Beta of Equities Listed in the Agricultural/agro-Allied Sector of the Nigerian Stock Exchange

[1]Chuke Nwude and [2]Sergius Nwannebuike Udeh
[1]Department of Banking and Finance, Faculty of Business Administration,
University of Nigeria Nsukka, Enugu Campus
[2]Department of Accounting, Banking and Finance, Faculty of
Management and Social Sciences, Godfrey Okoye University, Emene Enugu

Abstract: This study addresses a very important topic in corporate finance that is not well treated in many developing stock markets with particular reference to Nigeria. Beta is a major component of the capital Asset Pricing Model (CAPM) used in the determination of the required rate of return on equity but a very high percentage of the documented works done in this area have been carried out mostly in developed economies cum stock markets of America, Europe and Asia. However since we have need for stock market, there is also need to estimate equity betas which will be used to determine the required rate of return on equities traded in our markets in order to guide investors in making investment decisions. Therefore we calculated the (historical) betas of the listed stocks in the Agricultural/Agro-allied sector of the Nigerian Stock Exchange from 2000-2012, a thirteen year period. From the estimation of beta for the listed stocks, it was discovered that the beta content of the entire sector ranges between 7.66 and 2.57% which provided an average beta content of 3.09% for the sector and an average alpha risk content of 82.05%.

Key words: Equity beta, total risk, alpha risk, beta risk, market risk, agricultural/agro-allied sector

INTRODUCTION

The total risk of an investment consists of two components: diversifiable (alpha) and non-diversifiable (beta) risk, otherwise called non-market and market risks or unsystematic and systematic risks respectively. Diversifiable or unsystematic risk represents the portion of an investment risk that can be eliminated by holding well diversified portfolio. This risk results from controllable but uncontrolled events that tend to be unique to an industry and/or a company such as management changes, labour changes, labour strikes, lawsuits and regulatory actions. Non-diversifiable or systematic risk is external to an industry and/or a company and is attributable to broad natural forces such as war, inflation, political and sociological events. Such forces impact on all investments and are therefore not unique to a given company or sector. Therefore the relationship between total risk, diversifiable risk and non-diversifiable risk is that total risk is equals to diversifiable risk plus non-diversifiable risk. Because any knowledgeable investor can eliminate diversifiable risk by holding a large number of well diversified portfolios of securities, the only relevant risk to be concerned about is

non-diversifiable risk. Fischer and Jordan (2005) posit that studies have shown that by carefully selecting as few as fifteen securities for a portfolio, diversifiable risk can almost be entirely eliminated. But non-diversifiable risk is unavoidable and each security possesses its own level of non-diversifiable risk, measured with the financial metric called beta. Beta coefficient measures the sensitivity of each of the stock's returns to movements in the market's return. It shows how the price of a security responds to market forces. That is, it measures the sensitivity of a stock to the market index. In effect the more responsive the price of a security is to changes in the market, the higher will be its beta. It enables us to state what premium should be paid on each of the firms' shares by comparing each of them with that of the whole market portfolio. Beta is calculated by relating the returns on a security with the returns for the market. The beta for the overall market is equal to 1.00 and other betas are viewed in relation to this value. Beta can be positive or negative. Investors will find beta helpful in assessing systematic risk and understanding the impact market movements can have on the return expected from a share of stock. For example, if the market is expected to provide a 10% rate of return over the next year, a stock having a beta of 1.50 would be

Corresponding Author: Chuke Nwude, Department of Banking and Finance, Faculty of Business Administration, University of
Nigeria Nsukka, Enugu Campus

expected to experience an increase in return of approximately 15% (1.50 x10% = 15%) over the same period. This particular stock is much more volatile than the market as a whole. Decreases in market returns are translated into decreasing security returns and this is where the risk lies. For example if the market is expected to experience a negative return of 10% then the stock with a beta of 1.50 should experience a 15% decrease in its return (1.50 x-10% = -15%). Stocks having betas of >1 will be less responsive to changing returns in the market and therefore are considered less risky.

In the field of finance there is widespread agreement that the Capital Asset Pricing Model(CAPM) is a good predictor of stock return. To work with CAPM there is need for beta coefficient, a major component of the Capital Asset Pricing Model (CAPM). While several empirical works had been done in several developed stock markets to capture beta value, there have been few such works in developing stock markets like Nigeria. Such studies have now become imperative given the developments in the Nigerian stock market. In Nigerian Stock Exchange (NSE), the appropriate beta coefficients of the agricultural/agro-allied sector equity stocks have remained in doubt. As it were, there seems to be no definite values for this important component of the CAPM. Besides and specifically, there is need to re-evaluate the risk level of the Nigerian agricultural/agro-allied sector.

In emerging markets, measuring betas is more difficult and a complicated job because of insufficient data quite unlike the developed markets with abundant historical data. This lack of sufficient data on the stock market in emerging countries undermines beta computation and relevant formulas. And again, there might be no comparable local firms to firms that operate in the developed markets and this may cause unreliable betas estimates. The reliability and fitness of calculated betas are relevant to the valuation and investment of investors in emerging markets. Beta is useful in the: Determination of expected rate of return for a risky asset, via $Ri = Rf + \beta$ (Rm-Rf) Determination of cost of equity capital, via Ke Rf+β (Rm-Rf) Determination of portfolio risk via Portfolio Beta = βp βWi βi Stock classification: stocks can be classified by beta into Aggressive stocks = High Beta stocks = β = 1.79 1.06, Conservative stocks = average beta stocks = β = 1.05 0.93, Defensive stocks = low beta stocks = β = 0.92 - 0.02. On this fourth application of beta, one can recall that the return on any security varies with the security's beta. Beta measures the sensitivity of a stock's return to changes in the return on the market or the index. That is, beta measures the sensitivity of the underlying assets prospects and investor's assessment

thereof to those of the economy as a whole. Beta indicates how a stock is expected to move, up or down, relative to the overall market. Usually a stock with a higher beta represents a more volatile and riskier investment.

In the light of the above problem and needs, the major objective of this study is to find out the appropriate beta coefficients for the equity stocks with particular reference to the Agricultural/Agro-Allied sector. In addressing this specific objective, the study seeks to answer this specific question: What are the appropriate beta values for the listed Agricultural/Agro-Allied stocks in Nigeria for the period 2000-2012? To hazard a guess, it is hereby proposed that the Agricultural/Agro-Allied stocks are volatile as their beta values are greater or less than one. On the scope of the study, it is a well known fact that companies quoted on the Nigerian Stock Exchange are segregated into many sectors but the area of interest of this study is the Agricultural/Agro-Allied sector. The decision to research only on Agricultural/Agro-Allied stocks is informed by the fact that Agricultural/Agro-Allied sector is an active sector in the Exchange. However, the findings and conclusions to be derived from this work were as related to the Agricultural/Agro-Allied stocks in Nigeria. The study covers the period of thirteen years (2000-2012), comprising 156 months. The significance of study lies in the fact that the findings of the study would assist investors in the Nigerian Stock Exchange in their investment decisions. More importantly, it should be useful in guiding policy makers at the exchange to formulate policies on equity share price movements so as to restore investors' confidence in the market. When the investors' confidence is restored, trading activities can increase. Certainly, with an increased trading volume at the exchange, the overall wealth of the society will appreciate. For an investor, it represents a pivotal area around which sensible investment and financing decisions revolve. The profitability of trading on financial instruments depends on proper reference points. Therefore when deciding on the investment structure of an investor, the findings from this study become helpful to the investor. When deciding on which stock to transact in order to have a justifiable reward the beta value is needful. This work will bring to light and remind potential investors the price movement status of the Nigerian Agricultural/agro-allied stocks. This knowledge will help them to make informed investment and financing decisions that can enhance their investment value which is a sure way to wealth creation and poverty eradication. Undoubtedly, the study will provide a basis upon which other researchers in the capital market issues can explore other sectors of the market. One major limitation of this

study is the unavailability of complete data for 2013. The inclusion of 2013 data would have made the work a more current study.

Review of related literature: From conceptual theories in financial markets, systematic risk relates to the overall risk of the whole market which cannot be avoided by diversification and is measured by a financial metric, beta. Unlevered beta measures how much systematic risk a firm has, without debt, compared to the benchmark in the stock market. Equity beta covers systematic risk of a firm's equity while asset beta measures that risk which a firm's asset has. Several factors which can affect beta include, but not limit to, the volatility of expected return of a single stock, or the volatility of the expected return of the entire stock market index. Therefore, the company performance or its management performance, the investor confidence and the economic expectation might influence beta values. For a typical company, its beta can be estimated by using a regression of a stock returns against an overall stock exchange index return. Return is the rate at which an investment generates cash flows above the purchase cost of the investment. Return on a typical investment consists of two components. The basic component is the periodic cash receipts (or income) from the investment either in the form of interest or dividends. The second component is the change in the price of the investment asset which can be positive (or capital gain) or negative (or capital loss). This element of return is the difference between the purchase price and the price at which the asset can be or was sold. The income from an investment sometimes consists of one or more cash payments paid at specified intervals of time. For example, interest payments on most bonds are paid semi-annually where as dividends on common stocks are usually paid annually but sometimes are paid quarterly or semiannually. The term, yield is often used in connection with this component of return. Yield refers to the income component in relation to the purchase price of a security. The conceptual statement for total return of an investment consists of the sum of two components, income and price change (Fischer and Jordan, 2005; Pandey, 2009; Fernandez and Javier, 2010, Arnold (2008), Berk and DeMarzo (2009), Brealey, Myers, Marcus (1995), Copeland, Weston, Shastri (2005), Damodaran (2001), Howells and Bain (2008), Pandian (2005), Ross, Westerfield, Jaffe (1996), Weston, Besley, Brigham (1996). Therefore the return across time or from different securities can be measured and compared using the total return concept. The total return for a given holding period relates all the cash flows received by an investor during any designated time period to the amount of money

invested in the asset. It is defined as Total return equals to Cash payments received plus Price change over the period divide by Purchase price of the asset. That is, total

$$\text{Return } (R_i) = (D_t + P_t - P_{t-1})/P_{t-1}$$

Fernandez (2009a) computed Historical betas of ATandT, Boeing and Coca-Cola during the two-month period of December 2001 and January 2002 with respect to the S and P 500. Each day, betas were calculated using 5 years of monthly data, that is, on December 18, 2001, the beta is calculated by running a regression of the 60 monthly returns of the company on the 60 monthly returns of the S and P 500. The returns of each month are calculated on the 18th of the month. The monthly return of December 18, 2001 = (total return December 18, 2001/total return November 18, 2001) -1.

Pablo Fernandez (2013) also stated that industry betas are very unstable. And that a portfolio beta can be calculated by taking market capitalization of each stock in the portfolio and then, average beta of each company security (Blitz *et al.* (2012;Cont (2010), Fama and French (2004, 2006; Fernandez (2008) and Rogers *et al.* 2008). Fernandez and Vicente (2009) using the return of the S and P 500 as market return, computed the correlations of the annual stock returns (1989-2008) of the Dow Jones companies and discovered on average that the composite stock market with a beta that is equal to one does better than calculated betas. They also discovered that the Adjusted betas (ie 0.67(calculated beta)+0.33) have higher correlation than calculated betas but Adjusted betas have lower correlation than beta that is equal to one. They carried the exercise with four calculated betas every year end versus S and P 500 using) monthly data of last 5 years) monthly data of last 2 years) weekly data of last 5 years) daily data of last 5 years; and found similar results with the four betas. Despite this results, Fernandez (2009b) reports that 97.3% of the professors that justify the betas use regressions, webs, databases, textbooks or papers, while only 0.9% of the professors justified the beta using exclusively personal judgment (named qualitative betas, common sense betas, intuitive betas, logical magnitude betas and own judgment betas by different professors).

The Capital Assets Pricing Model (CAPM): The CAPM was developed by Sharpe (1964) in an attempt to simplify the individual portfolio theory as it relates to investment in securities. It states that the return on any asset or portfolio is related to the riskless rate of return and the expected return on the market in a linear fashion. It shows the relationship between expected return of a security and

its unavoidable systematic risk thus, $R = R_f + \beta\ (R_m - R_f)$, where R = Expected rate of return on a security or a portfolio, R_f = Risk-free rate of return, R_m = Expected market rate of return, β = Systemic risk of the security (the beta) relative to that of the market.

The model submits that only risk which cannot be diversified away, i.e., systemic risk is worthy of being rewarded with a risk premium for financial valuation purposes. The remaining risk, i.e., unsystemic or diversifiable risk may be reduced to zero by portfolio diversification and so it is not worthy of a risk premium. The line that reflects the combination of systemic risk and return available on alternative investments at a given time is called the Security Market Line (SML). Any security that lies on the SML is being correctly priced. If there is temporary disequilibrium in the market and the return on some assets becomes higher than that given by the SML, then the security is underpriced. Under this market condition, if the market mechanism is working ideally as investors demand more of such securities as super-good investment, the prices will continue to rise until that higher level of return reaches the SML value. Conversely if as a result of the market disequilibrium the level of return is lower than that given by the SML, then the security is overpriced. Under this market condition, if the market mechanism is working ideally, as investors sell-off more of such securities as super-bad investment, the prices will continue to fall until the level of return rises to that given by the SML value. Therefore, investors should select investments that are consistent with their risk preferences. While some investors consider only low risk investments, others welcome high risk investments. However, investors should sell overpriced securities, buy underpriced securities and hold onto correctly priced securities. The key to this decision is that when actual return-CAPM required return = +ve alpha, the security is underpriced, when actual return-CAPM required return zero alpha, the security is correctly priced when actual return-CAPM required return = -ve alpha, the security is overpriced. The CAPM provides a framework for valuation of securities.

Akintola-Bello (2004) used 96 months of security returns from Jan 1992 to December 1999 to estimate the betas for 173 firms quoted on the Nigerian stock exchange. He used growth rates in the NSE All-share index as the proxy for the market rate of return. It is generally accepted that due to some statistical factors, the estimated betas using the regression analysis are not unbiased estimates of the underlying beta of a firm's securities. The underlying beta of a security is likely to be closer to 1 than the sample estimate. To correct for this bias, Merrill Lynch developed an adjustment technique. After using the ordinary least squares to gain a preliminary estimate of beta, using 60 monthly returns, the beta is adjusted as follows: Adjusted Beta = 2/3 (Computed Sample Beta)+1/3(1) = 0.67(Raw beta) + 0.33(1). The formula pushes high betas down toward 1.0 and low betas up toward 1.0. The raw betas computed are adjusted to remove individual securities bias.

Therefore, the conventional approach for estimating betas used by most investment firms, analysts and services is to use historical market data for firms that have been quoted for a long period. One can estimate returns that an investor would have made on their investments in intervals (such as a week, a month) over that period. These returns can then be related to a proxy for the market portfolio to get a beta in the CAPM.

The beta of the overall stock market is+1.0 and every other stock beta is viewed in relation to this value+1.0. A stock with beta of exactly one will on the average move by just 1% for every 1% movement by the market. A stock with a beta of 1.5 tends to be 50% more volatile than the average stock market index, while that with a beta of 0.5 is half as volatile. If a stock with a beta rating of 1 moves 10% another stock with a beta equal to 2 can be expected to move twice as much (ie., 20%). The beta usually used in stocks classification is the adjusted stock beta (Akintola 2004).

When the stock market is declining, a stock with a beta rating of less than one is preferred. The reason is that such a stock is expected to decline less than the market. Conversely, in a rising market such a stock will underperform compared to the overall market. When the overall market is rising, a stock with a high beta is expected to out-perform the market. An investor's objective during the stock selection process is to identify stocks that will rise faster than the average stock during a bull market, decline less than the average stock during a bear market

Huy (2013) captures the views of Sharpe (1964) and Black (1972) that the expected stock return is linearly proportional to its market beta and affirms that certainly, beta, as a market risk measure, has certain influence on expected stock returns. He also reported that Fama and French (2004) also indicated in the three factor model that "value" and "size" are significant components which can affect stock returns. They also mentioned that a stock's return not only depends on a market beta, but also on market capitalization beta. The market beta is used in the three factor model, developed by Fama and French (2006) which is the successor to the CAPM model by Sharpe.

Estimation of beta coefficient (β): The conventional approach for estimating betas as used by Value Line Investment Services, Merrill Lynch(a US investment firm) and the London Business School Risk Management Service is to relate historical returns on an investment to a proxy for the market portfolio returns, using the ordinary least square techniques, to get a beta. Also, according to Fischer and Jordan (1995), the beta coefficient is

computed for equity using ordinary least square techniques. It is generally accepted that due to some statistical factors such as error in capturing the data and early approximations, the estimated betas using the regression analysis are not unbiased estimates of the underlying beta of a security. To correct for this bias, we adopted the technique developed by Merrill Lynch and also adopted by Akintola-Bello (2004). After using the ordinary least squares to gain a preliminary estimate of beta, using 96 monthly returns, they adjust the beta using Adjusted beta = Raw beta (0.67)+0.33. In order to correct the bias in estimating beta, the above formula pushes high betas down to 1.0 and low betas up toward 1.0 and generate a better estimates of betas values.

MATERIALS AND METHODS

The study involved quoted firms on the Nigerian Stock Exchange (NSE). The NSE daily official list provided the stock prices we used to compute the capital gain of the relevant months and years. The NSE Daily Official List (DOL) provided the composite market index, the All-Share Index (ASI) we used to obtain rates of return on the entire market. Follow-up figures were computed by the researcher as shown below. The second component of return which is the change in the price of the investment asset which can be positive (or capital gain) or negative (or capital loss) is used. This element of return is the difference between the monthly average market price of the stock at the beginning of each month and the monthly average market price at the end of the month. The average return for each year, both for the market and the stocks were obtained from the geometric mean of the 12-monthly returns for each year. The stocks betas were obtained using the linear regression model. In this study, we will use 156 months of each security's returns from January 2000 to December 2012 to estimate betas for the firms quoted on the Nigerian Stock Exchange. The proxy for the market portfolio is therefore the NSE All-Share Index (ASI) which encompass the total market value of quoted equity stocks.

Estimation Market Return (RM): The NSE All-Share Index (ASI) is used as a proxy for market rate of return. The NSE ASI was established on January 02, 1984 as a base date and set at 100 as a base value to which all subsequent values of the index can be related. It is a real time index because it is recalculated at the end of every trading day and captures the population of all listed shares.

Estimation of Rates of Return of an Asset (Ri): Sually, the total rate of return on each share is obtained by computing the relative values of prices between an holding period (monthly) plus dividend, as exemplified in

Akintola-Bello(2005), Pandian (2001). The return on a security is computed as $(D_t+P_t-P_{t-1})/P_{t-1}$, where D_t Dividend paid in period t, P_t = Closing price in period t, P_{t-1} Closing price in immediate preceding period t_{-1}. However, in this study, only the monthly capital gains were used as a proxy for rates of return to compute the beta in order to compare like terms with like terms. That is since market return does not include dividend in its return, then return from equity should be determined without the dividend element in order to place the two items on the same basis for reasonable comparison. The 12 monthly returns for each share were chain linked to obtain the annual return for stock. Chain link simply means finding the geometric mean of the 12 monthly returns.

Geometric mean: According to Watsham and Parramore (2007) the geometric mean is the most appropriate measure of means when an average rate of change over a number of time periods is being calculated. It is a single measure of periodic growth rate which if repeated n times will transform the opening value into the terminal value. To measure the annual growth rate over n years, the appropriate model for geometric mean is as follows: GM $(1+g_1)(1+g_2)(1+g_3)$---------$(1+gn)^{1/n} - 1$, where g is the periodic growth rates expressed in decimals. The Growth rate in earnings is computed using the Geometric mean of the respective year's earnings growth rates.

Population and sample: In any study, it is important to determine the group of persons or things to study (Freund and Williams, 1979). In line with this thought, the population of this study is all quoted companies in Nigerian Stock market. The sample of study is all the quoted Agricultural/Agro-Allied firms on the Nigerian Stock Exchange.

RESULTS AND DISCUSSION

Total risks of Agricultural/Agro-Allied stocks: Listed in Table 1 are the total risks for the Agricultural/Agro-allied stocks as computed from 2000-2012. The total risk of an asset is the sum of the diversifiable unsystematic risk (alpha risk) and the non-diversifiable systematic risk (beta risk). Table 1 above presents a measure of how much each of these companies' returns in the past has deviated from the average. While the sectoral average total risk is 10.34 and the market risk is 6.19, between the years 2000 to 2009, the 10-year average total risk of Afprint which is currently delisted from the market is 21.03. The three performing stocks in the sector which maintain steady presence in the market namely, Okomu Oil Palm, Presco and Livestock feeds, have average total risks of 10.48, 13.22 and 11.24 respectively which are higher than the market risk and the

Table 1: Total risks of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	8.56	5.00	11.33	21.46	32.83	11.48	23.80	47.77	33.29	14.73	Na	na	Na	21.03
Ellah	1.15	1.20	0	0	0	0	0	41.53	5.96	0	0	0	0	5.54
FTN	na	Na	na	Na	na	na	Na	Na	8.21	9.58	16.62	2.65	0	7.41
Grommac	2.02	11.96	1.89	1.44	1.37	2.37	0	43.34	32.50	Na	Na	na	Na	10.77
Livestock	1.68	2.06	0	4.12	0	0	14.21	38.66	24.59	21.95	15.31	5.99	17.59	11.24
Okitipupa	1.47	1.42	0	1.19	1.56	3.98	1.30	5.76	14.05	1.24	0.97	0	0	2.99
Okomu	13.76	4.14	6.11	20.18	18.45	7.33	11.74	14.46	10.65	2.40	9.44	4.92	12.72	10.48
Presco	na	Na	na	13.35	18.91	9.50	5.57	9.39	23.66	21.92	13.75	7.48	8.68	13.22
Average	4.77	4.30	3.22	8.82	10.45	4.95	8.09	28.70	19.11	11.97	11.22	5.26	9.75	10.34
Marketrisk	3.82	5.36	4.02	5.64	7.68	4.48	5.33	4.87	8.19	11.22	5.34	4.60	3.73	6.19

Computed from the Monthly rates of return from the subject firms

Table 2: Betas of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	1.28	0.43	-0.25	0.93	2.32	0.74	-0.60	3.86	3.00	0.58	0.00	0.00	0.00	1.23
Ellah	0.08	0.04	0.00	0.00	0.00	0.00	0.00	-4.76	0.25	0.00	0.00	0.00	0.00	-0.49
FTN	Na	Na	Na	Na	Na	Na	Na	Na	0.45	0.58	1.35	-0.05	0.00	0.58
Grommac	0.06	0.15	0.04	0.00	0.06	0.02	0.00	-2.79	1.33	Na	Na	Na	Na	-0.13
Livestock	0.03	0.07	0.00	0.26	0.00	0.00	0.95	2.94	2.63	1.69	2.04	-0.37	1.66	0.92
Okitipupa	0.09	-0.02	0.00	-0.05	-0.11	-0.23	-0.08	-0.41	1.11	0.01	-0.11	0.00	0.00	0.02
Okomu	1.13	-0.16	-0.85	2.16	1.01	0.52	1.18	1.60	0.24	0.03	0.55	0.12	1.16	0.67
Presco	Na	Na	Na	0.70	0.40	1.49	0.67	0.26	0.68	1.51	1.33	1.40	0.05	0.85
Average	0.45	0.09	-0.18	0.57	0.53	0.36	0.30	0.10	1.21	0.73	1.03	0.28	0.72	0.46

Computed from the Monthly rates of return from the subject firms

Table 3: Alpha risks of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	7.28	4.57	11.58	20.53	30.51	10.74	24.40	43.91	30.29	14.15	Na	Na	Na	19.80
Ellah	1.07	1.16	0	0	0	0	0	46.29	5.71	0	0	0	0	6.03
FTN	Na	Na	na	Na	Na	na	Na	Na	7.76	9.00	15.27	2.70	0	6.95
Grommac	1.96	11.81	1.85	1.44	1.31	2.35	0	46.13	31.17	Na	Na	Na	na	10.90
Livestock	1.65	1.99	0	3.86	0	0	13.26	35.72	21.96	20.26	13.27	6.36	15.93	10.32
Okitipupa	1.38	1.44	0	1.24	1.67	4.21	1.38	6.17	12.94	1.23	1.08	0	0	2.97
Okomu	12.63	4.30	6.96	18.02	17.44	6.81	10.56	12.86	10.41	2.37	8.89	4.80	11.56	9.82
Presco	na	Na	na	12.65	18.51	8.01	4.90	9.13	22.98	20.41	12.42	6.08	8.63	12.37
Average	4.33	4.21	3.40	8.25	9.92	4.59	7.79	28.60	17.90	11.24	10.19	4.99	9.03	9.90

Computed from the Monthly rates of return from the subject firms

sectoral average both yearly and in average. Okitipupa Oil Palm stopped presentation of its annual reports and accounts to investors since after 2008 and no reliable analysis can be done on it after year 2008. If we assume that the past is a good indicator of the future, Presco is the riskiest stock followed by Livestock feeds, Okomu and others in the order of average total risk.

Betas of Agricultural/Agro-Allied stocks: The beta for the overall market is 1 and other betas are viewed in relation to this value. Asset that is riskier than average will have beta that exceed 1. Those assets with less risk than average will have betas that are lower than one. The riskless asset will have a beta of 0. Listed in Table 2 are the betas for the Agricultural/Agro-Allied stocks as reported from the research. Each stock beta changes value from one period to another. Investors will find the betas helpful in assessing systematic risk and understanding the impact market movements can have on the return expected from a share of these stocks. For example, if the market is expected to provide a 10% rate of

return over 2012, stocks such as Afprint, Ellah, FTN Cocoa, Okitipupa Oil palm having a beta of zero will remain unaffected by the change in the market. On the other hand, return from Livestock Feeds will appreciate by 1.66 x 10% = 16.6%, Okomu Oil Palm appreciates by 11.6% and Presco by 0.5%. Conversely, if the market falls by 10%, the returns on Livestock, Okomu and Presco will tend to fall by 16.6, 11.6 and 0.5% respectively. Only two stocks Livestock and Okomu) have significant relationship with the market movement.

Alpha risks of Agricultural/Agro-Allied stocks: Unsystematic risk is that portion of the total risk that is unique or peculiar to a firm or an industry, above and beyond that affecting securities markets in general. Factors such as management capability, consumer preferences, labour changes and labour strikes, lawsuits and regulatory actions can cause unsystematic variability of returns for a company stock. Because these factors affect one industry and/or one firm, they must be examined separately for each company. Table 3 shows the

Table 4: Percentages of Beta risks of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	14.95	8.60	-2.21	4.33	7.07	6.45	-2.52	8.08	9.01	3.94	Na	Na	Na	5.77
Ellah	6.96	3.33	0	0	0	0	0	-11.46	4.19	0	0	0	0	0.34
FTN	na	Na	na	Na	Na	na	Na	Na	5.48	6.05	8.12	-1.89	0	3.55
Grommac	2.97	1.25	2.12	0	4.38	0.84	0	-6.44	4.09	Na	Na	Na	na	1.02
Livestock	1.79	3.40	0	6.31	0	0	6.69	7.60	10.70	7.70	13.32	-6.18	9.44	4.67
Okitipupa	6.12	-1.41	0	-4.20	-7.05	-5.78	-6.15	-7.12	7.90	0.81	-11.34	0	0	-2.57
Okomu	8.21	-3.86	-13.91	10.70	5.47	7.09	10.05	11.07	2.25	1.25	5.83	2.44	9.12	4.29
Presco	na	Na	na	5.24	2.12	15.68	12.03	2.77	2.87	6.89	9.67	18.72	0.58	7.66
Average	6.83	1.89	-2.33	3.20	1.71	3.47	2.87	0.64	5.81	4.44	5.12	3.27	4.78	3.09

Computed from the Monthly rates of return from the subject firms

Table 5: Percentages of Alpha risks of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	85.05	91.40	102.21	95.67	92.93	93.55	102.52	91.92	90.99	96.06	Na	Na	Na	94.23
Ellah	93.04	96.67	0	0	0	0	0	111.46	95.81	0	0	0	0	44.11
FTN	na	Na	na	Na	na	na	Na	Na	94.52	93.95	91.88	101.89	0	76.45
Grommac	97.03	98.75	97.88	100.00	95.62	99.16	0	106.44	95.91	Na	Na	Na	na	87.86
Livestock	98.21	96.60	0	93.69	0	0	93.31	92.40	89.30	92.30	86.68	106.18	90.56	72.25
Okitipupa	93.88	101.41	0	104.20	107.05	105.78	106.15	107.12	92.10	99.19	111.34	0	0	93.47
Okomu	91.79	103.86	113.91	89.30	94.53	92.91	89.95	88.93	97.75	98.75	94.17	97.56	90.88	95.71
Presco	na	Na	na	94.76	97.88	84.32	87.97	97.23	97.13	93.11	90.33	81.28	99.42	92.34
Average	93.17	98.11	52.33	82.52	69.72	67.96	68.56	99.36	94.19	95.56	94.88	96.73	70.22	82.05

Computed from the Monthly rates of return from the subject firms

Table 6: Capital Gain Yields of Agricultural/Agro-Allied stocks

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Ave
Afprint	-24.55	-44.26	-32.28	-25.32	17.31	-37.36	48.93	155.14	3.63	-112.75	na	Na	na	-5.15
Ellah	-4.08	4.09	0	0	0	0	0	198.93	30.76	0	0	0	0	17.67
FTN	na	Na	na	Na	na	Na	Na	na	-71.25	-94.62	15.79	-21.32	0	-34.28
Grommac	-19.81	-68.35	-2.15	-9.06	-4.87	-5.12	0	248.96	82.95	na	na	Na	na	24.73
Livestock	-14.57	-9.62	0	-19.65	0	0	-104.34	134.85	-36.66	-138.41	26.23	-25.26	97.16	-6.94
Okitipupa	-14.9	0	-7.61	6.17	28.73	6.54	98.58	107.67	-5.07	15.14	na	Na	na	18.18
Okomu	36.71	-27.05	-32.40	36.92	39.12	13.21	73.99	11.58	-14.50	-35.28	-48.92	50.45	46.67	11.56
Presco	na	Na	na	76.68	-3.09	19.62	-10.31	21.17	-10.5	-77.79	13.91	27.21	71.63	12.85
Average	-6.91	-26.68	-11.14	7.42	7.81	2.73	2.12	124.17	11.51	-66.27	0.33	6.22	43.05	7.26
Marketreturn	37.91	38.28	7.07	51.82	17.13	4.06	31.43	53.05	-58.54	-36.64	17.18	-20.03	30.57	13.33

Computed from the Monthly rates of return from the subject firms

values of the type of risk (the unsystematic risk or idiosyncratic risk, unique or specific non-market risk) that can be reduced through diversification. This element of variability in a share return is due to the particular circumstances of the individual firm.

Percentages of Beta risks of Agricultural/Agro-Allied stocks: Table 4 shows the average percentage of beta risk in Agricultural/Agro-Allied sector stocks is 3.09% while Afprint, Ellah, FTN, Grommac, Livestock, Okitipupa, Okomu and Presco register average of 5.77, 0.34, 3.55, 1.02, 4.67, -2.57, 4.29 and 7.66% respectively. On the average, Presco has the highest percentage of beta risk content in this sector, hence it is the riskiest stock in terms of beta or systematic non-diversifiable risk in the Agricultural/Agro-Allied sector of the Nigerian Stock Exchange (NSE).

Percentages of Alpha risks of Agricultural/Agro-Allied stocks: From Table 5 the average percentage of alpha risk in Agricultural/Agro-Allied sector stocks is 82.05% while

Afprint, Ellah, FTN, Grommac, Livestock, Okitipupa, Okomu and Presco recorded average of 94.23, 44.11, 76.45, 87.86, 72.25, 93.47, 95.71 and 92.34% respectively. On the average, Okomu has the highest percentage of alpha risk content in this sector, hence it is the riskiest stock in terms of alpha or unsystematic diversifiable risk in the Agricultural/Agro-Allied sector of the Nigerian Stock Exchange (NSE).

Capital Gain Yields of Agricultural/Agro-Allied stocks: Table 6 shows that the average return in terms of capital gains yield of the Agricultural/Agro-Allied sector stocks is 7.26% while Afprint, Ellah, FTN, Grommac, Livestock, Okitipupa, Okomu and Presco recorded average of -5.15, 17.67,-34.28, 24.73,-6.94, 18.18, 11.56 and 12.85% respectively. On the average, on full appearance in the market, Presco has the highest return in this sector. Therefore, it is the riskiest stock in terms of systematic non-diversifiable risk as well as the highest profitable stock in the Agricultural/Agro-Allied sector of the Nigerian Stock Exchange (NSE) within the period of study (Table 6).

Table 7: Volatility Ranking of the Agricultural/Agro-Allied stocks

Rank	2000	Beta	2001	Beta	2002	Beta	2003	Beta	2004	Beta	2005	Beta	2006	Beta
1.	Afprint	1.28	Afprint	0.43	Grommac	0.04	Okomu	2.16	Afprint	2.32	Presco	1.49	Okomu	1.18
2.	Okomu	1.13	Grommac	0.15	EllahLakes	0.00	Afprint	0.93	Okomu	1.01	Afprint	0.74	Livestock	0.95
3.	Okitipupa	0.09	Livestock	0.07	Livestock	0.00	Presco	0.70	Presco	0.40	Okomu	0.52	Presco	0.67
4.	EllahLakes	0.08	EllahLakes	0.04	Okitipupa	0.00	Livestock	0.26	Grommac	0.06	Grommac	0.02	EllahLakes	0.00
5.	Grommac	0.06	Okitipupa	-0.02	Afprint	-0.25	Okoitipupa	-0.05	EllahLakes	0.00	EllahLakes	0.00	Grommac	0.00
6.	Livestock	0.03	Okomu	-0.16	Okomu	-0.85	EllahLakes	0.00	Livestock	0.00	Livestock	0.00	Okitipupa	-0.08
7.	-		-	-	-		-		Grommac	0.00	Okitipupa	-0.11	Okitipupa	-0.23	Afprint	-0.60
AVE		0.45		0.10		-0.18		0.57		0.53		0.36		0.30

Table 8: Volatility Ranking of the Agricultural/Agro-Allied stocks

Rank	2007	Beta	2008	Beta	2009	Beta	2010	Beta	2011	Beta	2012	Beta
1.	Afprint	3.86	Afprint	3.00	Livestock	1.69	Livestock	2.04	Presco	1.40	Livestock	1.66
2.	Livestock	2.94	Livestock	2.63	Presco	1.51	FTN	1.35	Okomu	0.12	Okomu	1.16
3.	Okomu	1.60	Grommac	1.33	Afprint	0.58	Presco	1.33	Afprint	0.00	Presco	0.05
4.	Presco	0.26	Okitipupa	1.11	FTN	0.58	Okomu	0.55	EllahLakes	0.00	Afprint	0.00
5.	Okitipupa	-0.41	Presco	0.68	Okomu	0.03	Afprint	0.00	Okitipupa	0.00	EllahLakes	0.00
6.	Grommac	-2.79	FTN	0.45	Okitipupa	0.01	EllahLakes	0.00	FTN	-0.05	FTN	0.00
7.	EllahLakes	-4.76	EllahLakes	0.25	EllahLakes	0.00	Okitipupa	-0.11	Livestock	-0.37	Okitipupa	0.00
8.			Okomu	0.24								
AVE	0.10		1.21		0.63		0.74		0.16		0.41	

Table 9: Ranking of the stocks based on Relative Return (RR) = (Annual Return/Beta)

	2000		2001		2002		2003		2004		2005		2006	
Rank/s/n	Stocks	RR	Stocks	RR	Stocks	RR	Stocks	RR	Stocks	RR	Stocks	RR	Stocks	RR
Presco	81.42		Ellah	123.04	Presco	-5.52	Okitipupa	45.45	FTN	426.40	Presco	1432.60	Presco	157.66
Livestock	45.87		Okitipupa	97.00	Livestock	-81.90	Livestock	12.86	Okomu	420.42	Livestock	58.53	FTN	23.33
Afprint	40.19		Grommac	62.37	FTN	-163.14	FTN	11.70	Livestock	68.27	Okomu	40.06	Ellah	14.72
Okomu	7.24		Afprint	1.21	Afprint	-194.40	Presco	10.46	Presco	19.44	FTN	0.00	Okiti	-12.61
Ellah	-41.79		Livestock	-13.94	Okitipupa	-507.00	Okomu	-88.95	Okitipupa	0.00	Okitipupa	0.00	Afprint	-29.78
Grommac	-89.23		Presco	-15.44	Okomu	-1176.00							Okomu	-36.47
Okitipupa	-240.44		Okomu	-60.42									Livestock	-55.29
			FTN	-158.33							Grommac		Grommac	-133.74
AVE	-28.11		4.44		-354.66		-1.70		186.91		306.24		-9.02	

Volatility ranking of the Agricultural/Agro-Allied stocks: The yearly ranking of the stocks in order of the magnitude of the systematic risk shows that Afprint became the riskiest stock in the sector for 5 years in 2000, 2001, 2004, 2007, 2008 while Livestock Feeds, Okomu Oil Palm, Okitipupa Oil Palm, Ellah Lakes and Okomu Oil Palm were the lowest systematic risk in these years respectively. Livestock Feeds had the highest systematic risk in 2009, 2010 and 2012, Okomu Oil Palm in 2003 and 2006, Presco in 2005 and 2011, Grommac in 2002. This classification is important because during a period of expected upswing in the market return, investors should go for the shares whose beta coefficient is positively high. Conversely, during a period of expected downswing in the market return, investors should go for the shares whose beta coefficient is negatively high. Tables 7-8 made this choice quite easy.

Ranking of the stocks based on Relative Return (RR): The yearly ranking of the stocks in order of the magnitude of the relative return (annual return per unit of beta) shows Okomu occupying the first position in 2000, 2004-2006, with 32.49, 38.73, 25.40, 62.70% per unit of systematic risk incurred. Okitipupa had the highest

relative return in the sector for 2001, 2003, 2010 while Afprint made it highest in 2002. Presco became the highest relative return stock in 2007, 2009, 2012. While the sectoral average is-9.02% return per beta, Presco has an average of 157.66, quite an impressive positive figure. The sector performed below the market which provides an average of 2.15% as against the sector average of-9,02%. Table 9-11 shows the standing of all the stocks and that of the market on this scale of measure. Market Relative Returns for the period are shown in (Table 12).

Number of Stocks in each Volatility level: In the Agricultural/Agro-Allied sector stocks a total of thirteen years were examined. Out of the 87 stock-period examined, 50 which represents 56% of the stocks for the period were of very low beta ($0 < \beta < 0.4$); 1 which represents 1% of the stocks for the period were of low beta ($0.4 < \beta < 0.5$); 14 which represents 16% of the stocks for the period were of moderate low beta ($0.5 < \beta < 1.0$); 11 which represents 12% of the stocks for the period were of moderate high beta ($1.0 < \beta < 1.5$); 4 which represents 5% of the stocks for the period were of high beta ($1.5 < \beta < 2.0$); 9 which represents 10% of the stocks for the period were of very high beta ($2.0 < \beta$). On the average, 25, 12.5, 50 and 12.5%

of the stocks are in the very low, low, moderate low, moderate high respectively as can be seen from Table 13 below. Finally from Table14 it can be seen how the stocks fared in terms of value of beta below zero, between zero and one and above one.

CONCLUSION

Looking at Table 11, we note that 22 firms in the sector sample has beta values higher than 1. There are 55 firms in the sector sample with beta values <1. Fifteen firms in the sector sample with beta values <0. Therefore in essence, within the study period, we have 15 defensive stocks, 55 conservative stocks and 22 aggressive stocks. None of the stocks recorded beta of 1 which shows that none of the stocks moves in tandem with the movement of the market.

From the estimation of beta for the listed stocks, it was discovered that the beta content of the entire sector ranges between 7.66 and-2.57% which provided an average beta content of 3.09% for the sector and an average alpha risk content of 82.05%. On the average, the systematic risk content in the Agricultural/Agro-Allied sector stocks is far <4%. Therefore the bulk of the risk in this sector is constituted by unsystematic idiosyncratic non-market determined specific diversifiable risk. Hence some corrective measures have to be embarked upon in order to reduce noise in the rates of return of these stocks.

REFERENCES

Akintola-Bello, O., 2004. The Nigerian stock market: Behaviour and performance. Arbitrage Consulting Group, Lagos.

Akintola-Bello, O., 2005. How common stock are valued. Nigerian Stockbroker, 6: 3-11.

Arnold, G., 2008. Corporate Financial Management. 4th Edn., Prentice-Hall, USA.

Berk, J. and P. DeMarzo, 2009. Corporate Finance: The Core. Prentice-Hall, USA.

Blitz, D., J. Pang and P. van Vliet, 2012. The volatility effects on emerging markets. SSRN Working Paper Series, April 10, 2012.

Brealey, R.A., S.C. Myers and A.J. Marcus, 1995. Fundamentals of Corporate Finance. McGraw-Hill, USA., ISBN: 9780070074613, Pages: 679.

Cont, R., 2001. Empirical properties of asset returns: Stylized facts and statistical issues. Q. Finance, 1: 223-236.

Copeland, T.E., J.F. Weston and K. Shastri, 2005. Financial Theory and Corporate Policy. 4th Edn., Pearson Education India, New York, USA.

Damodaran, A., 2001. Corporate Finance: Theory and Practice. 2nd Edn., John Wiley and Sons, New YorK, USA.

Fama, E.F. and K.R. French, 2004. The capital asset pricing model Theory and evidence. J. Econ. Perspect., 18: 25-25.

Fama, E.F. and K.R. French, 2006. The value premium and the CAPM. J. Finance, 61: 2163-2185.

Fernandez, P. and V.J. Bermejo, 2009. Beta=1 does a better job than calculated betas. IESE Business School, May 19, 2009, pp: 1-20.

Fernandez, P., 2008. Levered and unlevered beta. SSRN Working Paper Series, October 17, 2008.

Fernandez, P., 2009. Betas used by professors: A survey with 2,500 answers. IESE Business School, SSRN, pp: 1-12.

Fernandez, P., 2009. Ten badly explained topics in most corporate finance books. IESE Business School, April 23, 2012, pp: 1-9.

Fernandez, P., J. Aguirreamalloa and L. Corres, 2010. Shareholder value creators in the S&P 500: 1991-2010. IESE Business School, February 10, 2011, pp: 1-12.

Fischer, D.E. and R.J. Jordan, 2005. Security Analysis and Portfolio Management. 6th Edn., Prentice-Hall, Upper Saddle River.

Freund and Williams, 1979. Modern Business Statistics. 7th Edn., Pitman, London.

Howells, P. and K. Bain, 2008. The Economics of Money, Banking and Finance: A European Text. 4th Edn., Prentice-Hall, Upper Saddle River.

Huy, D.T.N., 2013. Beta of viet nam listed computer and electrical company groups during and after the financial crisis 2007-2011. Asian J. Finance Account., 5: 127-139.

Pandey, I.M., 2009. Financial Management. Vikas Publishing, New Delhi, India.

Pandian, P., 2005. Security Analysis and Portfolio Management. Vikas Publishing, New Delhi, India.

Rogers, P. and J.R. Securato, 2007. Comparative study of CAPM, fama and french model and reward beta approach in the brazilian market. SSRN Working Paper Series, November 2007.

Ross, S.A., R.W. Westerfield and J.F. Jaffe, 1996. Corporate Finance. 4th Edn., McGraw-Hill, New York.

Sharpe, W.F., 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. J. Finance, 19: 425-442.

Van-Horne, J.C., 1998. Financial Management and Policy. 11th Edn., Prentice-Hall, USA.

Watsham, T.J. and K. Parramore, 2007. Quantitative Methods in Finance. Pearson Education Ltd., UK.

Weston, J.F., S. Besley and E.F. Brigham, 1996. Essentials of Managerial Finance. 11th Edn., Dryden Press, USA.