ECONOMIC RISK FACTORS AND EXPECTED RETURN: EVIDENCE FROM UPSIDE AND DOWNSIDE MARKET CONDITIONS IN NIGERIA

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Abstract
This paper examines the economic risk factors and expected return, emphasizing Nigeria's upside and downside market conditions. The study adopted an experimental research design. All the quoted companies in the Nigerian Stock Exchange (NSE) served as the population from December 2005 to December 2018. The study espoused a purposive sampling method to select 41 companies' stocks frequently traded throughout the study period. The study employed purely secondary from NSE Factbook of various issues and Central Bank Statistical Bulletin. The dependent variable (stock prices from NSE Factbook while the macroeconomic factors (Inflation, exchange rate, monetary policy rate, oil price, and money supply) were from the Central Bank of Nigeria's annual statistical bulletin. The paper used the Ordinary Least Squares (OLS) technique in estimating their parameters both at the first and second pass regression models. Findings revealed the existence of observed and unobserved risk factors in the upside and downside market in Nigeria. The study also documents that economic risk significantly commands a market premium in both the upside and downside market phase. Besides, the finding observed that factor likelihood appears to be superior to the macroeconomic variable model. The study concluded that economic risk factors significantly explain average returns variations in the Nigerian capital market, notably when the market scaled downward. The research suggests that investors in the Nigerian capital market should consider: financial, diversifiable risks, and unobservables in the determination of expected returns.
Keywords: Arbitrage Pricing Theory, economic risk factors, expected return, upside market, downside market .

1. INTRODUCTION

In a global sensation, the stock market's role is pertinent because it is a catalyst and an avenue for the intermediation process between the surplus unit and deficit unit for economic growth and development. The stock market accommodates different players concerned about the return, the risk factors, and the nexus between risk and return. The study of the risk-return relationship has attracted many scholars' interests in this modern social-economic society because it forms the basis of investment. Latunde, Akinola, and Dare (2020) asserted that vigorous reactions toward observable and unobservable risk

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factors created unpredictable returns, as most stock investors could not control these risk factors. The directional link between risk factors and the return has been a debatable issue in modern finance scholars, which led to the proposition of various asset pricing models in addressing risk factors and return phenomena. Multiple theories such as Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT), multifactor asset pricing model, among others, have been propounded to capture and depicted the fact picture of risk factors and expected return. Despite various asset pricing models, there are contradictory findings between risk factors and expected return (Aliyev & Soltani, 2018; Elgiziry & Awad, (2017). Bajpai & Sharma, 2015). There is no concession on the number of risk factors that determined expected return, which has created background challenges for finance scholars in the asset pricing model.

Studies such as Elgiziry and Awad (2017) and Elshqirat (2019) emphasized that macroeconomic factors shaped expected return, especially in developing and emerging economies. Likewise, within the Nigerian context, studies such as Agbatogun and Olowe (2019) and Onoh, Ukeje, and Nkama (2017) observed that economic risk factors served as hindrance factors achieving an expected return.

Kahuthu (2017) and Abdullahi and Fakunmoju (2019) pointed that in developed, developing, and emerging capital markets, the challenges of unpredictable stock return cut through investors, including Nigerian stock market investors.

Abdullahi et al. (2019) further pointed out that stock market investors in Nigeria suffer unstable stock returns due to volatile macroeconomic factors associated with the Nigerian economy.

Agbatogun et al. (2019) and Bala and Hassan (2018) stated that economic risk factors negatively affect stock return due to Nigeria's unstable economic policies. Although several studies have focused on how economic risk factors such as inflation rate, exchange rate, interest rate, and money supply determine stock return in the aggregate market. However, none of these past studies focused on how economic risk factors influence expected yield in the Nigerian stock market's upside and downside market conditions. Past studies, especially in Nigeria, have no unobservable factor risks in modeling anticipated return in the upside and downside market conditions in the Nigerian stock market, contrary to established literature (Leković & Stanišić, 2018).

Similarly, Abdullahi et al. (2019) and Agbatogun et al. (2019) emphasized that studies specifically in Nigeria never examine the reaction of downside and upside markets for unobservable economic risk factors. Till this current moment, no research in Nigeria has investigated how observable and unobservable financial risk factors affect expected yield in upside and downside market conditions. Past studies in Nigeria have not focused on the superiority between the factor likelihood model and the macroeconomic variable model under the APT approach to determine the expected stock return. These lacunae identified motivate this study.

2. LITERATURE REVIEW

Literature review comprised underpinned theory, empirical appraisal of related studies, and hypotheses development of gaps identified.

Theoretical Framework

Arbitrage Pricing Theory (APT) is the anchor of this study. Ross (1976) propounded the APT as an alternative to Capital Asset Pricing Model (CAPM), propounded by Sharpe (1964), Treynor (1962), Lintner (1965a, b), and Mossin (1966) in determining the expected return. In a different token, Ross (1977) criticized CAPM's assumption and subjected its empirical validity to mean-variance efficiency for the market portfolio. In his view, if the proxy to the market portfolio is mean-variance efficient, then the practical truth of the CAPM would hold and vice versa.

Moreover, Roll (1977) sees any effort to test the CAPM as futile; the actual market portfolio can neither be inspected nor proxied by a single factor like the stock market index. Roll extends his criticisms to rejecting the CAPM entirely and becomes an ardent supporter of Ross's Arbitrage Pricing Theory (APT) as an alternative to the CAPM. The APT is considered an elegant model that relates expected return to an asymptotic but approximate number of market factors or systematic factors in an economy. APT is a multi-index (multi-factors) model, i.e., one in which the portfolio's returns were generating process depends on several risk factors. In testing the APT, a researcher can select any element that provides the best explanation for the risk-return relationship. Still, he/she cannot explain variations in asset returns in terms of a limited number of easily identified market/economic factors.

Studies such as Agbatogun et al. (2019) and Cortes (2015) have employed APT to determine the link between risk factors and expected return; this validated and justified the anchored theory. Concerning this importance, the study examines the economic risk factors (observable and unobservable risk factors) and expected return, emphasizing the upside and downside market conditions in Nigeria.

Empirically, Sill (1995) examined macroeconomic risk and the determination of expected returns on the stock. The study adopted the first and second conditional moments on stock excess returns to the conditional variances and covariances of a set of pre-specified macroeconomic factors. The study employed simultaneous GMM estimation and the GARCH model using monthly data over the period 1941:10 to 1989:11. The estimation results suggest that industrial construction growth, Inflation, and short-term interest rates help explain the behavior over time of anticipated excess returns on stocks. The finding revealed that stock market risk premium is on the decline compared with conditional variances of industrial production growth and Inflation. The study further observed that the stock market's conditional volatility and the excess return varying-time are dynamically related to the conditional volatilities of industrial production growth, Inflation, and short-term interest rates.

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Iqbal and Aziz (2005) examine the validity of the Arbitrage Pricing Theory (APT) model on returns from 24 actively trading stocks in the Karachi Stock Exchange using monthly data from January 1997 to December 2003. The explanatory factor analysis shows the two factors governing stock return. The pre-specified macroeconomic system identifies these two factors as the expected and unforeseen Inflation and market index and dividend yield. Besides, the study observed some evidence of instability. The overall finding of two significant-priced factors for a sub-period supports APT for an emerging capital market.
Azeez and Yonezawa (2006) investigate the empirical proof of the pricing of macroeconomic factors in the Japanese stock market during the fizz period using the Arbitrage Pricing Theory (APT) model. The study also examined pre- and post-bubble periods to liken the sturdiness of priced factors over the fizz age. The study observed that the empirical gratified of the APT, namely the showed across-equation pricing constraints, is not disallowed in any of the sample periods

Babar, Rehman, Khan, and Safwan (2010) examined whether economic factors influence stock returns, emphasizing a firm and industry level analysis. The economic factors used include: change in consumer price index (CPI), risk-free rate of return (RFR), growth in industrial production (IP), fluctuation in the exchange rate (EXR) and increase in money supply (M2), and the increase in industrial production of an individual industry. In contrast, the market return was proxied with the closing value of the KSE 100 index for ten (10) years, starting from Jul 1998 to Jun 2008. The study adopted the GARCH model to analyze the risk and returns relationship. The results disclose that market return accounted for variation in stock returns. The inclusion of other macroeconomic and industry-related variables has added explanatory power in describing the stock returns variation. The study concluded that different firms' stock returns behave differently in similar economic conditions that acquaint investors about the stock market's risk diversification opportunities.

Elgiziry and Awad (2017) conducted a study to test the Arbitrage Pricing Theory (APT) in the Egyptian Stock Exchange. The study adopted the Principal Component Analysis using the once-a-month return of all the shares included in the EGX30 index from 2007: 1 to 2013:12 of the Egyptian Stock Exchange while the explanatory indicators are growth rates of the value-added of industrial production; the study used the monthly return of all the shares in the EGX30 index from January 2007 to December 2013 of the Egyptian Stock Exchange as the dependent variable, while the explanatory variables included: growth rates of the value-added of Industrial production, Consumer price index (inflation rate), Money supply (M1), Short-term interest rate, Discount rate, the conversion rate of the Egyptian pound with the US$, Price of Brent crude petroleum, and the market directory (EGX100). The results reveal that only the growth rates of the Consumer price index (inflation rate) and the Price of Brent crude petroleum has a significant influence on the stock return and thus included in The Egyptian Arbitrage Pricing Model. The study concluded that

there is a presence of legitimacy but feeble relevance of APT in the Egyptian Stock Exchange over the period under review.

Subing, Kusumah, and Gusni (2017) examined internal and external factors of stock pricing. The study used the data of 18 consumer goods companies listed on the Indonesia Stock Exchange from 2008 and 2015. The study used to explain factors affecting the stock pricing of the company. The study observed that price-earnings ratio, return on assets, and oil prices positively influence company stock prices, while Inflation negatively correlates with company stock prices. Moreover, systematic risk and interest rate do not impact the companies' stock price in Indonesia.

Fahmi, Geetha, and Mohidin (2017) investigated the effect of systematic risk on stock returns. The study employed interest rate, inflation rate, exchange rate, crude oil price, and industrial production index as independent indicators while the dependent variable is stock returns. The study employed a unit root test, Johansen Cointegration, and short-run relationship using Vector Error Correction Modeling as analysis tools. The study found that the macroeconomic variables chosen positively influence stock return, but the variables differ based on the industry portfolio and period. However, the study lacks a conclusion and recommendation.

Khudoykulov (2017) examined the arbitrage pricing model's analysis on stock return in the Athens stock market. The study employed the 31 companies listed on the Athens stock exchange (ASE) with the highest market capitalization. The study collected data every month for a period from 2009:1 to 2014:12. The APM ideal estimates that the macro-economic factors influence the Athens stock return. The tool of analysis was a principal factor and regression analysis. The primary factor analysis identifies the macro-economic factors used in the regression analysis. The study found that the macro-economic factors influence the expected stock return, and the APM model is invalid for the ASE market. The study concluded that APT is void on the Athens stock market selected macro-economic factors. The study recommended any researcher who wants to investigate the APT model for the Athens stock market case replicates this attempt in the future.

Amtiran, Indiastuti, Nidar, and Masyita (2017) examined the relationship between macroeconomic factors, economic growth, inflation rate, and the exchange rate on stock returns in the Indonesian using the Arbitrage Pricing Theory (APT) approach. The data used in this study were inflation rate, exchange rate, interest rate, gross domestic product, and industrial production index, collected from the Indonesian Capital Market Directory (ICMD) and the Central Bureau of Statistics from 2007 to 2014. The sampling method used purposive sampling, and the total sample of this research is 80 companies listed in The Indonesian Stock Exchange (BEI). The analysis technique used is ordinary least square regression - OLS. The study found that GDP, interest rate, exchange rate, and inflation rate have high sensitivity to stock

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return among the macroeconomic factors. The study concluded that Market conditions in Indonesia are strongly influenced by macroeconomic factors, especially about interest rates and exchange rates

Elshqirat (2019) conducted a study on empirical examination of the Arbitrage Pricing Theory on JordanData obtained included the ASE price index and the independent macroeconomic variables of the unemployment rate, gross domestic product (GDP), industrial producers' price index (IPPI), and exports for 2000 to 2016. The data were estimated using multiple linear regression. The results revealed that only IPPI negatively affected the stocks' return rate among the three variables tested. The study concluded that the selected variables' APT model does not explain the variation in the stocks' returns in the Jordanian market.

Elhusseiny, Michieka, and Bae (2019) investigated the influence of deviations in indigenous macroeconomic risk factors on revenues on the banking, chemicals, insurance, telecommunication, and utility industries in the U.S. market. The study used industrial production, Inflation, term structure, foreign exchange rate, and oil price to measure macroeconomic factors from 1998:01 to 2017:12. In contrast, industry indices measured the market excess return and analyzed it with a multifactor pricing model. The results showed that the banking sector, chemical, and telecommunication industries' stock reactions positively influence macroeconomic risk factors. On the other hand, insurance industries do not react significantly to risk factors. The study revealed that all the industries show strong reactions to the local market portfolio.

Ayub1, Kausar, Noreen, Zakaria, and Jadoon (2020) examined the Downside Risk-Based Six-Factor Capital Asset Pricing Model (CAPM): A New Paradigm in Asset Pricing. The study replaced beta in the five-factor model and used the downside beta plus a push factor to recommend a new six-factor downside beta, capital asset pricing model (CAPM). The PSX-100 index and three-month T-bills represented the proxies for market and risk-free returns. The study used three subsamples for robustness. These include very high volatility, period of stability, and period of steadiness and growth with volatility. The results revealed that the worth factor is out of work in the two models. The push factor disallowed the beta-based six-factor model. The R2 is high for the other two periods.

On the other hand, the downside beta six-factor model effectively captures the market's downside trend with a relatively high R2. The risk-return relationship is more vital for the downside beta model. These reasons led to the belief that, overall, the downside beta six-factor model is a better option for investors than the beta-based six-factor model in the area of asset pricing models.

From the literature review, none of the works in Nigeria emphasized the relationship between economic risk factors (observable and unobservable risk factors) and expected yield in aggregate market, upside,

and downside market conditions. They also failed to use the Factor Likelihood Model (FLM) and Macroeconomic Variable Model (MVM). Thus, this study fills the empirical gap assessment: the factor likelihood model and macroeconomic model's superiority using the residuals-based method.

Hypotheses Development

Based on the gaps identified, this study hypothesized that;

H01: Unobservable risk factors have no significant effect on expected return in aggregate market, upside and downside market conditions in Nigeria using Factor Likelihood Model (FLM)

H02: Economic risk factors have no significant effect on expected return in aggregate market, upside and downside market conditions in Nigeria using both Factor Likelihood Model (FLM) and Macroeconomic Variable Model (MVM)

H03: Diversifiable risk factors have no significant effect on expected return in aggregate market, upside and downside market conditions in Nigeria using both Factor Likelihood Model (FLM) and Macroeconomic Variable Model (MVM)

H04: There is no significant superiority between Factor Likelihood Model (FLM) and Macroeconomic Variable Model (MVM) under the arbitrage pricing theory approach.

3. RESEARCH METHODOLOGY

The study adopts an experimental research design. The study population includes all the quoted companies in the Nigerian Stock Exchange (NSE) market from December 2005 to December 2018. The sampling technique was purposeful to select stocks traded frequently throughout the study period to avoid tin trading and illiquid stocks. The study used the daily trading list to determine the shares traded in the Nigerian Stock Exchange Market. The study used the monthly average of the stocks frequently traded to determine the monthly expected return. The study selected forty-one (41) companies stocks often traded from 2995 to 2018.

The data employed in this study are purely secondary data of raw stock prices sourced from NSE, while the macroeconomic factors (such Inflation, exchange rate, monetary policy rate, oil price, and money supply) obtained from the annual statistical bulletin of the Central Bank of Nigeria. The study adopted the Ordinary Least Squares (OLS) estimation technique for the parameters both at the first and second levels of differences. Simple regression runs to determine stock betas between each stock's monthly average return and the corresponding return on the market index during December 2005 and December 2018. In this way, the study estimates for Parameters up to December 2018. The result is tandem with the general approach to testing the Arbitrage Pricing Theory proposition on the set of security return data.

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The study underwent two distinct stages by way of empirical testing of the above model. The first stage is the analysis of deriving the proxies for $\beta_i = (\beta_{i1}, \beta_{i2}.....\beta_{ik})$ using the time-series OLS regression technique for the APT on the set of security return data. OLS method provides estimate loading for betas while the latent market structure established using the principal factor. Factor loadings associated with this factor structure estimate the systemic risk terms. The second stage involves analyzing the risk factors' estimation in all the respective equations by cross-sectional regression methods.

Model Specification

The study employed the logarithmic approximation formula in estimating monthly expected returns

$R_{j(t)} = \log(p_{j(t)} / p_{j(t-1)})$. .....Equation 1

In the same vein, the monthly market returns obtained using R_m = log (Closing index/ opening index). $R_{j(t)}$ Is the return on security say (j) at the time (t), $p_{j(t)}$ is the current price of security say (j), and R_m is the return of the market portfolio. The study discussed model specifications under the FLM and MVM and presented them as follows. The FLM of APT pricing equations adopted in this study take their leads from the apriori works of Ross (1976), Ross and Roll (1977), and they are stated as follows in modified forms:

RiY0+Y1b^i1+Y2b^i2+.....+ Ykb^ik + e~i.....Equation 2

Where: R_i is the average return of ith securities

b_{i1}, b_{i2}.....b_{ik} are the sensitivities of asset returns with F_{i1} to F_{ik} factors

y_1, y_2.....y_k are the coefficients of the risk premiums associated with the ith factors.

y_0 and e_i are the constants and error terms, respectively. The study tested the first APT hypothesis when equation (2) estimate and the numbers of significant parameters are known. A-priori demands that if at least one of the parameters is substantial, it means that APT is empirically fair. The market proxy is unobservable, while two or more significant parameters are sufficient to distinguish the APT's empirical content from that of the CAPM. Thus, the MVM is in line with Chen et al.'s specifications.

$Rr_t - R_{ft} = b_0 + b_1IFR_t + b_2EXR_t + b_3MPR_t + b_4COP_t + b_5MS_t\ e_t$..... Equation 3

Where: $r_t - r_{ft}$ is the excess return of security (i) at the time (t), INR_t is the inflation rate at the time (t), Er_t is the exchange rate at the time (t), MPR implies the monetary policy rate at the time (t), COP_t is the crude oil price at (t), Ms_t is the money supply at (t), b_0 is the constant term over the specified period. b_1, b_2, b_3 are the regression parameters

Therefore, to load the pre-specified factors in equation (3.3), the following analogous equations are estimated.

$R_t - R_{ft} = b_0 + a_1Ir_t + \mu_t$..... Equation 4

$R_t - R_{ft} = a_0 + b_1Er_{t+} v_t$..... Equation 5

$R_t - R_{ft} = c_0 + c_2 Mpr_t + w_t$…….. Equation 6

$R_t - R_{ft} = d_0 + d_3 Croil_t + h_t$…….. Equation 7

$R_t - R_{ft} = c_0 + e_4 Ms_t + \varepsilon_t$……..Equation 8

Where: a_1 b_1, c_2, d_3, and e_4 are the security (i) sensitivity to the economic factors IFR, EXR, MPR, COP, MS, respectively. These macroeconomic factors prices determined cross-sectionally in the pricing equation presented below:

Ri = λ0 + λira^i + λ$\overline{er}$b^2i + λmprc^3i + λcroild^4i + λmse^5i +v_i…….. Equation 9

In developing this equation (9), the study compares the factor likelihood framework of the APT in equation (2) with the macroeconomic variable method of the APT using the Residual Based Method as shown below:

$e_i = \lambda_1 + \lambda_2 a\hat{}_i + \lambda_2 b\hat{}_i$ …+ $\lambda_5 e\hat{}_i + \mu_i$…….. Equation 10

$v_i = a_0 + a_1 b\hat{}_i$ +……$a_k b\hat{}_{ik} + \varepsilon_i$…….. Equation 11

Where: e_i and v_i are the residuals in equations 9 and .2, respectively. On the apriori, from equation 11, it yields a stronger explanatory power than equation 10 for the FLM_{APT} to be more superior to MVM_{APT}.

To test the second hypothesis that the standard deviation of return does not command a premium in addition to the factor risk coefficients; we have to obtain the residuals from equation (2) and then make them the explained variables in the following regression

$e\tilde{}_i = a_0 + a_1 S\hat{}r\tilde{}_i + W\tilde{}_I$ …….. Equation 12

Where: $S\hat{}r\tilde{}_i$ is the estimated standard deviation of returns calculated over the same period as the factor loading estimates in equation (3).On the apriori ground $E(\lambda_1) = 0$, the estimation of the standard deviation of return is not expected to be statistically significant. If this apriori ground holds, it means that the systematic risk hypothesis that the only risk that commands premium is the systematic risk is valid. Thus, if $R_{mt} - R_{ft} < 0$, that is the market risk premium is negative at the time (t) that signifies down-market phase and if $R_{mt} - R_{ft} > 0$, that is the market risk premium is positive at the time (t), and that signifies up-market stage (Fletcher, 1997).

4. RESULTS AND DISCUSSIONS

Results

The study adopts the propositions arbitrage pricing theory to test the formulated hypotheses in section one. Furthermore, the study presents and discusses the factor model results using the APT version first since the empirical tests of the APT, the factor likelihood model, and the macroeconomic variable model are interrelated. After that, the testing of price implication of the APT, using Factor Likelihood Model (FLM) and Macroeconomic Variable Model (MVM)

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Factor model Estimation and Selection

There are three basic rules or strategies used in selecting the correct number of factors from the factor analysis solution. These are: variance explained Kaiser Rule of Eigenvalues and Cattell criterion. However, the Kaiser Rule of Eigenvalues appears to be the strictest strategy among the three rules. It uses only the factors whose Eigenvalues are at or above the average (mean) Eigenvalue. Note that the average Eigenvalue for any sample is one (1). Also, this rule may result in very few factors to be selected.

TABLE 1 - UNOBSERVABLE RISK FACTORS AND EXPECTED RETURN IN AGGREGATE MARKET USING FLM – HYPOTHESIS ONE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
b1	-3.531996	1.481541	(-2.38400)*	0.0241
b2	-0.197666	0.461069	(-0.42871)	0.6714
b3	-0.843946	0.503916	(-1.67477)	0.1051
b4	-0.409222	0.485420	(-0.84302)	0.4064
b5	1.232587	0.490370	(2.51358)*	0.0180
b6	-0.478821	0.538682	(-0.88887)	0.3816
b7	1.020715	0.466414	(2.18843)*	0.0371
b8	-0.219119	0.468426	(-0.46777)	0.6436
b9	-0.568407	0.558676	(-1.01741)	0.3177
b10	-0.693655	0.631191	(-1.09896)	0.2811
b11	1.222596	0.541994	(2.25573)*	0.0321
b12	0.550007	0.461456	(1.19189)	0.2433
C	0.649538	0.258861	(2.50921)	0.0182

Note: The critical value for the t-test with 29 Degree of freedom @ 95% confidence level is 1.699 using one-tail test
* mean significant at 5% levels, AR2 = 0. 43 with associated P(F-Stat) of 0.002879

Source: Authors' Computation (2021)

Consequently, the study excludes all the variables that have Eigenvalues less than the average Eigenvalue. The variables excluded from the sample are from x13 to x41. Therefore, the APT cross-sectional regression equation moderation in section three has 12 explanatory variables in testing the APT's empirical stance in the Nigerian capital market. These factors are loaded using the Principal Component Analysis (PCA). The essence of this is to derive proxies for the APT model (equation 3.8) in section three. The results of the estimated coefficients regressed against one parameter hypothesis. This hypothesis says that at least one of the explanatory variables in the specified APT framework must be significantly different from zero for the APT model to hold or valid. This hypothesis's results are in three-fold of the market, which are the aggregate market, downside market, and upside market.

The results in Table 1 detail the component factors in the aggregate market, and it reveals that F1, F5, F7, and F11 display absolute t-values of 2.38400, 2.5135, 2.18843, and 2.25573, respectively. These values are more significant than the critical t-value of 1.699 at a 95 percent level of confidence. The result is in line with the associated P-values that are lesser than 5 percent. The finding rejected the null hypothesis that none of the specified APT explanatory variables is significant. Also, the Adjusted R-squared (AR2) reveals the models' descriptive powers, and F-statistic shows the degree of fitness of the

models and the considerable level of the AR2. Therefore, the result follows the APT's apriori expectation in the Nigerian capital market and is considered valid in determining asset return variations. Thus, the result implies that four other unobservable risk factors significantly influence stock return other than the Nigerian Capital market's systematic risk. The study proceeds to investigate the effect of the hypothesis that none of the risk factors commands significant risk premium in the downside and upside market conditions.

TABLE 2 - UNOBSERVABLE RISK FACTORS AND EXPECTED RETURN IN THE UPSIDE AND DOWNSIDE MARKET CONDITIONS USING FLM – HYPOTHESIS ONE

Panel A: Down Market Condition				
Variable	**Coefficients**	**Std. Error**	**t-Statistic**	**Prob.**
b1	-3.531996	1.481541	(-2.38400)*	0.0241
b2	-0.197666	0.461069	(-0.42871)	0.6714
b3	-0.843946	0.503916	(-1.67477)	0.1051
b4	-0.409222	0.485420	(-0.84302)	0.4064
b5	1.232587	0.490370	(2.51358)*	0.0180
b6	-0.478821	0.538682	(-0.88887)	0.3816
b7	1.020715	0.466414	(2.18843)*	0.0371
b8	-0.219119	0.468426	(-0.46777)	0.6436
b9	-0.568407	0.558676	(-1.01741)	0.3177
b10	-0.693655	0.631191	(-1.09896)	0.2811
b11	1.222596	0.541994	(2.25573)*	0.0321
b12	0.550007	0.461456	(1.19189)	0.2433
C	0.649538	0.258861	(2.509212)	0.0182
Panel B: Up Market Condition				
Variable	**Coefficients**	**Std. Error**	**t-Statistic**	**Prob.**
b1	-2.443144	1.331487	(-1.83489)	0.0822
b2	-0.552745	0.527589	(-1.04768)	0.3079
b3	0.0606	1.009522	0.505997	(1.99511)
b4	0.693148	0.510902	(1.35671)	0.1908
b5	0.120280	0.629504	(0.19107)	0.8505
b6	0.152634	0.514887	(0.29644)	0.7701
b7	-1.566861	0.509519	(-3.07518)*	0.0062
b8	-1.184057	0.506038	(-2.33985)*	0.0304
b9	0.275154	0.569252	(0.48336)	0.6344
b10	-0.051007	0.544733	(-0.09363)	0.9264
b18	0.153603	0.544727	(0.28198)	0.7810
b19	0.796524	0.509102	(1.56456)	0.1342
b20	0.318694	0.517496	(0.61583)	0.5453
b21	-0.020219	-0.020219	(-0.03980)	0.9687
b22	-1.138378	0.509360	(-2.23491)*	0.0376
b23	0.028636	0.508460	(0.05632)	0.9557
b24	-0.115993	0.509076	(-0.22785)	0.8222
b25	0.320756	0.506704	(0.63302)	0.5343
b26	0.094383	0.510819	(0.18476)	0.8554
b27	-0.515580	0.505982	(-1.01896)	0.3210
b28	-0.257922	0.507857	(-0.50786)	0.6174
C	0.445744	0.228298	(1.95246)	0.0658

Note: The critical value for the t-test @ 95% confidence level is 1.699, * mean significant at 5% levels, AR2 = 0. 43 with associated P(F-Stat) of 0.002879 for down market while the up market the critical value for t-test @ 95% confidence level is 1.725, AR2 = 0.32 with associated P(F-Stat) of 0.045976

Source: Authors' Computation (2021)

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From the result in Table 2, it is evident that F1, F5, F7, and F10 are the four latent significant factors in the down market condition. In contrast, the upmarket conditions reveal F7, F8, and F22 important latent factors discovered. It implies that the arbitrage pricing theory's proposition holds in both upside and downside market conditions in Nigeria. The researcher also makes a fresh attempt to examine the difference (if any) in moving from the factor likelihood method APT to the Macroeconomic Variable process of APT. The results are also in three market folds: the aggregate, the downside, and the upside market conditions.

TABLE 3 - ECONOMIC RISK FACTORS AND EXPECTED RETURN IN AGGREGATE MARKET USING FLM – HYPOTHESIS TWO

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COIL_BETA	0.059469	0.009048	(6.57250)*	0.0000
EXC_BETA	-0.440886	0.049294	(-8.94403)*	0.0000
INF_BETA	0.009256	0.002825	(3.27631)*	0.0024
MPR_BETA	-0.000709	0.000351	(-2.02181)*	0.0509
MS_BETA	0.436436	0.019953	(21.87336)*	0.0000
C	-0.028479	0.007243	(-3.93200)	0.0004

Note: The t-test @ 95% confidence level's critical value is 1.688 and *mean significant at 5% level.

Source: Authors' Computation (2021)

Table 3 results of the test conducted on the macroeconomic variable method of APT (MVMAPT) show that crude oil risk factor, exchange rate risk factor, inflation risk factor, monetary policy risk factor and, the money supply risk factor absolute t-values of 6.57250, 8.94403, 3.27631, 2.02181, and 21.87336 respectively. Compared with the critical t-value of 1.688 at a 95 percent confidence level, all the macroeconomic risk factors prices are significantly priced. Therefore, the MVM of APT also shown that the APT is a multifactor model, and it is substantially different from a one-factor model like the CAPM. The finding conforms with the factor Likelihood of APT tested in table 4.1 above, indicating four Latent significant factors influence variations in average return. Based on this, it is evident that APT is genuinely a multi-index model that extends the CAPM's empirical dimension.

TABLE 4 - ECONOMIC RISK FACTORS AND EXPECTED RETURN IN THE UPSIDE AND DOWNSIDE MARKET CONDITION USING MVM – HYPOTHESIS TWO

Down market Condition		Up market Condition	
Pricing Factor	Coefficients	Pricing Factor	Coefficients
COIL BETA	0.540(0.0398) [13.564]*	COIL BETA	-0.117 (0.0380)[-3.102]*
EXC BETA	2.454 (0.4645)[5.281]*	EXC BETA	0.309(0.1590)[1.914]*
INF BETA	-0.004 (0.0116)[-0.341]	INF BETA	-0.002 (0.0046)[-0.493]
MPR BETA	-4.037(0.5142) [-7.851]*	MPR BETA	-0.008 (0.0102)[-0.840]
MS BETA	-0.440 (0.1146)[-3.844]*	MS BETA	0.000 (0.0002)[1.328]

Note: The figures in parentheses and brackets are the standard errors and t-values, respectively. The critical t-value for t-test @ 95 percent confidence is 1.688 and * mean significant at 5% levels. AR2 = 0.991930 with P(F-stat.) of 0.000000 & 0.992233 with P(F-stat.) of 0.000000 respectively for down and upmarket conditions

Source: Authors' Computation (2021)

From table 4, it is evidence that in the down market condition, there is evidence of four macroeconomic risk factors. There is evidence of two macroeconomic risk factors in the upside market condition, which implies that the assumption of arbitrage pricing theory also holds in the upside and downside market conditions under the macroeconomic variable model of APT. Despite this, the study proceeds to test the second hypothesis, which is the diversifiable risk hypothesis. It states that the only risk that commands a premium in the capital market is systematic. Therefore, the diversifiable risk is insignificant due to the diversification process. The study tested the opinion in the APT framework context using equation (3.12), the factor loading, and the pre-specified APT approach

TABLE 5 - DIVERSIFIABLE RISK FACTORS AND EXPECTED RETURN IN AGGREGATE MARKET USING FLM – HYPOTHESIS THREE

Variable	coefficient	std error t-value	p-value	
STAND DEV	3.270448	0.602369	(5.42930)*	0.0000
C	-0.180770	0.056791	(-3.18309)	0.0019

Note: That standard deviation is a measure of diversifiable risk; the figures in bracket and parenthesis are the common errors and t-statistics. The critical t-value for the t-test @ 95% confidence level using the one-tale test is 1.686, while * denotes significance at 95% level of confidence. AR^2 is 0.415866 with P(F-Stat) of 0.000003.

Source: Authors' Computation (2021)

Table 5 reveals that the standard deviation's coefficient value is 3.270448, which tallies with an absolute t-value of 5.42930 and given a critical t-value of 1.686 at a 95% confidence level. The observed t-value is larger than the critical t-value; therefore, the null hypothesis's rejection is because the diversifiable risk does not command risk premium. The study is not consistent with the apriori stance of the APT, and in this regard, the APT framework lacks sufficient evidence in the Nigerian capital market. The study further examined the hypothesis in the upside and downside market conditions under the factor likelihood model approach.

TABLE 6 - DIVERSIFIABLE RISK FACTORS AND EXPECTED RETURN IN UPSIDE AND DOWNSIDE MARKET USING FLM – HYPOTHESIS THREE

Down market Condition Coefficients	Up market Condition Coefficients
Stand. Dev. 3.228 (0.602369)[5.42930]*	Stand. Dev.2.6493 (0.526870)[5.028399]*
Constant -0.124 (0.056791)[-3.18309]	constant -0.017 (0.050864)[-2.013520]

Note: That standard deviation is a measure of diversifiable risk; the figures in bracket and parenthesis are the common errors and t-statistics. The critical t-value for the t-test @ 95% confidence level using the one-tale test is 1.686, while * denotes significance at 95% level of confidence. AR^2 is 0.4823 with an associated P(F-Stat) of 0.00000 for the downmarket, while the critical value for the upmarket is 0.3777 with an associated P(F-Stat) of 0.000011.

Source: Authors' Computation (2021)

From table 6, the result shows that the coefficients of standard deviation in both markets are lesser 5 percent, which implies that the study rejected the hypothesis that diversifiable risk does not command risk premium in both markets, which negates the assumptions of APT. In the same token, the study examines APT against diversifiable risk hypothesis using MVM in the aggregate marketplace and both up and down market conditions.

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TABLE 7 - DIVERSIFIABLE RISK FACTORS AND EXPECTED RETURN IN AGGREGATING MARKET USING MVM – HYPOTHESIS THREE

Variable	coefficient	std error	t-value	p-value
STAND_DEV	0.363325	0.321101	1.131497	0.2648
C	-0.020082	0.030273	-0.663373	0.5110

Note: That standard deviation is a measure of diversifiable risk; the figures in bracket and parenthesis are the standard errors and t-statistics. The critical t-value for the t-test @ 95% confidence level using the one-tale test is 1.686, while * denotes significance at 95% level of confidence. AR2 is 0.415866 with P(F-Stat) of 0.000003.

Source: Authors' Computation (2021)

Table 7 reveals that the standard deviation's coefficient value is 3.270448, which tallies with an absolute t-value of 1.131497, given a critical t-value of 1.686 at a 95% confidence level. It means that the observed t-value is lesser than the critical t-value. Therefore, the study does not permit the rejection of the null hypothesis because the diversifiable risk does not command risk premium. The study is consistent with the apriori stance of the APT.

TABLE 8 - DIVERSIFIABLE RISK FACTORS AND EXPECTED RETURN IN THE UPSIDE AND DOWNSIDE MARKETS USING MVM– HYPOTHESIS THREE

Down market Condition Coefficients		Up market Condition Coefficients	
Stand. Dev	0.218(0.1220)[1.789]	Stand. Dev.	0.069(0.061146)[1.138]*
Constant	-0.012(0.0115)[-1.049]	constant	-0.004(0.005765)[0.667]

Note: That standard deviation is a measure of diversifiable risk; the figures in bracket and parenthesis are the common errors and t-statistics. The critical t-value for the t-test @ 95% confidence level using the one-tale test is 1.686, while * denotes significance at 95% level of confidence. AR^2 is 0.415866 with P(F-Stat) of 0.000003

Source: Authors' Computation (2021)

From table 8, the result shows that the coefficients of standard deviation in the downside market are more significant than the critical value of 1.686. It suggests that the study cannot reject the hypothesis as diversifiable risk does not command risk premium in the downside market, and this follows the assumptions of APT. However, the coefficient of standard deviation in the upside market is lesser than the critical value of 1.686. The result connotes that diversifiable risk does command the risk premium on the upside. The finding reveals a mixed result. Based on this, the study proceeds to compare the superiority between the factor likelihood model and the macroeconomic variable model.

TABLE 9 - RESULTS ON COMPARISON BETWEEN FLMAPT AND MVMAPT USING RESIDUAL BASED – HYPOTHESIS FOUR

Model	AR^2	F-stat	P(F-Stat)
FLMAPT	0.382275	25.75378	0.000010
MVMAPT	0.020993	0.177538	0.675811

Source: own result (2021)

The result in table 9 shows a very weak Adjusted R-squared (0.020993) for the MVMAPT, while the FLMAPT shows about 0.38 Adjusted R-squared. It means that FLMAPT captures about 38 percent variations in the Residual of the APT. In the same vein, the inclusion of only 2 percent of the APT residuals variation by the MVMAPT is considered weak. Thus, evidence has shown that FLMAPT captures more information in the Nigerian capital market than the MVMAPT, and as such, FLM appears to be superior to the MVM in the APT residuals

5. DISCUSSIONS

The study revealed observed and unobserved risk factors in the upside and downside market in Nigeria. It indicates that the market will pay the investors' premium and reward the evident and unobserved risk factors in both market phases. Also, the study documents that economic risk significantly commands a market premium in both the upside and downside market phase. It implies that the assumption one parameter hypothesis of APT holds in both market conditions under the Factor likelihood model and macroeconomic variable model. This result aligns with the findings of Iqbal and Aziz (2005), who documented one parameter hypothesis's validity under the factor likelihood model and macroeconomic variable model. The study further reveals a difference between the factor likelihood model and macroeconomic variable models when testing the diversifiable risk hypothesis. Hence the factor likelihood model approach suggested a rejection diversified in upside and downside market conditions. The macroeconomic variable models support the denial of diversified risk in upside and downside market conditions. It indicates that APT lacks sufficient evidence in the Nigerian Capital Market, which conforms with the previous findings. Thus, since there is a disparity between the two methods, the study examines the superiority between the factor likelihood model and the macroeconomic variable model using the residuals-based method. The result shows that factor likelihood appears to be superior to the macroeconomic variable model.

6. CONCLUSIONS AND RECOMMENDATIONS

The study concluded that economic risk factors significantly explain variations in average returns in the Nigerian capital market when market. Evidence shows some latent factors that can explain the expected stock return better than the downside and upside conditions' observable characteristics. Hence, the study observed that the Nigerian capital market pays a premium to the investors based on the visible risks and unidentified/unexpected risks. Consequently, when an investor is diversifying, there are some unobservable market factors that he/she cannot reduce or eliminate. Therefore, when an investor is diversifying, there are some unobservable market factors that he/she cannot reduce or eliminate. The study further concludes that the factor likelihood model is superior to the macroeconomic variable model.

The study recommends that; (i) investors should give maximum attention to unobservable risk factors to achieve expected return; (ii) stock market investors should efficiently analyze economic risk factors before investing in the stock market to gain targeted expected return; (iii) stock market analyst or investors should factor in diversifiable risk factors in determining stock return; as the study showed that diversifiable risk factor affects stock return thus enhance the accurate analysis of the risk factors in the stock market in aggregate market, upside and downside market conditions; and (iv) stock investors should give more priority to factor likelihood risk model than macroeconomic risk variable model in determining stock return because factor likelihood model impact APT than macroeconomic risk variable model. However, the study

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fails to consider non-market risk factors in the upside and downside market conditions. Future researchers are encouraged to look at this aspect according to the existing risk factors explaining the market's expected return.

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