American Research Journal of Business and Management

Volume 8, Issue 1, 76-84 Pages
Original Article | Open Access
ISSN (Online)- 2379-1047
DOI : 10.21694/2379-1047.22012

AMERICAN RESEARCH JOURNALS
An Academic Publishing House

Capital Asset Pricing Model (CAPM) Versus FF Three Factor Model: The Choice of Asset Pricing Model for Bank Stocks at Nairobi Securities Exchange

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ABSTRACT

The paper discusses efficiency tests of two popular asset pricing models; Sharpe-Lintner (CAPM) and Fama-French 3 factor model using banking stock data at the Nairobi Securities Exchange. The purpose is to propose a more efficient model between the two based on end year returns for 10 banks over the study period 2010-2015.

Design: *Comparative analysis: Fitting data on stock returns, market returns, size and value factors to the two asset pricing models to find their statistical power measured by R^2 and significance of the coefficient alpha.*

Results: *Fama-French 3 factor model has better fit (R^2 =77.5%) compared to CAPM (R^2=57%) when the bank stock data is analysed and fitted into the two models. However value factor is irrelevant in the 3 factor model. The coefficient alpha is observed not to be different from zero signifying better efficiency for the FF model. Stock return is positively related with market risk(r=0.775, p=0.000) but negatively associated with size (r= -0.841, p=000).*

Originality: *The paper makes unique contribution by validating asset pricing models using bank stock prices at the Nairobi Securities Exchange. It uses end year stock data (low frequency) which can then be compared with higher frequency data models. Lastly a shortened version of Fama-French (1993) is proposed for pricing bank stocks that captures only market risk and size effects as explanatory factors at the NSE.*

KEYWORDS: *Asset pricing Models, CAPM, F-F Three Factor Model, Banking industry, Nairobi Securities Exchange.*

INTRODUCTION

Asset pricing models are important to investors and financial analysts in the capital market because they make it possible to estimate cost of capital and evaluate performance of fund managers (Datta and chakraborty, 2018).Portfolio managers, institutional and retail investors need the tools in their everyday investment decisions. Rational investors require understanding of how to identify mispriced securities so they can engage in profitable trading. Securities are said to be mispriced when actual return deviates from expected return. This happens because of either the market is inefficient or the pricing model is mis-specified. The expected return on a security is the opportunity cost of equity that applies in security valuation since cash flows to equity are discounted at an appropriate opportunity cost to realize present value of the asset. Portfolio performance evaluation and capital budgeting decisions also require a fair amount of pricing skills to make better decisions.

There are a number of asset pricing tools developed to explain how security prices behave and the most popular one is the CAPM by Sharpe (1964), Lintner (1965) and Black (1972). From the single factor (market risk) model, CAPM has been extended to three factor (Fama and French (1993), four factor model by Cahart (1997), to five factor model by Fama and French (2015) and six factor model. Since Markowitz (1952) modern portfolio theory was postulated to explain how security returns behave based on mean- variance analysis, there have been several empirical attempts to model security returns by authors mentioned above. The debate continues- to find the right measures of risk to predict portfolio returns in different capital markets. Market anomalies have largely contributed to the lack of consensus about the efficiency of CAPM around the world form its construction of market portfolio. An anomaly occur when a model fails to predict returns in the market more efficiently so that doubts emerge as to whether CAPM reasonably capture the right amount and number of risk to define security price.

Several studies have documented anomalies associated with CAPM when pricing portfolios and individual securities (Banz, 1981, Chan *et al.* 1991, Basu, 1977, Bhandari, 1988). Empirical findings significantly overestimate or underestimate returns on portfolios. In other words, market risk is challenged as the only source of risk to be compensated when pricing securities. Consequently this paper compares efficiency or statistical power of two popular pricing models; Sharpe-Lintner (1964, 1965) CAPM and FF3F (Fama and French 1993, three factor model) to determine the better alternative for predicting returns for banking stocks at Nairobi Securities Exchange. The rest of the paper is organized as follows; the next section (2) explores literature both conceptual and empirical reviews on asset pricing since early 1950s when Markowitz developed the theory of portfolio selection. Section (3) discuss the methodology and data used in the study, section 4 analyses and presents results, and finally section 5 discusses the conclusion and recommendation and opportunities for further study.

LITERATURE REVIEW

The overarching theory to anchor the study is portfolio theory by Markowitz (1952,

1959) where he explained how choice of security and portfolios is made based of two key variables-risk and return, or what is famously referred to as mean-variance analysis. In the theory there is a tradeoff between risk and return when it comes to portfolio selection. That generally asset selection is guided by the assumption of non- satiation and risk aversion. That given two assets with the same risk but different expected returns, an investor will choose one with higher expected return (Non- satiation). Conversely, risk aversion implies that when an investor is faced with two assets or securities with equal expected returns but different levels of risk, then the asset with lower risk will be selected. The concept of covariance of returns was used to achieve selection of optimum portfolio considered efficient portfolio characterized by highest expected return per unit risk in the capital market. Diversification is key to minimizing risk in a portfolio context. This is achieved through combining securities with negative or low correlation coefficient of returns to form a portfolio. Risky and risk free assets when selected well, an investor will achieve high return per unit of risk for his/her portfolio. The market portfolio on the other hand is a combination of risky assets that are diversified widely so that the only risk element inherent is systematic. All unsystematic or stock specific risk is eliminated through proper diversification. Market risk represented by *Beta* is the only risk rewarded for trading securities in the capital market. In this context the investor is assumed to be well diversified. Market portfolios are proxied by relevant asset index for example, NSE 20 share index, S&P 500 (big and small), Nasdaq, Dow-Jons Industrial average, Tokyo Nikkei and others stock indices for stock portfolios. Every portfolio that is well diversified mirrors a particular index.

Markowitz work (1952, 1959) was extended by his student (Sharpe, 1964) followed by Lintner (1965) and Mossin (1966) to make the theory testable and empirically valid. The capital asset pricing model (CAPM) and FF3F models continue to compete for validity and efficiency in many capital markets around the world. They have been empirically tested with mixed result since each stock market has its unique characteristic. Following is a discussion of the two rival asset pricing models.

Capital Asset Pricing Model (CAPM)

The capital asset pricing model (CAPM) developed by sharpe (1964), Lintner (1965),

Mossin (1966) and Black (1972) singles out market risk as the most important factor determining asset expected return or cost of capital. It identifies the only source of compensation for securities or portfolios in the capital market is beta. Beta is the responsiveness of an asset return to market return expressed as

$$Beta(i) = Cov(R_i,R_M)/Var(R_m)$$

Where; Cov = covariance, Ri= returns on security/portfolio i, Rm= returns on the market portfolio

Var=variance

According to CAPM, securities or portfolios are priced as;

$$E(R_i) = R_f + \beta(R_m - R_f) + \varepsilon_i$$

$E(R_i)$ =Expected return on a security or portfolio(i), β=beta (systematic risk), R_f =risk free rate of interest, R_m=Returns on the market portfolio or index., εi= error term for the model.

This model was and continues to be widely popular for its simplicity and this probably is its problem partly because the market portfolio (source of risk) has never been properly defined. Thus the model has been challenged for being less efficient or unrealistic since it only recognizes a single factor for risk and is limited to a single period. Additionally the model is criticized for using the risk-free rate for both borrowing and lending which is not realistic. CAPM also assumes taxes and transaction costs are non-existent and that information is freely and instantly available to market players. Fama and French (2004) discount the positive relationship between beta and average return predicted by CAPM. Other authors (Friend and Blume, 1970) assert that CAPM estimates of cost of equity/expected returns for high beta stocks are too high while too low for low beta stocks. Among portfolio managers, performance evaluation studies indicate that passively managed portfolios also produce abnormal returns (Elton, Gruber, Das, and Hlavka(1993). They also noted that small stocks or even value stocks have produced positive abnormal returns contrary to predictions by sharpe-Lintner CAPM in the absence of any special talent for picking stocks. Therefore CAPM has exhibited some anomalies when used to estimate average returns.

CAPM is to be tested against other models that were developed thereafter like the Fama-French (1993) 3 factor model since these models were framed from the weakness of the sharpe-lintner model (CAPM). Banking stock prices are selected between the periods 2010 - 2015 because they are liquid and highly active in the stock market (NSE). The purpose is to compare between the two models predictive power so as to propose the better choice for investors and portfolio managers. The models efficiency is measured using their goodness of fit or coefficient of determination (R^2).

Three Factor Asset Pricing Model

The three factor asset pricing model by Fama and French (1993) emerged because CAPM was inefficient or did not fit some data well. For example small cap stocks generated higher returns than expected and so were value stocks compared to growth stocks (*ibid*). Value stocks are stocks with high book to market values while growth stocks are those with low book to market value. This observation led to writing of a paper in 1993 to attempt to improve on the CAPM. The two Nobel laureates were of the opinion that systematic risk could not be the only measure of risk in an asset pricing model. Instead they proposed addition of size effect and value effect as other sets of portfolios to increase the statistical power of the model. The three factor model is formulated as;

$$R_j - R_f = \beta_0 + \beta_1 (R_m - R_f) + \beta_2 (SMB)_j + \beta_3 (HML)_j$$

$R_j - R_f$ =Excess returns on the portfolios

$R_m - R_f$ = Market risk premium

SMB_j =Difference in returns between small stock and big stocks for portfolio j

HML_j = Difference in returns between high book to market stocks and low book to market stocks in portfolio j.

β_0= intercept coefficient expected to be zero if the model is efficient or fits the data well in the market.

β_1, β_2, β_3= Slope coefficients representing risk factor for market, size and value portfolios.

In this model, a stocks excess return is better explained by its market risk premium, size risk premium, and value risk premium represented by the slope coefficients. Fama and French (1995) contend that two additional factors (Size and Value) are unique risks that contribute to higher expected return (Cost of equity). This would be consistent for the model if the intercept term β_0 is not significantly different from zero (Rustam and Nicklas 2010). Otherwise the model would still be considered less efficient but its goodness of fit will determine its statistical power and therefore its rank in relation to CAPM.

Market Portfolio

A market portfolio in the context of CAPM is a benchmark portfolio comprising of well diversified assets that represent market performance. Markowitz (1952, 1959) portfolio selection and efficient diversification theory identifies the market portfolio as one with highest mean return per unit of risk or lowest risk per unit return. The risk here can be systematic or total so that either Treynors ratio= $(R_i - R_f)/\beta$, or sharpe ratio= $(R_i - R_f)/\sigma_i$ may be applied to identify the mean-variance efficient portfolios. An efficient portfolio constructed is one with a high correlation of returns with the market (r=0.9 and above) and low or negative covariance of returns with the market. Market risk (beta) is a source of risk for which investors are rewarded assuming they are well diversified. It is measured as the responsiveness of security or portfolio returns to market return. The market portfolio in this paper is proxied by the oldest stock market index-Nairobi 20 share index (1966). This index comprise a group of 20 blue chip stocks at the exchange with a history of generating high incomes and with good growth prospects. It is a value weighted index with performance that mirrors overall market performance. It is noteworthy that a market portfolio is difficult to properly define in terms of its constituent securities because it may comprise other assets that do not fall into the strict definition of equity. However a broadly diversified basket of equities may be representative of this market portfolio.

Size Effect

The size of a firm may explain abnormal return on a stock according to Banz (1981). In their study Fama and French (1992) found size anomaly responsible for a significant variation in expected return for USA stocks based on NASDAQ listed stocks. This discovery is considered inconsistent with CAPM model expectation. Small cap stocks produce higher expected returns compared to big cap stocks which is contrary to CAPM expectation. Thus small stocks possess significant risk due to their size that was not discernible by CAPM. Firm size is measured by market capitalization which is the product of price and number of shares outstanding. This factor was captures in the regression model (FF3F) by ranking market cap in descending order and choosing the median cap as the break between small and big firms. Small firms are those below the median value while big firms are those above the median value. The difference in the average returns between small firms and big firms become the values for size factor to be regressed upon for the set of portfolio.

Value Effect

Value anomaly proxied by book to market ratio is also said to predict higher returns than CAPM predicts. Stocks with high book to market ratio are referred to as value stocks because they hold more cash and assets but with little or few opportunities to invest and grow (Fama & French, 1992). These stocks outperformed those with low book to market value again beating the prediction by CAPM. Such stocks have poor past performance history hence higher risk and thus higher expected returns (fama, 1998). The value factor is introduced in the three factor model by computing the book to market ratios and then ranking them before categorizing into high BTM and low BTM ratios. The difference or excess returns between the two groups of stocks yield the value factor to be applied in the regression analysis.

Empirical Review of Literature

Asset pricing models have been tested using cross sectional and time series stock price data in different countries with mixed results. For instance in Kenya, Riro and Wambugu (2015) tested three asset pricing models using monthly price data from Nairobi Securuties Exchange between January 2009 and December 2013. The three models (CAPM, Fama-French (1993) three factor model and four factor model (Cahart, 1997). What they discovered was that the predictive power of CAPM and FF3F models was weak. They created six portfolios that returned R square ranging between 11 % and 50 % for CAPM and 13% to 58% for Fama- French three factor model. In both cases the intercept coefficients were statistically significant implying the models were not quite efficient in capturing all sources of risk for the portfolios. According to their finding, momentum effects was more significant at improving model efficiency. However momentum effects is criticized for being temporal thus not fit for inter-temporal forecasting of returns. As a result a more permanent and efficient model is sought to help market players in predicting returns.

Another study by Bartholdy and Peare (2002) discovered Fama-French three factor model did not do better than CAPM when market portfolio is constructed using an equal weighted index. Further empirical tests identified Value premium among international stock returns for countries in North America, Europe, Japan and Asia pacific (Fama and French 2011). However the same value factor was not significant in the five factor model that include profitability and investments (Fama and French 2014). In the same study small stock behavior in the five factor model was inconsistent with their earlier prediction using three factors.

Kothari, Shanken and Sloan (1995) conclude that size factor and book to market factor explain variability of returns in cross section data due to survivorship bias. CAPM according to Black (1970) predicts a positive beta premium although expected returns from US data was either understated for low beta stocks or overstated for high beta stocks. It is noteworthy that regressing excess returns on the market portfolio yields positive beta and the intercept coefficient is not expected to be significantly different from zero. Fama and French (1998) contend that the three factor model performs better than international CAPM for stocks in 13 major markets. Bartholdy and Peare (2002) compared performance of CAPM and the three factor model for individual stocks and results are that CAPM explained 3% of the variation in stock returns while FF3F model explained 5% of the variation in expected returns for individual stocks. This means that in some markets, FF3F does not perform better than CAPM (Black, Jensen & Scholes, 1972).

METHODOLOGY

Fama and French (2004) advice that when regressing stock returns on market returns for individual stocks or portfolios, then it is important that cross sectional data or time series data be used on diversified portfolios. In order to reduce bias occasioned by shrinking data and range of beta, portfolios should be sorted on the basis of beta from low beta stocks to high beta stocks. In this study, banking stock annual prices and other market value ratios were obtained from financial statements contained in the NSE hand book 2016.

Capital asset pricing model was used to generate value for risk free rate of interest and Market risk (beta) for bank stock portfolios for the period 2010 -2015. This was conducted by regressing stock returns on market returns. The returns on stock is computed as Pt-Pt-1/Pt-1 while market portfolio return is calculated as; $Index_t - Index_{t-1} / Index_{t-1}$ for the NSE 20 share index values for the study period. In this model, $R^2$is read to explain goodness of fit while the intercept value represent the risk free rate of interest.

As for FF3F model, excess returns for the banking stocks are regressed on market premiums, size premiums and value premium portfolios. The coefficient of determination and significance of the intercept coefficient are interpreted for model efficiency.

DATA ANALYSIS AND RESULTS

Descriptive Statistics and Model Estimates

Descriptive statistics shown on Table I for stock and market return indicate that the mean value for stock returns is Kshs. 0.1368 and a standard deviation of 0.44795 from a sample size of 54 time series observations. Conversely the mean value for market return is kshs.0.0211 and standard deviation of 0.2172 of the 53 observations made. This means that investors in these banking stocks made a return averaging 13.6 % as the market produced a return averaging 2.11%. The variability of stock return was higher than that of market return at 44% and 21% respectively. The data is approximately normally distributed since skewness and kurtosis values lie within +2.0 and – 2.0 limits.

Table I. Descriptive statistics for Stock and Market Return

	Stock Return	***Mark Return***
Mean	0.136296296	0.021132075
Standard Error	0.060966073	0.02983586
Median	0.11	0.04
Mode	-0.36	-0.24
Standard Deviation	0.448007313	0.21720834
Sample Variance	0.200710552	0.047179463
Kurtosis	-0.576598034	-1.515250055
Skewness	0.289092962	-0.339829416
Range	1.93	0.57
Minimum	-0.79	-0.28
Maximum	1.14	0.29
Sum	7.36	1.12
Count	54	53
Confidence Level (95.0%)	0.122282457	0.059870033

When data analysed is based on the model with excess returns for stock and factor premiums, the mean value for stock excess returns is Kshs. -10.163, market risk premium (Kshs. -10.27), Size premium (SMB) -kshs. 0.241) and value premium (HML) is Shs.-0.268 (Table II). Similarly, the data on excess stock return and factor premiums are symmetrically distributed around their mean values as evidenced by low skewness and kurtosis values.

Table II. Descriptive statistics for excess return and factor premiums

	Excess stock return	***MKTRISK Prem***	***SMB prem***	***HML prem***
Mean	-10.1637037	-10.27666667	0.241923077	-0.268846154
Standard Error	0.060966073	0.029360765	0.142770412	0.095510494
Median	-10.19	-10.21	0.43	-0.325
Mode	-10.66	-10.54	-0.46	-0.72
Standard Deviation	0.448007313	0.215756676	0.727989117	0.487009872
Sample Variance	0.200710552	0.046550943	0.529968154	0.237178615
Kurtosis	-0.576598034	-1.484864759	0.440377613	-0.16450909
Skewness	0.289092962	-0.36845529	-0.871148128	0.632435689
Range	1.93	0.57	2.79	1.86
Minimum	-11.09	-10.58	-1.52	-0.99
Maximum	-9.16	-10.01	1.27	0.87
Sum	-548.84	-554.94	6.29	-6.99
Count	54	54	26	26

Correlation & Regression Analysis

Table III represents correlation matrix which show that excess stock return is highly positively and significantly related to market return (r=0.773, sig= 0.000), stongly negatively associated with size premium (r=-0.841) and fairly positively related with value premium(r=0.561). The association are all statistically significant at the 0.05 level of significance. This coefficients signs and relationships are theoretically plausible particularly from Sharpe-Lintner CAPM linear postulation and Fama-French (1993) three factor assertion about size and value effects; that small cap stocks tend to record higher positive returns than big cap stocks because they are riskier. Conversely higher value firms (those with high book- to -market ratios) are also considered riskier due to poor past performance hence positive returns.

Table III. Correlation Matrix

		Excess Return	Market Risk Premium	SMB prem.	HML prem
Excess stock Return	Pearson Correlation	1			
	N	26			
Market Risk Premium	Pearson Correlation	.773*	1		
	Sig. (2-tailed)	.000			
	N	26	26		
SMB premium	Pearson Correlation	-.841*	-.687*	1	
	Sig. (2-tailed)	.000	.000		
	N	26	26	26	
HML premium	Pearson Correlation	.516*	.382	-.488*	1
	Sig. (2-tailed)	.003	.054	.012	
	N	26	26	26	26

** Significant coefficient at 0.05 level of significance.*

Table IV. Regression result for Market return

Coefficients[a]												
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	.103	.041		2.521	.015	.021	.185					
Market Return	1.570	.190	.756	8.254	.000	1.188	1.952	.756	.756	.756	1.000	1.000

a. Dependent Variable: stock Return

Table V. Regression Result for Market Risk Premium

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.753515							
R Square	0.567785							
Adjusted R Square	0.559474							
Standard Error	0.297352							
Observations	54							
ANOVA								
	df	SS	MS	F	*Significance F*			
Regression	1	6.039907	6.039907	68.31059	4.86E-11			
Residual	52	4.597752	0.088418					
Total	53	10.63766						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	5.915525	1.945876	3.040032	0.003699	2.01084	9.820211	2.01084	9.820211
MKTRISKPrem	1.564635	0.189308	8.265022	4.86E-11	1.18476	1.944509	1.18476	1.944509

Table VI. Regression Result for 3 factor Model (stock premium, market premium, size premium, Value premium)

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.895666405							
R Square	0.802218308							
Adjusted R Square	0.775248078							
Standard Error	0.204671201							
Observations	26							
ANOVA								
	df	SS	MS	F	*Significance F*			
Regression	3	3.738029	1.24601	29.74458	6.34E-08			
Residual	22	0.921587	0.04189					
Total	23	4.659615						
	Coefficients	*Standard Error*	t *Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-3.41089346	2.493138	-1.36811	0.185089	-8.58135	1.759559	-8.58135	1.759559
SMB	-0.303520696	0.082147	-3.69487	0.001266	-0.47388	-0.13316	-0.47388	-0.13316
MKTRISKPrem	0.656282893	0.242753	2.703505	0.012976	0.152845	1.159721	0.152845	1.159721
HML	0.155809053	0.096537	1.613978	0.120785	-0.0444	0.356015	-0.0444	0.356015

Regression Analysis

A simple and multiple regression analysis was carried out on stock returns- market returns on one hand and excess stock return-market premium-size premium and value premium on the other. The two expressions generated important information about suitability of the models under examination.

Equation (1) is an asset pricing expression that provides CAPM coefficient estimates to be used in formulating and testing the validity of both CAPM and FF3F models. It is based on actual returns derived from the banking stock portfolio and the market portfolio for the period 2010-2015.

E(Ri) =0.103 + 1.57 (Rm) (1)

t : 2.521 8.254

se : 0.041 0.19 R^2 =0.57.

From the estimated equation (1), beta for the stock portfolio is 1.57 (market risk) and the risk free rate is 10.3%. This implies that bank stocks are riskier in relation to market portfolio. A higher beta (above 1.0) make them attract higher than average returns for every unit increase in market return. Such stocks are aggressive and tend to do well when the market is bullish. The intercept and beta coefficients are statistically significant at the 0.05 level of significance (t= 2.521 and 8.254 respectively) Model efficiency or R^2 is 0.57 indicating that market risk alone explains 57% of the variation in expected returns on this portfolio. The intercept coefficient represent risk free rate which is the subtracted from both sides of the equation to determine excess returns on both the stock and the market portfolio. Equation (2) is then constructed by regressing these excess returns to see if the mean alpha value is significant or not. A non-significant intercept term (alpha) would mean that the only source of risk for predicting returns for these stock portfolio is beta or systematic risk and thus the model would be sufficient as stated. Conversely a significant alpha mean the model is inefficient and therefore a search for a more fitting one is expected.

A regression of excess return on the stocks (Ri-Rf) is made against market risk premium (Rm-Rf) and the model estimated is;

E(Ri-Rf) = 5.975 + 1.57 (Rm-Rf) (2)

t 3.055 8.254

se 1.956 0.19

Where; Rm is return on the market portfolio, Rf is the risk free rate. D-W =2.079, R^2=0.57.

Clearly, the coefficients in equation (2) are significant at the 5% level (t=3.055 and 8.254) for intercept term and beta respectively. The significant intercept coefficient (alpha) signify that market risk is not sufficient risk for pricing banking stocks in this market. So presence of additional risk factor require remodeling the expression to capture other factor(s) that may improve its efficiency. The Fama-French 3 Factor model is now introduced as the competing model which factors in size premium (SML)which is the difference between small cap stock return and big cap stock return and the value premium (HML) which is the difference between high book- to -market stock return and low book- to- market stock return. Upon carrying out the analysis, the estimated FF3F model is as follows;

$$E(Ri–Rf) = -3.41 + 0.656(Rm -Rf) -0.3(SML) + 0.155(HML) \quad (3)$$

t	-1.3681	2.703	-3.694	1.613
se	2.493	0.242	0.08214	0.0965
p	0.185	0.0129	0.00126	0.1207

R2 = 0.775, F = 29.744 (sig =0.000)

The regression result above, equation (3) represent three different portfolios examined for their suitability in predicting returns on banking stock portfolio; market, size and value portfolios. From the result it is clear the model's coefficient of determination has climbed to 0.775 which implies that market risk and size factor explain 77.5% of the variation in excess returns on the bank stock portfolio. It is not necessary to include the value factor since its contribution is not different from zero (t=1.613, se=0.0965). An inspection of the coefficients show that a unit rise in market premium translates into a 0.656 units increase in excess return on the stocks. However when it comes to size of bank, an increase by a unit of SML reduces excess returns by 0.3 units all else remaining the same. The corresponding t values indicate the slope coefficients are statistically significant at the 0.05 level of significance. More important, is the significance of the intercept term which is also the mean absolute alpha. This term indicate whether the model is efficient or not to predict returns for the stock portfolio. The coefficient value (-3.41) and its corresponding t statistic (-1.3681) confirms that the intercept value is not different from zero; which is to say that the two factors (market risk and size) sufficiently explain variations in excess returns. This finding is supported by Riro and Wambugu (2015), Datta and chakraborty (2018), Kothari, Shanken and Sloan (1995, Fama-French (1993), Banz (1981), Cahart (1997). All the mentioned studies agree with this one to the extent that two main sources of risk to predict return for stocks are; beta and size of firm, measured by its market capitalization. Datta & Chakraborty(2018) discovered FF model fitted financial services cross sectional data in India very well when compared against the auto industry. So in the banking industry, size matters since small banks are riskier compared to large banks. Size effect however became irrelevant later in a study by Fama and French (2015) after testing a five factor model on international stock portfolios. Overall therefore FF3F model is more efficient compared to CAPM based on data analysed because its R square is much higher than that of CAPM (77.5% and 57% respectively) and no additional risk element was apparent because the alpha value was not different from zero; similar to the value factor. A shortened form of the fama-french three factor model is appropriate for use by fund managers, retail and institutional investors when making investment decisions involving banking stocks at the NSE. The two factor model constructed from this analysis very well explains bank stock returns.

CONCLUSION

The paper examined suitability of the two popular asset pricing models –single factor CAPM and Fama & French three factor models to predict bank stock returns at the NSE. Ten banks stock price data for the period 2010-2015 is analysed in the framework of the two models to reveal that stock returns for the banking industry is well explained by market risk and size risk. Thus a two factor model which modifies FF3F fits sample data quite well. Market risk premium and size premium predict 77.5 percent of the returns on stocks for banks. While market risk premium is positively associated with excess returns, size premium is negatively related with these returns. The findings on size factor is supported by Banz (1981), Fama & French (1993), Datta and Chakraborty (2018), Kothari, Shanken and Sloan (1995) though inconsistent with Fama-French (2015). Small cap stocks have increased risk so that they predict higher returns. Riro and wambugu (2015) realized findings that are similar from six different portfolios constructed by size, value and the market portfolio but their results largely supported the four factor model (Caharts ,1997).

Therefore this paper accomplishes its aim of explaining which asset pricing model between CAPM and the three factor model is more appropriate for predicting bank stock portfolio returns at the Nairobi security exchange. A two factor asset pricing model representing Market risk and size risk in the framework of Fama–French (1993) model is more efficient at forecasting returns in the banking industry at the exchange.

RECOMMENDATION

From the foregoing discussion, the paper recommends that portfolio managers and other retail and institutional investors in banking stocks target a well-diversified market portfolio, similar to NSE 20 share index and small banks to earn above average returns especially when the stock market is on an upward trend. Value stocks should be disregarded because they are statistically insignificant. The most suitable asset pricing model for bank stocks at the NSE is shortened version of the Fama and French (1993) model that predict about 77.5% of asset returns which must only factor beta for the portfolio and size of the portfolios.

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Citation: Dennis M. Bulla, "Capital Asset Pricing Model (CAPM) Versus FF Three Factor Model: The Choice of Asset Pricing Model for Bank Stocks at Nairobi Securities Exchange", American Research Journal of Business and Management, Vol 8, no. 1, 2022, pp. 76-84.