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EFFICIENT RISK-MANAGEMENT TECHNIQUES AND OPTIMUM PORTFOLIO SIZE: THE CASE OF DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT

Despite a number of papers have discussed the net effect of increased size on risk levels in portfolio of securities, there still remains a remarkably empirical gap in the finance literature. Thus, the objective of this paper is to fill this gap at least to a noticeable extent by examining the portfolio risk of small size, medium size and large size portfolios over the period 2002 to 2009. The results show that the risk of a portfolio reduces as size increases to an extent, and then additional increase in size causes a considerable increase in risk. To be precise, our findings unveil that medium size portfolio is the optimum size portfolio in the Nigerian banking system.

Keywords: Risk Management, Optimum Portfolio, Banks.

INTRODUCTION

Over the last fifteen years the banking and the overall financial systems of Nigeria have been undergoing major changes facilitated by deregulation, innovations in information technology and the integration of global financial markets. The pressure of competition arising from these changes forces banks to hold a well managed and diversified portfolio with the aim of reducing risk. Virtually, all the banks in Nigeria financial system adopt the strategy of risk reduction which ultimately involves optimum selection of negatively correlated securities to form a risk hedged portfolio. However, in managing portfolios of banks, it is ideal that managers should be cautious of the number of securities in their portfolios. This is why Francis (1986) warns that portfolio managers should not become overzealous and spread their resources over too many assets. If ten or fifteen different assets are selected for a portfolio, the maximum benefit from naive diversification must be attained. Further spreading of the portfolio's assets is certainly a superfluous diversification and as much as possible, it should be avoided. Thus, in practice, portfolio management is generally aimed at reducing risk by adjusting the number of assets in a portfolio. In view of this, early studies including that by Evans and Archer (1968) reached their conclusion by simulating the relationship between risk and the number of stocks. They found out that the risk reduction effect diminish rapidly as the number of stocks increases and concluded that the economic benefits of managing a portfolio are virtually exhausted when portfolio contains 10 to 20 stocks. Elton and Gruber (1977) investigated the relationship between risk and the number of stocks further and provided an analytical solution for the relationship between the two. Elton and Gruber's results reveal that 51 percent of a portfolio standard deviation is eliminated as number of securities increases from 1 to 10. Adding 10 more securities eliminates an additional 5 percent of standard deviation and increasing the number of securities to 30 eliminates only an additional 2 percent of the standard deviation. Efficient diversification or portfolio management does not require investing in a large number of different industries or securities. A portfolio that houses 8 to 10 securities is capable of reducing the total risk to be equal to systematic risk, while the unsystematic risk is fully eliminated or diversified away (GLP, 1983). In an equal vein, the study of Reilly (1985) complements that of GLP (1985) by stressing that it is possible to derive most of the benefits of diversification with a portfolio consisting of 10 to 18 stocks, hence to hold an efficient portfolio does not require 200 stocks to be in the portfolio. The complimentary studies of these two authors imply that there is a level in which diversification is entrapped into liquidity trap and at that level it becomes imprudent or meaningless in diversity. Thus, the current study is a fresh attempt to examine: (1) the extent to which non-market risk could be reduced by portfolio management and (2) the nature of the relationship between a portfolio's risk and its size. The study is structured into four sections viz: (1) literature review (2) methodology and data description, (3) analysis of empirical results and its conclusion.

LITERATURE REVIEW

Our discussion so far centres on efficient portfolio or how efficient portfolio can be attained by adjusting the number of securities in a portfolio and selecting perfectly negatively correlated securities. These are conventional facts in finance literature which were initiated by (Markowitz 1952). Markowitz in his

celebrated paper titled "portfolio selection" held the view that if securities returns are not correlated, the risk of a portfolio cannot be eliminated through diversification. It will be like flipping a coin that we cannot predict with confidence the outcome of a single flip, but if a great many coins are flipped we can be virtually sure that head will appear appropriate one half of them. Since cancelling out chances events provides stability to the disbursement of banking companies, correlation among securities returns however prevents similar market problems. He concludes that if correlation among security returns were perfect. That is, move up and down in perfect union, management of portfolio which essentially involves adjusting the number of stocks in portfolio can do nothing to eliminate risks. In essence before risk can be reduced or completely eliminated, security returns must have a perfectly negative correlation coefficient (-1). Olowe (1994), goes further to explain the effect of correlation coefficient on a well managed portfolio by stressing that an investor can reduce relative risk, if he or she selects securities whose returns are negatively associated with one another in such an optimal manner. Optimality in this context demands that the correlation coefficient should be -1 or close to -1. The lower the correlation coefficient of securities in a portfolio, the more effective the portfolio is managed in reducing the portfolio overall risk. Therefore, a good portfolio is not simply a collection of investment but rather how the investments in the portfolio fit together based on their correlation coefficient (Jaffray 2003). Furthermore, a set of notable researchers have empirically or critically looked at what happens to portfolio risk as randomly selected stocks are combined to form equally heightened portfolio. This is documented in the various studies from Fama (1976), Markowitz (1952, 1959), Sharpe (1964), Even and Acher (1968), Jonne (1989), Haim and Mayshall (1984), Khoury (1983), Bierman (1980), Federico and Alberto (2002), ELCA (1998), Myers and Brealey (1996); because their findings show that as the number of assets in a portfolio increases, the risk that the individual assets contributes to the portfolio reduces to be exclusively the covariance risk. Their illustrations are given as follows: Fama (1976) illustrated the extent to which risk could be reduced by varying the size of a portfolio. He randomly selected 50 New York stock Exchange (NYSE) monthly listed securities and calculated their standard deviation using monthly data from July (1963) to June (1968). Then a single security was selected randomly, its standard deviation was around 11%. He found out that when the security was combined with another, also randomly selected to form an equally weighted portfolio of two securities, the standard deviation fell to 7.2%. Step by step more securities were randomly added to the portfolio until all 50 securities were included. At a point the standard deviation quickly approached a limit that is roughly equal to the average covariance of all securities. Miller and Scholes (1972), having worked on a different body of data indicated that by granting securities into a portfolio, the unsystematic risk are being eliminated allowing a clear view of the relationship between returns and systematic risk. Myer and Brealey (1996) compare the standard deviation in common stocks between Coca Cola and Compaq. Their results show that the individual variability of the security is 21.6% for Coca Cola and 43.5% for Compaq respectively. The results show that the standard deviation of a portfolio with half investments in each was 26.5% which is relatively small compare to investing in either of the securities. Thus, their findings are replications of Markowitz's views, which supported the common practise of portfolio management and showed exactly how an investor could reduce the standard deviation of a portfolio by choosing stocks that do not move exactly together. This is in the tandem with the hypothesis that, increasing the number of stocks in a portfolio reduces variability. ELCA (1998) Board of pensions indicates that the standard deviation is a statistical method showing the variability of securities in a portfolio. For instance, between 1972 and 1994, long term treasury bonds returned an average of 8.6% with a standard deviation of 11.9% (measuring that the bonds annual returns over 22 years varied as much as 11.9% points from the average). During the same period, a portfolio consisting of two-third (2/3) large capitalization stocks and one-third (1/3) Treasury bill had the same standard deviation as the bond only. However, the average investment return was 2% point higher i.e. 10.6%. Thus, the portfolio that included typically riskier investments was actually equally risky due to the diversification effect. This board concluded that the diversification effect which is deeply rooted on efficient of a portfolio provides the opportunity for high returns with much less risk if you allocate your account among different types of investments. This is because different types of investments tend to behave differently in various economic and market situations. The possible effect of an efficiently managed portfolio is also seen in the works of Federico et al. (2002). In explaining the model of portfolio diversification of an electoral investment, the model conceives public spending as an investment with variable risk accruing to specific policy instruments. They borrowed from the standard capitalization asset pricing model and mean variance analysis in finance to specify the comparative statistic of an optimal portfolio choice among various types of public expenditure. Adapting the classic mean variance relationship from the work of Markowitz (1952), Roy (1952), Sharpe (1964), Litner (1965), they concluded that earlier models assume that incumbent politicians are risk averse actors who seek the best available mix of projects to maximise vote shares and reduce risk. Politicians would prefer

to invest resources in goods and services that provide the highest possible electoral yield with the lowest possible variance in expected outcome. Therefore, from these various analyses, there is an implication that as the number of randomly selected stocks held in a portfolio is increased, the total risk of the portfolio is reduced until it becomes the systemic risk. This will however, be subject to the magnitude of correlation coefficient (r), for a low value of r provides a litmus test of an efficiently managed portfolio

METHODOLOGY

The model adopted in this study is deeply rooted in the heroic work of Markowitz (1952). Harry Markowitz persuasively showed that the variance of a portfolio of N assets is given by

$$S_p^2 = \sum_{i=1}^N W_i^2 S_i^2 + \sum_{i=1}^N \sum_{j=1}^N W_i W_j S_i S_j R_{ij} \quad (1)$$

Where:

- " S_p^2 is the portfolio variance
- " S_i^2 is the variance of security
- " S_i is the standard deviation of security (i)
- " S_j is the standard deviation of security (j)
- " R_{ij} is the correlation between assets i and j
- " N is the number of assets.

Let's assume a special case where S_i equals the average standard deviation \bar{S} and R_{ij} equals the average correlation coefficient \bar{r} for all i , then equation above becomes thus:

$$S_p^2 = \sum_{i=1}^N W_i^2 \bar{S}^2 + \sum_{i=1}^N \sum_{j=1}^N W_i W_j \bar{S}^2 \bar{r} \quad (2)$$

It is noted that the sum of the weights of the two securities equals one i.e. $W_i + W_j = 1$, therefore, for $j \neq i$ must equal $(1 - W_i)$. Substitute this into the last term of equation 2 to

$$S_p^2 = \bar{S}^2 \sum_{i=1}^N W_i^2 + \bar{S}^2 \bar{r} \sum_{i=1}^N W_i (1 - W_i) \quad (3)$$

Equation (3) can be simplified further, if we assume equal weighting, to equation (4) as follows:

$$S_p^2 = \bar{S}^2 \sum_{i=1}^N W_i^2 + \bar{S}^2 \bar{r} \sum_{i=1}^N W_i (1 - W_i) \quad (4)$$

Equation (4) shows that the total risk (variance) of a portfolio can be broken down into two components. The first component $\bar{S}^2 \bar{r}$, represented by $\bar{S}^2 \bar{r}$ shows the position of the total risk that can be eliminated by adjusting the number of stocks in a portfolio. This component is common to all investors on the market and it is known as systemic or non-diversifiable risk see Elton and Gruber (1977). In Sharpe contrast, the second component represented by $\bar{S}^2 (1 - \bar{r}) / N$ can be effectively reduced or totally eliminated by increasing the number of stocks in a portfolio. This part of total risk is called unsystemic or diversifiable risk and its elimination can be achieved rapidly, since as N increases, $1/N$ approaches zero very quickly. The level of risk reduction that can be achieved in a portfolio is limited or bounded by the systemic risk. Thus, the reduction of risk within a portfolio of increasing size can only be achieved by the elimination of the unsystemic risk or residual variance inherent in the investment. Two basic techniques have been advanced in finance literature to measure the impact of size on portfolio risk, these are graphical approach and statistical. In the graphical approach researchers usually simulate portfolio of increasing size (typically equal-weighted), based on individual data, and calculate the level of risk (standard deviation or variance of returns) for each portfolio. The individual portfolio risks are then averaged and plotted against portfolio size. The resultant graphs typically show an initial rapid decline in average portfolio risk which then tapers away towards some "Market Level". The statistical approach follows much the same procedure with a large number of portfolios of increasing size simulated from individual data from which some measures of risks are calculated for each portfolio and the resultant values for each portfolio size averaged. The researchers may then display the results graphically and/or more usually employ regression methodology to derive the relationship between the measure of risk and the portfolio size see Barber (1991) and Cullen (1991).

The first regression approach adopted in the literature was suggested by Evan and Archer (E&A) (1968) which simply relates the standard deviation (total risk) of a portfolio to the number of investments held using the following equation:

$$S_p = \bar{S} \left(\bar{r} + \frac{1 - \bar{r}}{N} \right) \quad (5)$$

E&A argue persuasively that the regression of total risk or standard deviation on $1/N$ shows the impact of portfolio size on the unsystemic risk within the portfolio because any fall in the value of the standard deviation must be a consequence of the reduction of the unsystemic risk within the portfolio. E&A found that their model explained 98.6% of the variability of the mean standard deviation for US stock market. Their analysis further showed that the reduction in standard deviation was substantial up to portfolio of eight or ten securities after which standard deviation of the portfolio became asymptotic to the market risk or systemic

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The second regression approach is suggested by Wagner and Lau (W&L) (1971). This approach uses the proportion of market risk in a portfolio to indicate the reduction in risk achieved by increasing portfolio size. W&L use the Single Index Model (SIM) to determine how much of the variability in returns index:

$$R_i = \alpha_i + \beta_i R_m + \sum \epsilon_i \quad (6)$$

Where R_i is the return of the i 'th portfolio

- R_m is the return on the market portfolio

- β_i is the component of the total risk that cannot be reducing by increasing the size of a portfolio, it is known as the systemic risk of portfolio

- α_i is the intercept and

- $\sum \epsilon_i$ is the random error term, which has an expected value of zero.

The coefficient of determination (R^2) of such a regression indicates the proportion of variability in returns that can be explained by the market. The amount that is unique or specific to the portfolio itself, i.e. the non-market risk (unsystemic risk) is given by $(1-R^2)$. A regression of R^2 on $1/N$ using equation (7) below indicates the number of investments to hold so as to reduce the non-market risk to minimise bequest level.

$$R^2 = \alpha + \beta(1/N) \quad (7)$$

W&L using this approach again found that the increase in R^2 was substantial up to eight or ten securities after which the gain becomes marginal. Based on the E&A and W&L approaches the initial impression is that portfolio needs to have only a few investments to house in order to be fully diversified down to the market level.

The above procedures provide the foundation for the regression equation adopted in this present study. The equation is stated thus:

$$R_i^2 = \alpha + \beta(1/N) \quad (8)$$

Where: α is alpha i.e. the regressions intercept.

- β is the slope of the regression of the return of i 'th portfolio on the returns on the market portfolio using equation (6)

- R_i^2 is the residual or unsystematic variance of portfolio, and it is functionally defined as:

$R_i^2 = \delta^2(R_i) - \beta_i \delta^2(R_m)$. The first term in the RHS i.e. $\delta^2(R_i)$ is the variance of returns for i 'th portfolio. While $\delta^2(R_m)$ is the variance of market return.

Thus, our study utilises equation (8) to measure the level of risk reduction as portfolio size increases.

2.2. Data Description and collection period.

The data used in this study come from two sources: Monthly Stock Market Review (MSMR) and Daily Official List (DOL) both are issued by Nigerian Stock Exchange (NSE). We source data relating to stock prices and returns from MSMR while returns on market portfolio are sourced from DOL. However, our study period covers 2002 to 2009. This is due to the fact that the First Volume of MSMR was issued in January 2002.

Return on a particular stock say (i) is mathematically expressed as: $R_i = \frac{P_t - P_{t-1} + D}{P_{t-1}}$

Where: R_i is the return on security (i)

- P_t is the price of security (i) at month (t)

- P_{t-1} is the price of security (i) at month $t-1$

- D is income or dividend (but our study assumes no dividend)

Return on market portfolio (RM) is expressed as:

$RM = \frac{\text{closing share index} - \text{opening share index}}{\text{opening share index}}$

R_i is the regressed against R_m to source for the market risk (β) see equation 6.

4.0 Analysis and Results

The regression results for total risk on number of securities are displaced in table 4.1. The coefficient of determination (adjusted R^2) is negative and as a result the standard errors around the regression results are very large for the three classes of the portfolio sizes. It is this which leaves the Banks with little confidence that their portfolio will behave "Like the average". The number of securities in a portfolio has varying impacts on the portfolio risks. The market risk in terms of beta and R^2 for Small size portfolios are 1.76 and 0.11 respectively. While the diversifiable risk is 0.89, this means that the measure of risk that banks can reduce by diversification when they hold small size portfolio is 89% while about 11% of the total risk remains residual or non-diversifiable. Also, the coefficient of beta appears to be positive and significant at 25% level using two-tale implying that the market risk of small size portfolio move in the same direction with returns which according to Markowitz (1952), this type of portfolio does not yield satisfactory results. However, the performance

Table 1: The relationship between portfolio size and risk.

Portfolio Size	Market Risk as a Measure of Beta	Market Risk as a Measure of R^2	Diversifiable Risk (1- R^2)	T-Stat. Beta	Adj R ²	Stand. Error
Small Size	51.76	0.10	0.89	(0.97) ^a	-0.01	53.26
Medium Size	-34.82	0.05	0.95	(-0.86) ^a	-0.02	40.35
Large Size	-101.38	0.07	0.93	(-0.55)	-0.16	185.18

Small Size Portfolio - is a portfolio with 10 numbers of securities.

Medium Size Portfolio - is a portfolio with 15 numbers of securities.

Large Size portfolio - is a portfolio with 20 numbers of securities.

^a indicates significant at 25% level of significance using Z-table test.

of medium size portfolio meaning that return can be maximised at any given level of risk. The portfolio therefore displays mean variance efficient quality of CAPM initiated by (Sharpe 1962). Our investigations show that as the portfolio size increase from small size to medium size by adding five additional securities, the percentage of total risk that can be diversified increase from 89% to 95%. However, this percentage increases by 2% when five additional securities are added to the medium size portfolio to form a large one. Thus, the optimum portfolio size for Nigerian deposit money banks is the medium size portfolio. The small size and large size portfolio are both sub-optimal because they may not maximise return at a particular level of risk.

CONCLUSION / RECOMMENDATION

This paper has examined the potential for risk reduction in the Nigerian Banking System for portfolio of securities across three spectrum of portfolio size using monthly return data over the period 2002 to 2009. The results confirm the findings of Markowitz (1952) and Sharpe (1962) respectively. The diversifiable risk of small size portfolio reduces as five securities are additional added to the portfolio but when five more securities are added to the medium size portfolio, the proportion of risk that can be reduced decline considerably by 2% implying that medium size portfolio is the optimum size portfolio that can be held by any bank in Nigeria. Small size and large size portfolio appear to be sub-optimal. However, size alone does not necessarily lead to a reduction in portfolio risk. Clearly, other factors are of great importance. Therefore, based on these findings, we recommend that Nigerian banks should strip the size of their portfolio to house securities between 15 and 17, while 14 and below or 18 and above will lead to inefficient diversification.

REFERENCES

- Alberto, D. And Federico, E. (2002): "A portfolio Diversification Model of Electoral Investment". Frontier in Latin America political Economic Conference.
- Barber, C. (1991). Modern Portfolio Theory: Fact and Fantasy. A Paper presented as part of the seminar series organised by the Society of Property Researchers and the RICS, entitled Property in a Portfolio Context.
- Bieman, H. And Sindle, S. (1980): "The Capital Budgeting Decision" Economic Analysis of Investment Projects.
- Brealey, R. and Myers, C. (1996): "Principle of Corporate Finance". 5th Edition, McGraw-Hill, pp 153-165.
- Cullen, I. (1991). Risk Management in Investment Property Portfolios. Paper presented as part of the seminar series organised by the Society of Property Researchers and RICS, entitled Property in a Portfolio Context.

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- ELCA Board of Pension (2004) "How Time and Diversification minimize Risk": ELCA Fund Performance Monthly View.
- Elton, E.J. and Gruber, M.J. (1997). Risk Reduction and Portfolio Size: An Analytical Solution. *Journal of Business*, 50, 415-437.
- Elton, E.J., Gruber (1977) "Risk Reduction and Portfolio Size: An Analytical Solution," *Journal of Business* 50, 415-437.
- Evans, J.L. and Archer, S.H. (1968). Diversification and the Reduction of Dispersion: An Empirical Analysis, *Journal of Finance*, 23,761-767.
- Fama, E.F. (1971). "Risk, Return and Equilibrium: *Journal of Political Economics* 79:1 January February Pp 30-55.
- Francis, J.C. (1986) *Investment: Analysis and Management*, 4th ed. New York: McGraw-Hill.
- Gup, B.E. (1983). *The Basics of investing*, 2nd ed, New York: John Wiley & Sons. Jones, P. (1991) *Investment Analysis and Management*, 3rd Edition, John Wiley and Sons New York.
- Khoury, S. (1985) "Investment Management Theory and Application", MacMillan Publishing Coy; New York. Pp 334.
- Lintner, J. (1965): "The Valuation of Risk Assets and the Selection of Risky Investment in Stock Portfolio and Capital Budget", *Review of Economics and Statistics*, 47:2, February pp. 13-37.
- Markowitz, H.M. (1952): "Portfolio Selection", *Journal of Finance*, 7: 77-91.
- Maysbar, J. (1979): "Transaction Cost in a Model of Capital Market Equilibrium." *Journal of Political Economy*, 87, 673-700.
- Miller, M.H and M. Scholes, (1972): "Rates of Return in Relation to Risk: A Re-examination of some Recent & Findings", in Jensen, M.C. (ed.), *Studies in the Theory of Capital Markets* (Praeger Publishers, Inc. New York). Pp 47-78.
- Olowe, R.A. (1997): "Financial Management: Concepts, Analysis and Capital Investments", Brierly Jones Nigeria Limited, Lagos. Pp 129-151.
- Piper Jaffray (2003): "Effect Market Risk in Portfolio Diversification", A paper presented, New York Stock Exchange.
- Reilly, F.K. (1985) *Investment Analysis and Portfolio Management*, 2nd ed. San Francisco: Dryden Press.
- Roy, A.D. (1952) "Safety-first and the Holding Assets." *Econometrical*, 20, 431-449.
- Sharpe, W.J. (1964): "Capital Asset Prices". A Theory of Market Equilibrium Under Condition of Risk. *Journal of Finance*, Pp 425-42.
- Wagner, W.H. and Lau, S.C. (1971). The effect of Diversification on Risk. *Financial Analysts Journal*, 27, 48-53.

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