2.71)**			
16 Berger Paint Nig. Plc		-0.479	0.57	0.08	2.13	
		(-1.81)	(2.25)*			
17 Chemical and Allied Product		-0.743	0.83	0.07	2.03	
		(-1.84)	*(2.12)			
18 DN Mayer Plc.		0.113	-0.01	0.00	2.2	
		(0.22)	(-0.02)			
19 Triple Gee and Company Plc.		-0.043	0.06	0.00	1.73	
		(-0.08)	(0.124)			
20 A.G. Leventis (Nig) Plc.		0.357	-0.19	0.001	1.97	
		(0.59)	(-0.34)			
21 CFAO Nig Plc.		-0.726	0.78	0.05	2.05	
		(-1.65)	(1.97)*			
22 UAC of Nig. Plc.		-0.712	0.76	0.10	2.22	
		*(-2.35)	(2.60)**			
23 G Cappa Plc.		-0.288	0.27	0.07	2.2	
		(-2.16)	(2.09)			
24 Julius Berger Nig. Plc		0.733	0.73	0.10	2.01	
		(-2.53)	(2.60)			
25 Nigerian Wire and Cable Plc.		-1.181	1.21	0.07	2.26	
		(-2.05)	(2.18)			
26 Seven of Bottling Company		-0.647 ⁵	0.77	0.06	2.01	
		(-1.55)	(1.98)*			
27 Cadbury Nig. Plc.		-0.557	0.61	0.08	2.02	
		(-2.22)	(2.22)			

Brown 1978, Brown, Harlow & Tinic (1988) and Barnard & Thomas (1989) cited in Oludoyi (1998), the issue of low R^2 in regression of event studies is however not uncommon. It implies that the return on the market portfolio may not be the only factor determining firm's returns. According to Collins and Dent (1984), Brown, Harlow & Tine (1984), Bernard & Thomas (1989), Fama (1991), Draper and Paudyal (1995), Alin & Sung (1995), Mackinlay (1997), Cited in

Figure 2:

2

S/No.	Company	Return (%)	Beta
1	Okumo Oil Palm Coy Plc.	11	0.89
2	Dunlop Nig Plc	1.2	0.77
3	R.T. Brisco Plc	8.4	0.84
4	Access Bank Plc	4.4	0.61
5	Afri Bank Nig Plc	4.1	0.48
6.	EIB International Bank Plc	7.2	0.61
7	First Bank of Nig. Plc.	8.0	0.89
8	Guaranty Trust Bank	8.0	0.57
9	United Bank for Africa	5.1	1.18
10	Union Bank Plc.	4.2	0.82
11	Wema Bank Plc.	8.0	0.88
12	Ashaka Cement Plc.	3.4	1.08
13	West Africa Portland Cement Plc.	0.1	1.01
14	Guinness Nig. Plc.	10.7	0.91
15	Nigerian Breweries	7.7	0.89
16	Berger Paint Nig. Plc.	11.6	0.57

Figure 3: Table 2 :

Source : Author's calculations, 2011.

For table II, it was observed that an average return in the Nigerian stock market between January 2000 - December 2004 was estimated to be 7.0%. The firms' returns above the estimated average market return were 25, representing only 45% of the total firms covered by this study. Generally the betas associated with the returns of the firms studied in the Nigerian Stock Market are predominantly positive. This outcome conformed to the study carried out by Oludoyi (2003). From this study the size of risk are different in firms, they varied differently but directly mostly with the size of returns. This conformed to the theory in finance that return has direct relationship with risk as graphically represented by security market line (Sharpe 1964). This implies that the higher the risk, the higher the return and vice versa.

V.

1 CONCLUSION

It is important to know the risk-return characteristics of quoted firms in the stock market to enable investors take rational investment decisions. This study attempted to highlight upon these characteristics which appears not to have been adequately addressed Empirical Analysis of the Risk-Return Characteristics of the Quoted Firms in the Nigerian Stock Market in the Nigerian Stock Market. This study revealed that betas of the quoted firms in the Nigerian Stock Market are predominantly positive. This implies little scope for diversification in the market. Further more, according August they varied differently but directly mostly with the size of returns. The magnitudes of risk apparently do not depend on firm size. There is a wide difference between the lowest beta (-0.01) and the highest 1.43

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