COMPARISON OF CAPM AND APT PRICING MODELS IN THE KENYAN STOCK MARKET : THE KENYAN BANKING SECTOR

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

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This Research Project has been submitted for examination with my approval as the Supervisor.

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LIST OF ABBREVIATIONS

ROE – Return on Equity

ROA – Return on Assets

NSE – Nairobi Securities Exchange

CMA – Capital Markets Authority

ETFs – Exchange Traded Funds

CAPM – Capital Asset Pricing Model

APT – Arbitrage Pricing Theory

EMH – Efficient Market Hypothesis

CAL – Capital Allocation Line

CML – Capital Market Line

CCAPM – Consumption-based Capital Asset Pricing Model

EGX – Egypt Stock Exchange

DAX Index – Deutscher Aktienindex Index

GDP – Gross Domestic Product

NASDAQ – National Association of Securities Dealers Automated Quotations

CRR – Cash Reserve Requirement

Int. – Intercept

S.E – Standard Error

ADF – Augmented Dickey-Fuller

BP Value – Breusch-Pagan Value

DW Value – Durbin-Watson Value

VIF – Variance Inflation Factor

MAD – Mean Absolute Deviation

ABSTRACT

This study aims to comparatively look at the CAPM and APT models and assess which one has a more explanatory power in predicting stock returns of listed banks in the NSE. This study uses secondary data from 2016 to 31st June 2024. For CAPM, regressions were done directly with the market risk being the NSE – All Share Index. For the APT model, several factors such as bank regulations and central bank policies, consumer behavior and monetary policies, were assumed to have an impact on the stock price movement. Regressions on the same were conducted as well as tests for heteroskedasticity, multicollinearity, autocorrelation and stationarity. The MAD of the two models were conducted as well and it was established that the APT model had a lower MAD value than CAPM. This implies that monetary policy makers, researchers, regulators and financial market participants can rely on the changes in the policies and regulations to assess stock price movements.

CHAPTER 1: INTRODUCTION

1.1 Background of study

In Kenya, the banking sector plays an essential role to the country's financial and economic growth. Through credit scoring, banks attempt to ensure that financial resources are distributed adequately across the Kenyan economy by lending to consumers as well as businesses. Furthermore, financial institutions facilitate company operations by processing settlements, and by offering mobile and online banking services and facilities that allow companies and individuals to comfortably save and invest (Nyasha and Odhiambo 2012).

Kenya's banking sector has for many years been known for its size and diversification when compared with other African economies by African standards (Beck, T. et al, 2010). According to the Kenyan banking sector overview of 2023, done by NCBA, the banking industry in Kenya is a vastly competitive sector characterized by a great number of financial providers. The banking sector is overshadowed by tier 1 banks, which have a combined market share of 74.76%. Nevertheless, it is important to acknowledge that smaller banks and financial institutions have also significantly contributed to economic growth, as evidenced by their remarkable expansion in recent years (National Commercial Bank (NCBA), 2023).

According to Kiemo and Mugo (2021), before the global financial crisis of 2008, common performance indicators such as ROE and ROA revealed that the banking sector was doing very well due to sectoral reforms and regulations. Between 2008 and 2014, there was stagnation and since then, there has been a decline possibly due to tightened regulation in global markets and de-risking by global banking corporations from emerging and developed countries. Since the 1990's, the banking sector in Kenya has undergone 41 mergers and 8 acquisitions as of 2019. This has been triggered by financial innovations, interconnectedness and complexities in globalized operations. Although, this sector faces quite a number of challenges such as high numbers of non-performing loans, declining capitalization and skewed lending, the dynamic banking landscape plays a crucial role in facilitating capital flow and investment opportunities within the Kenyan economy where investors can capitalize on this opportunity, for example through stocks in the Nairobi Securities Exchange.

The Nairobi Securities Exchange, Kenya's stock market, provides an avenue for investors to trade securities by looking at the return they get from investing in these securities. Established in the 1920s, the Nairobi Securities Exchange has provided an avenue for businesses to publicly trade and advance capital for development. Increasing share prices tend to be correlated with increased business investment and vice versa (Aduda, J., Masila, J. M., & Onsongo, E. N., 2012). The Nairobi Securities Exchange (NSE) has given Kenyan investors an avenue to trade stocks through various stock brokerage firms regulated by the Capital Markets Authority (CMA). By categorizing the companies into various subsectors, including agricultural, automotive, banking, commercial, construction, energy, insurance, investment, investment services, manufacturing, telecommunication, real estate, and exchange-traded funds (ETFs), the Nairobi Securities Exchange has attempted to streamline the process of buying stocks. Due to the risk that comes with equities, these subsectors allow investors to diversify their investments on the Kenyan stock market.

Asset returns can be projected using two models the capital asset pricing model and the arbitrage pricing theory model. Proposed by William Sharpe in 1964, the capital asset pricing model uses market risks and the risk-free rate to determine the return on investment for an investor. The model suggests a direct correlation between market risk and the return on investment. The Arbitrage pricing theory, conversely, was proposed by Ross in 1976-1977. Ross developed a multi-factor approach to explaining asset pricing. He established an approach that offers the tools to use arbitrage arguments to establish asset prices and offer returns on securities (Edwin J. Elton et al, Modern Portfolio Theory and Investment Analysis, page 364). The arbitrage pricing theory framework and the capital asset pricing model contrast in that the latter one is a single risk factor model and the former is a multiple risk factor model.

1.2 Problem Statement

The CAPM model posits that the expected return of stocks is linearly related to its systematic risk, as measured by its beta with the market portfolio. However, empirical evidence in the Kenyan market tends to challenge its predictive power. According to Odock, A. O. (2013), the study aimed at looking at the validity of the CAPM model using thirty different companies listed in the NSE. The study reveals that minor evidence was seen regarding the applicability of CAPM, but it was only in traces. In a different study that was evaluating CAPM in predicting the security returns of agricultural companies listed at the NSE, the model shows limitations in accurately predicting portfolio returns, hence may not fully capture the risk-return relationship for all sectors in the Kenyan market. (Magut, J. T., & Bogonko, J. B. (2017)).

The Arbitrage Pricing Theory offers a more nuanced framework that incorporates multiple risk factors beyond the market risk that are believed to significantly influence the expected return of assets. Akwimbi, W. A. (2003) argues that the APT model developed for the study has been successful in explaining the expected return in the stock market of the NSE. This study aims to comparatively look at the two models and assess which one has a more explanatory power in predicting stock returns of listed banks in the NSE. At the end of the study, this paper will be able to enhance the knowledge of the stock market and understand how the returns are achieved. Moreover, it will be able to assess deeper into other macroeconomic variables that may have been overlooked by market participants.

1.3 Research Objective

To assess and compare how well the APT and CAPM models estimate shifts in asset returns in the Kenyan banking industry.

1.4 Significance of the study

This study will provide investors, analysts, policymakers and other market participants valuable perceptions into the drivers of stock returns and enhancing the understanding of risk-return dynamics within the Kenyan banking sector. Moreover, it will make more educated and effective choices about risk management, investment strategies, and regulatory structures for financial market participants.

CHAPTER 2: LITERATURE REVIEW

2.1 Theoretical review

A. Efficient market hypothesis

Proposed by Maurice Kendall in 1953, the efficient market hypothesis came about when he examined the stock market. There was the theory that stock prices reflect the prospects of the firm, and that periodic patterns of peaks and troughs ought to be reflected in the stock prices. However, what Kendall got was that priced evolved randomly in any particular day, regardless of their past performance. Hence, random price movements indicate a well-functioning market. An efficient market is a market where security values adapt rapidly in the presence of new information and therefore reveal all available information (Bodie, Kane & Marcus, 2009, p. 349). The Efficient Market Hypothesis asserts that only new security news will substantially move the stock prices as long as the new information is unknown and arises randomly in future. Mburu, G. (2016) tests the efficient market hypothesis in the Nairobi Securities Exchange. The hypothesis was that the Nairobi Securities Exchange exhibits a weak form efficient market hypothesis. The results were that none of the forms of hypotheses were exhibited. The reason given was that there could be a possibility of poor dissemination of information in relation to pricing. Having these results in mind the EMH is linked to the CAPM and APT, such that both models have assumptions that markets are efficient, reflecting all price information.

B. The Mean-Variance Portfolio

Developed by Harry Markowitz in 1952, the mean-variance portfolio idea was that for a portfolio consisting of risky and risk-free assets, an optimal portfolio can be achieved (Bodie, Kane & Marcus, 2009, p. 291). Any rational investor will place their wealth in a portfolio consisting of risky and risk-free assets to diversify their portfolio, implying that investors should not put their eggs in one basket. Moreover, for such a portfolio, the variance of the mean-variance portfolio decreases hence proof that diversification reduces the risk linked to a portfolio. A minimum-variance frontier is generated as a result of the combination of portfolios, by plotting the expected return against the standard deviation. The Markowitz theory outlines the risk-return trade-off investors must undergo to attain their level of satisfaction.

Within the frontier, individual assets are not ideal. This indicates the presence of an outstanding portfolio with a greater anticipated mean and a smaller standard deviation. The global minimum variance serves as a portfolio's minimum point; anything below it is deemed null and void because it is presumed that sensible investors would want more or less. The global minimum-variance portfolio advancing along the efficient frontier of risky assets would therefore be the optimal portfolios. On the optimal frontier, the Capital Allocation Line (CAL) is a tangent.

It represents the relationship linking risky and risk-free assets. The slope is the sharpe ratio. The greater the ratio, the nearer we are to the ideal point. The point p below shows the ideal portfolio, where the investor achieves the valuable optimal risky portfolio.

Figure 1:The Efficient frontier curve

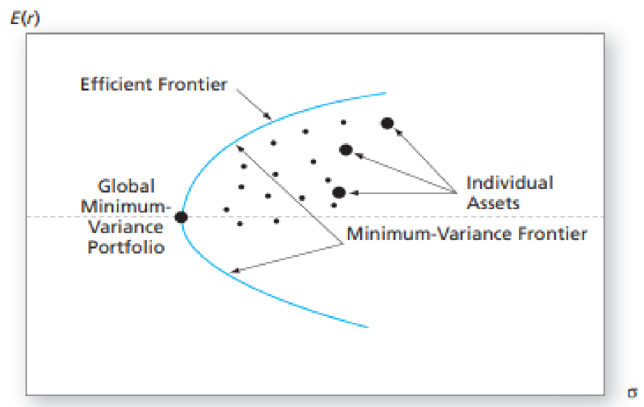
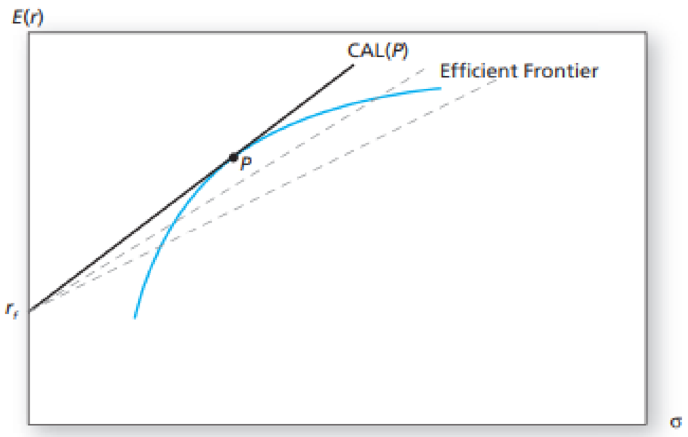


Figure 2: The Efficient Frontier Curve tangent to the CAL at point P



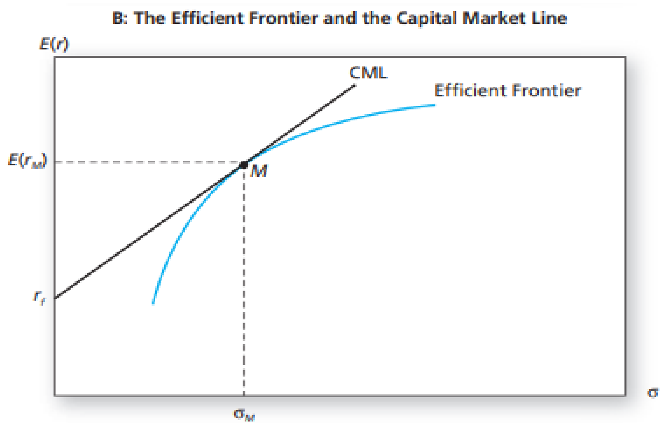
Liu, Y. (2022) argues that the Markowitz portfolio theory, with its focus on risk-return trade-off, remains relevant in decision making. As financial markets evolve, there is continuous refinement of the theory as it adapts to the changing conditions and maximizes investment utility.

2.2.2 The Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model was developed by the American economist, William F. Sharpe in 1964. This paper is an extension of the earlier work of Harry Markowitz who published a paper on diversification and modern portfolio theory (Bodie, Kane & Marcus, 2009, p. 291). The Capital Asset Pricing Model, from here henceforth referred to as CAPM, is a model that tries to explain the connection between the risk associated with an asset and its expected return. While the Markowitz model deals with investors' perspective, this model deals with the market whereby the goal is to maintain an equilibrium state.

The Capital Asset Pricing Model establishes a standard rate of return for the purpose of evaluating investments and determining the expected return on assets that are not yet transacted on the market. It is presumed that on a comparable investable space, investors define their effective frontiers using the same input list. This suggests that if they were all faced with the same risk-free rate, they would all conclude at the identical risky portfolio. The market portfolio, M, is a comprehensive combination of all alike risky portfolios and if all the investors choose an identical risky portfolio it must have an identical market portfolio. The capital market line is, curiously enough, the capital allocation line, according to research using the capital asset pricing model. According to the economics of this model, any borrowing position for risk-free investments must be balanced by the creditor's lending position.

Figure 3: The efficient frontier curve tangent to the CML at point M



CAPM builds on a suitable risk premium on an asset, established by its influence on the risks of investors' general portfolio. Portfolio risk matters more to investors, as it directs the risk premiums they demand. The market portfolio is the tangency portfolio. It is the payment-to-risk ratio for investment in the market portfolio. It is often called the market price of risk as it calculates the additional return that investors demand to exhibit portfolio risk. For CAPM to be equilibrium investments should offer the same payment-to-risk ratio

$$\frac{Market\ risk\ premium}{market\ variance} = \frac{E(Rm)}{\sigma^2} \tag{1}$$

If the comparing ratios were varied, then investors would readjust their portfolios leaning towards the alternative with a better trade-off, imparting tension on security prices until their ratios are balanced. Rs represents a stock return on an individual stock.

$$\frac{\mathrm{E(Rm)}}{\mathrm{Cov(Rs, Rm)}} = \frac{\mathrm{E(Rm)}}{\sigma^2} \tag{2}$$

The fair risk premium of the stock is,

$$E(Rs) = \frac{Cov(Rs, Rm)}{\sigma^2} * E(Rm) \tag{3}$$

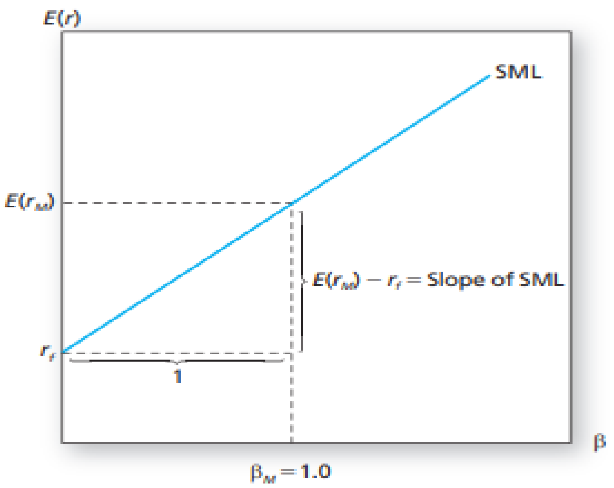
$\frac{Cov(Rs,Rm)}{\sigma^2}$ measures the role of stock to the variance of the market portfolio as a fraction of the total variance of the market portfolio, Beta (β). Making the $E(R_s)$ the subject of the formula, we obtain:

$$\mathrm{E(Rs) = rf + \beta s[E(Rm) - rf]} \tag{4}$$

β's that are more than 1 are regarded as aggressive since investing in high-beta stocks necessitates a higher level of sensitivity to market swings, while those that are less than 1 are characterized as defensive. A stock's beta value indicates how much of its variance contributes to the market portfolio's variance; so, beta dictates the required risk premium. One may clearly understand the link as a securities market line between the expected return and the beta. The market portfolio's beta and risk premium have a direct relationship with the security risk premium. The required rate of return is necessary to reward investors for risk as well as the time worth of money provided by the security market line.

When a stock is cheapened, its expected return exceeds the fair return stipulated by the security market line; therefore, the price of the stock plots above the security market line, while that of the stock plots below. The inference of this model is that there is a risk-return trade-off, investors investing in high beta value stocks expect high returns, which as a result is accompanied by high market risks. The other implication is that if the model holds, then there is a level of market efficiency that has been attained, where stock prices reflect all relevant information on that particular stock.

Figure 4: The Security Market Line



The Capital Asset Pricing Model equation is

$$E(R_i) = R_f + \beta(E(R_m) - R_f) \tag{5}$$

The assumptions of this model are:

a) Investors are logical.
b) The projection horizon is for a single period.
c) Investors have a consistent outlook.
d) All assets are openly held and traded on public exchanges.
e) All news is publicly available.
f) No charges or transaction costs.

2.2.3 Extensions of CAPM

2.2.3.1 Zero – Beta Model

Derived by Merton and Roll(1972), the Zero - Beta model has the following characteristics:

i. Any portfolio that is that is a mixture of two frontier portfolios is on the efficient frontier.
ii. Every portfolio on the efficient frontier excluding the global minimum variance portfolio has a similar portfolio on the bottom half of the frontier with which it is uncorrelated.

On the high-risk premium segment of the efficient frontier, investors choose their portfolios. As opposed to borrowing money to construct their portfolios, investors who find it unnecessary or pricey will shift their investments to high-beta equities and stay away from low-beta ones. The security market line will be flatter than the basic CAPM as a result of high beta stock prices rising and risk premiums decreasing.

2.2.3.2 The Consumption- Based CAPM

Propositioned by Mark Rubinstein, Robert Lucas, and Douglas Breeden, they argued that investors need to find a balance between spending their current wealth on consumption today and setting aside savings and investment for future consumption. Moreover, they argue that if the returns are high during periods when consumption is abundant it is said to be a riskier asset and less risky when consumption is limited. This results in assets having higher correlation with consumption growth and as a result have higher risk premiums. In the CCAPM, consumption portfolio has a similar role to the market portfolio in the traditional CAPM. The beta however of the market portfolio relative to the market aspect in the CAPM is not equal to 1. It is possible that there is a linear relationship between the risk premium of the market index and that of the consumption portfolio which can be supported by empirical evidence that the beta is greater than one. This can be illustrated by the equation as follows:

$$E(Rm) = \alpha m + \beta mcE(Rc) + \varepsilon m \tag{6}$$

The α and ε allow for empirical deviation from the exact model and the beta is not necessarily equal to 1.

2.2.4 Arbitrage Pricing Theory

In 1976, Stephen Ross developed the theory of arbitrage pricing (APT), (Bodie, Kane & Marcus, 2009, p.327). When an investor may make risk-free profits without having to make a net investment, this is known as arbitrage. The law of one price, which asserts that two assets should have identical value on the market if they are identical in an efficiently relevant sense, is the fundamental basis for the idea of arbitrage pricing. For efficient markets, this model assumes that in the presence of arbitrage opportunities prices will be forced back to equilibrium as the rational investors take advantage of them which balances supply and demand. If the law of one price is held, then portfolios with the same sensitivity to common economic factors are expected to yield the same expected return such that if a mispricing occurs, arbitrageurs will act until the price adjusts to reflect their fundamental values. The arbitrage pricing model is an arbitrage dominance model, whereas the CAPM is a risk-return dominance argument. An arbitrage dominance model is one that pricing takes place by exploiting arbitrage opportunities based on exposure to multiple economic factors assuming that arbitrage will correct any mispricing while CAPM being a risk-return dominance model asserts that expected returns depend on the risk return trade off. Prices derived from no-arbitrage arguments are more aggressive than repercussions derived from CAPM because this indicates that when arbitrage opportunities arise, every investor wants to take as large a position as possible and it won't take many investors to bring out the price stresses required to reestablish equilibrium. The Arbitrage Pricing Theory relies on three key propositions:

a. Asset returns can be described by a factor model.

b. There are adequate assets to spread out the idiosyncratic risk.

c. Well-functioning security markets do not allow for the continuity of arbitrage opportunities.

For a one-factor market of well-diversified portfolios, the excess return on an end stock portfolio with the aggregate of weights equal to one is as follows:

$$Rp = E(Rp) + \beta pF + ep \tag{7}$$

Where:

$$\beta p = wi\beta i \,; E(Rp) = sum\big(wiE(Ri)\big) \tag{8}$$

When executing arbitrage for a one factor market where the diversified portfolio and denotes the market factor the excess return of any security is given by

$$Rp = \alpha p + \beta pRm \tag{9}$$

and that of a diversified portfolio P is given by:

$$E(Rp) = \alpha p + \beta p E(Rm) \tag{10}$$

The APT no-arbitrage equation states that any zero-beta, well-diversified portfolio's risk premium is immediately anchored to zero by the arbitrage movement. The portfolio P's risk premium is derived from the product of its beta and the risk premium of the market index. This demonstrates that, according to APT’s additional arbitrage requirement, the CAPM's security market line applies to portfolios that are well-diversified.

$$E(Rp) = \beta p E(Rm) \tag{11}$$

Using graphical representation, we can confirm that APT yields the same security market line as CAPM and demonstrates why all well-diversified portfolios with an identical beta must have an identical anticipated return. This suggests that the factor risk levels out across long and short positions if the earnings are risk-free.

We predict that the disclosure of any of these variables could influence the anticipated return and risk of a stock in multifactor APT. Since each component gauges the surprise in the systematic variable rather than the level of variables, they all have zero expected values. Introducing a factor portfolio, which is a well-diversified portfolio built with each factor's beta at zero and one on each other. Stated alternatively, the returns on this type of portfolio track the specific macroeconomic risk source and have no correlation with other risk sources. According to the multidimensional security market line, the overall risk premium of the securities is expected to be affected by the disclosure of each risk factor by a value equal to the factor-beta times the risk premium of the factor portfolio that tracks that source of risk.

$$Ri = E(Ri) + \beta i1F1 + \beta i2F2 + \cdots + ei \tag{12}$$

This implies that there are factors that affect the banking sector which are tied to macroeconomic policies, banking regulations and consumer behavior. The APT model therefore allows multiple factors that are possibilities of effects of change to be investigated and look at their impacts.

2.2.4.1 The Fama-French Three factor model

The Fama-French three-factor model(1993), which is the presently overriding approach to postulating factors as candidates for relevant sources of systemic risk, uses from features that seem empirically to substitution for revelation to systematic risk given by:

$$Rit = \alpha i + \beta imRmt + \beta ismbSMBt + \beta ihmlHMLt + eit \quad (13)$$

Where:

SMB stands for Small Minus Big, indicating the excess return on a portfolio of tiny stocks above that of a portfolio of large stocks.

HML these High Minus Low or the profit from a portfolio of high-book-to-market equities over the return from a portfolio of low-book-to-market firms, is what this term refers to.

The sole empirical issue with the Fama-French model is the fact that it relies on proxies to identify additional market risk sources, and none of the elements in the suggested frameworks can be recognized as meaningful sources of uncertainty or as hedging. Furthermore, size and book-to-market portfolio ratios have been proven by Fama and French to determine average returns in a variety of time periods and global markets, limiting the potential consequences of data spying.

The assumptions under this model are:

- Capital markets are competitive and frictionless.
- All investors share homogeneous beliefs.
- The number of securities in the market is larger than the number of factors.
- There exist common factors in all assets and all investors agree on the identity of these factors.

2.3 Empirical review

Zhang & Li (2012) studied which model is appropriate for forecasting stock returns on the Chinese stock market between the capital asset pricing model and the arbitrage pricing theory model. Secondary daily data was obtained from the ChiNext Board of 58 companies and SME board of 102 companies. The range of study periods was from 1st September 2009 to 31st August 2010. Through comparing the two asset pricing models on SME and ChiNext Boards in China, it was found that the APT model does not perform better than CAPM.

Shaker and Elgiziry (2014) conducted a study on comparability of the Egyptian stock market's asset pricing models. The CAPM, the three-factor Fama-French model, the Carhart four-factor model, the liquidity-augmented four-factor model, and the five-factor model (liquidity and momentum augmented Fama-French) three-factor model are the five asset pricing models that they test. The paper uses a sample of 55 firms out of 100 stocks listed on the EGX 100. Monthly data ranges from January 2003 to December 2007 and the market return is the monthly return for Egypt's market index. The results indicate that the three-factor Fama-French model works better than any other model as it incorporates size and value factors which significantly improve its predictive power compared to CAPM. Contrary to expectations, the one-year study did not enhance the model's explanatory power, which raised questions about its applicability in emerging markets. The study also found limited support for the role of liquidity likely due to the use of a single dimensional measure hence making the Fama-French three-factor model a robust tool for estimating expected stock returns.

Musharbash (2016) assessed the performance of the capital asset pricing model and the arbitrage pricing theory model from the Frankfurt Stock Exchange. The period used for testing the model was between March 2001 to December 2015 to capture three specific periods during the global financial on the German economy and its financial markets. The stocks used were taken from the Deutscher Aktienindex (DAX) index which is a blue-chip stock market index consisting of the 30 major German companies trading on the Frankfurt Stock Exchange. The results revealed that both models showed statistically significant results in explaining stock returns over the long-term and short-term. However, the CAPM’s intercept and beta coefficients did not accurately reflect the prevailing economic conditions. The APT model, using factor analysis to identify systematic risk factors, demonstrated better explanatory power than CAPM.

Alshomaly and Masa’deh (2018) looked into testing the validity of the capital asset pricing model and the arbitrage pricing theory model in the Amman Stock Exchange market in Jordan using three different firms from three different main sectors that are the financial, industrial, and service sector. Quarterly historical data on the periodical stock prices, market indexes, and risk-free rates were required from 2000 to 2016. The value of the unsystematic risk that could be eliminated by diversification was discovered to be lower than CAPM due to the multi-factor model that restructured the firm-specific risks into more systematic risks as we add more factors. This was determined while testing the legitimacy of the arbitrage pricing theory model, which included sources of systematic risk such as GDP growth in addition to market risk.

Sirait and Sumarto (2019) used monthly data returns from the Indonesia Stock Exchange, to examine the impact of microeconomic risk indicators on market price risks from January 2017 to December 2018. The macroeconomic variable risk in Indonesia has minimal impact on the movement of stock returns in the country's capital markets. The result was that all four capital market sectors in Indonesia can be represented by the CAPM model's coefficient of beta. The APT model is unable to explain the movement in stock returns in Indonesia's capital market, both in the Composite Index and sectorial return index.

Afzal, F. ., & Haiying, P. . (2020) examined the Pakistan Stock Exchange through an evaluation of the stock prices and returns of list good companies in the Pakistan Stock Exchange. The primary objective was to determine the degree to which CAPM and APT accurately predicted the anticipated earnings from the exchange. Overall, the findings indicated that whereas APT produced inconsistent outcomes and did not exhibit any substantial findings for variables like the exchange rate and unemployment rate, CAPM provided the most significant outcomes for the stock exchange. In general, the findings indicated that while investors can use the CAPM to forecast their stock returns, they may also use additional elements based on their specific needs for the APT model, as each factor has a different impact.

Salameh (2020) argued that in an aim to empirically assess the accuracy of the standard pricing asset models to the Saudi Arabia Stock Exchange (Tadawul), the five-factor, three-factor, and CAPM was used to test the theory as it was an emerging market and wanted to investigate the models applicable in developed markets. The data used from January 2014 to August 2017 consisting of monthly stock prices which were a total of 44 observations. The result was that the model with an intercept that is closer to 0 would capture the cross-sectional variations in the stock better than other models. The analysis concluded that the five-factor model may be applicable to this stock market; however, the determinants may not be as distinct due to the nation's distinct culture.

Wahyuny and Gunarsih (2020) aimed at comparing the accuracy of the CAPM and the APT methods and calculating stock returns in the manufacturing companies listed on the Indonesian Stock Exchange for the period between 2015 to 2018. Secondary time series data was used on closing prices and the Composite Stock Price Index of the manufacturing companies listed on the Indonesia Stock Exchange. The study utilized the market risk premium, inflation, exchange rates, interest rates, and stock returns as variables for the Arbitrage Pricing Theory model. The analysis's findings revealed that when it comes to forecasting stock returns for the manufacturing sector of the Indonesian Stock Exchange, the capital asset pricing model beats the arbitrage pricing theory model in terms of accuracy and precision.

Gbadebo and Oyedeko (2021) examined the economic risk factors and unexpected returns emphasizing Nigeria’s upside and downside market conditions. The study adopted an experimental research design and populated all the quoted companies in the Nigerian Stock Exchange market from December 2005 to December 2018. The study used a monthly average of stock frequently traded to determine the monthly expected return and consisted of 41 companies who often traded from 1995 to 2018. Macroeconomic indices including inflation, money supply, oil price, currency rate, and monetary policy rate were used in the study. The results showed that two macroeconomic risk factors under the macroeconomic parameter model of the arbitrage pricing theory were confirmed in the upward market condition, indicating that the theory's assumption holds true in both upside and downside market circumstances.

Three econometric tools are used in a study that aimed to identify the model most appropriate for analyzing stock returns in the NASDAQ Stock Exchange's technology sector: residual analysis, the Davidson and MacKinnon equations, and the standard multivariate regression framework (Mudthoulad, S., & Wongpit, P, 2023). Further, the purpose was to also investigate the difference in findings in the CAPM and APT models in the technology sector. The data used was that of NASDAQ stocks in the technology sector which is the largest and most active market consisting of 32 companies and used monthly closing price data from January 2015 to December 2022.

The analysis determined that the APT model was ideal for analyzing the rate of return of technology sector stocks than the CAPM model.

2.4 Conclusion

From the discussion above, for some results, it is evident that the Arbitrage Pricing Model is useful but not on its own. This implies that the APT model could be used together with CAPM model, for example the Pakistan Stock exchange. Some results from previous research agree that the CAPM model is a good fit for asset pricing, implying that APT does not apply to asset pricing at all in their respective stock markets. For example, the results from the study in the Chinese Stock Market and the Indonesia Stock exchange. For others, it was found that the APT model did a good job in asset pricing, for example in NASDAQ's Stock exchange, Saudi Arabia stock exchange and Egypt Stock exchange. For other results from research, there is a proposal to adopt the APT model for asset pricing for example in the Nigerian Stock Exchange.

CHAPTER 3: METHODOLOGY

3.1 Introduction

The purpose of this section is to give a summary of how the data analysis will be done. It involves outlining the sample of the research, the research design, the data collection method, and the process that will be undertaken to achieve the objectives as stated in Chapter One.

3.2 Research Sample

For this research, we shall use data from the banking sector in the Nairobi Securities Exchange which consists of 12 companies. Moreover, we shall use the adjusted close price to get the returns and use those returns for our analysis. The National Bank of Kenya will be excluded from the sample as it ceased trading at the Nairobi Securities Exchange. The table below shows the companies that will be used:

Table 1: List of banks listed in the NSE to be used in the research

Bank	Symbol	Change % as of 8th July
Stanbic Holdings Limited	SBIC	1.33
Diamond Trust Bank Kenya Limited	DTK	-0.65
Equity Bank Limited	EQTY	3.21
HF Group PLC	HFCK	-1.21
Kenya Commercial Bank Limited	KCB	4.53
National Bank of Kenya Limited	-	0.00
NCBA Limited	NCBA	0.12
Standard Chartered Bank Limited	SCBK	0.13
The Co-operative Bank of Kenya Limited	COOP	-0.40
IMH Holdings Limited	IMH	-0.46
ABSA Bank Kenya Limited	ABSA	1.78

The data period to be used will be for a period of the last 8 years to capture the election season, the COVID-19 pandemic, the post-COVID-19 period, and the current affairs of the country. Moreover, this will give the data many data points so we to accurately come up with the correct results.

3.3 Research Design

The current research uses a comparative design and is quantitative in nature. It is comparative in nature, comparing the two theories—CAPM and APT—in attempting to figure out which is most appropriate for the Nairobi Securities Exchange, especially with respect to the banking sector. It is quantitative in nature, as it makes use of numerical data.

3.4 Data Collection

Secondary data will be used for this study, which is immediately accessible on the Nairobi Securities Exchange portal. The Central Bank of Kenya and the Kenya Bankers Association websites will be the sources of data for the remainder of the variable components in the APT model.

3.5. Data Analysis Procedure

3.5.1 Capital Asset Pricing Model

For this model, we shall use the regression model shown below:

$$E(R_i) = R_f + \beta\big(E(R_m) - R_f\big) + \varepsilon i \tag{14}$$

Where: $E(R_i)$ represents return on the asset. This will be the adjusted close column in the data.

Rf represents risk-free assets. We shall use the government treasury bill as the risk-free rate.

$E(R_m)$ represents the market portfolio. We shall use the NSE all share index as the market portfolio.

β is the result from regressing the return on the asset and $\big(E(R_m) - R_f\big)$.

ε_i is the error term

3.5.2 Arbitrage Pricing Theory

For this model, some of the factors that affect the banking sector will be considered and tests will be done before the MAD is conducted. Through this analysis, it shall provide the most relevant factors to use for our model then utilize the equation below.

$$Ri = \alpha + \beta i1F1 + \beta i2F2 + \cdots + \beta nFn + ei \tag{15}$$

Where: Ri is the return on the stocks,

α is the intercept

β's represents the coefficients of the independent variable

F's represent the surprise factors of the factors that are assumed to impact stock prices of the banking sector. The surprise factor is the actual value – expected value, where $Fi = \frac{Fi,t - Fi,t-1}{Fi,t-1} * 100$.

ei represent the error terms

3.5.3 Tests and Comparisons

A number of tests will be carried out for each of the above-mentioned models, including an assessment of the abnormal returns in the model to determine whether the intercept is zero. This will thereafter provide a good knowledge of the model's efficiency. In addition to performing tests for stationarity, the data's mean and variance will be continuously monitored using the Augmented Dickey-Fuller (ADF) test. H0: The data is non-stationary, and H1: The data is stationary, would be our alternative hypothesis. We reject the null hypothesis if the test statistic exceeds the crucial value; alternatively, we do not. Our test statistics are normally given by the formula:

$$t = \frac{\beta - H0}{(se(\beta))} \tag{16}$$

where H_0 is normally 0, and se (β) is the standard error of the β coefficient

Test for multicollinearity will be conducted. Multicollinearity is the phenomenon of high intercorrelations among the independent variables for the APT model. This checks whether the independent variables used in the model are highly linear related. We shall use the Variance Inflation Factor (VIF). If the Variance inflation factor is greater than 5 or 10, then it signifies severe multicollinearity.

$$VIF\ (\beta i) = \frac{1}{(1 - R^2)} \tag{17}$$

Test for heteroskedasticity and autocorrelation will be performed. Heteroskedasticity is when the variables have large disparities in the data in the largest and smallest observed vales of the dependent variable, where we shall perform the Breusch-Pagan test, where our H0 will be that the data is homoscedastic and H1 will be that the data is heteroskedastic. Autocorrelation is the degree of correlation of the same variables between two-time intervals. To test for this, we shall use the Durbin Watson test where H0 will be that the data is autocorrelated and H1 will be the data is not autocorrelated. The aim of these tests is to ensure that the data is homoscedastic, has no multicollinearity and has no autocorrelation. The final step would be to perform a Mean Absolute Deviation which is given by the formula below. The averages of the MAD for the CAPM and APT models will be calculated then compare the values calculated. The model with the least MAD value is the most appropriate model to be used.

$$MAD = \frac{\sum\left|\left(R_i - E(R_i)\right)\right|}{n} \tag{18}$$

CHAPTER 4 : DATA ANALYSIS AND DISCUSION

4.1 The Capital Asset Pricing Model (CAPM)

4.1.1 Regression results

We recall the formula for regressing the Capital Asset Pricing Model:

$$E(R_i) = \alpha + \beta\big(E(R_m) - R_f\big) \tag{19}$$

The table below outlines the results obtained after regressing $E(R_i)$ and $[E(R_m) - R_f]$.

Table 2 : Regression results for CAPM

COMPANY	SYMBOL		Estimate	Std. Error
ABSA Bank Kenya Limited	ABSA	Intercept β	0.00323 0.83435	0.00524 0.07184
The Co-operative Bank of Kenya Limited	COOP	Intercept β	0.000885 1.000691	0.005384 0.073870
Diamond Trust Bank Kenya Limited	DTK	Intercept β	-0.01071 0.89531	0.00518 0.07102
Equity Bank Limited	EQTY	Intercept β	0.00596 1.14360	0.00518 0.07107
HF Group PLC	HFCK	Intercept β	0.0664 1.1352	0.0671 0.9207
IMH Holdings Limited	IMH	Intercept β	-0.01081 0.84983	0.00801 0.10994
Kenya Commercial Bank Limited	KCB	Intercept β	0.00346 1.13953	0.00514 0.07053
NCBA Limited	NCBA	Intercept β	0.00423 0.98206	0.00684 0.09380
Stanbic Holdings Limited	SBIC	Intercept β	0.00426 0.78505	0.00484 0.06637
Standard Chartered Bank Limited	SCBK	Intercept β	0.0017 0.7732	0.0048 0.0659

The α value, the intercept, implies that when Rm- Rf is 0, the expected return of the stock is the value of α. The β value implies the change in expected returns of the stock for a unit change in the overall market return.

Table 3: Summary Statistics in CAPM Regression

SYMBOL	Residual standard error	Degrees of freedom	Multiple R^2	Adjusted R^2	F-Statistic on 1	P- Value
ABSA	0.05244	99	0.5767	0.5724	134.9	< 2.2e-16
COOP	0.05392	99	0.6496	0.646	183.5	< 2.2e-16
DTK	0.05184	99	0.6162	0.6123	158.9	< 2.2e-16
EQTY	0.05188	99	0.7234	0.7206	258.9	< 2.2e-16
HFCK	0.6721	99	0.01512	0.005174	1.52	0.2205
IMH	0.08025	99	0.3764	0.3701	59.75	9.046e-12
KCB	0.05148	99	0.725	0.7223	261.1	< 2.2e-16
NCBA	0.06847	99	0.5254	0.5206	109.6	< 2.2e-16
SBIC	0.04845	99	0.5856	0.5814	139.9	< 2.2e-16
SCBK	0.04811	99	0.5816	0.5774	137.6	< 2.2e-16

The residual standard error measures the typical distance between the observed data points and the regression line. The lower the residual standard error the more the model fits the data more closely. The degrees of freedom represent the number of independent data points available to estimate parameters. The multiple R^2 represents the proportion of the variances in the dependent variable that is explained by the independent variable. The higher the coefficient of determination in the model, the more the model explains a larger portion of the variation in the dependent variable.

The adjusted R^2 is a modification of the coefficient of determination to account for the number of predictors in the model relative to the sample size. The F-Statistic indicates that the model explains a significant amount of variance in the dependent variable compared to a model with no predictors. The p-value associated with the F- statistic indicates strong evidence against the null hypothesis. This means that the model is statistically significant.

4.1.2 The unit root test

The unit root test is a test for stationarity that utilizes the Augmented Dickey-Fuller (ADF) test. The ADF test tests the null hypothesis that a unit root is preset in a time series sample. H0: The data is non-stationary, and H1: The data is stationary, would be our alternative hypothesis. Stationarity implies that the data has a non-changing mean and variance over time while non-stationarity implies that the data has changing mean and variance over time.

Table 4: Results from the ADF test in CAPM

COMPANY	SYMBOL	Dickey-Fuller Value	Significance level	P-Value
ABSA Bank Kenya Limited	ABSA	-4.31	0.05	0.01
The Co-operative Bank of Kenya Limited	COOP	-4.38	0.05	0.01
Diamond Trust Bank Kenya Limited	DTK	-3.36	0.05	0.065
Equity Bank Limited	EQTY	-4.4	0.05	0.01
HF Group PLC	HFCK	-4.37	0.05	0.01
IMH Holdings Limited	IMH	-4.09	0.05	0.01
Kenya Commercial Bank Limited	KCB	-3.88	0.05	0.018
NCBA Limited	NCBA	-3.95	0.05	0.014
Stanbic Holdings Limited	SBIC	-4.04	0.05	0.01
Standard Chartered Bank Limited	SCBK	-4.47	0.05	0.01

The Dickey- Fuller statistic or value is a measure of how strongly the data rejects the null hypothesis of a unit root. This means the more negative a value is, the stronger the rejection of the null hypothesis. Values less than -3.0 imply strong stationarity. Values between -2.0 and -3.0 imply moderate stationarity and values greater than -2.0 indicate weak stationarity. For the cases where the level of significance is less than the p-value, it gives contradictory information with the Dicker-Fuller values. The reason Diamond

Trust Bank has contradicting results could be that the ADF test has insufficient power in detecting stationarity.

4.2 The Arbitrage Pricing Theory (APT)

For this model, several variables were considered that are assumed to have a significant effect in the banking sector spilling over to their stock performance. These variables are categorized as follows:

a) Monetary policies – these are policies set by central banks that control supply of money in the economy and influence interest rates ensuring and maintain price stability in the economy. Examples include inflation rates, Exchange rates etc.
b) Consumer behavior – refers to how consumers select, purchase, use and dispose goods and services to satisfy their financial needs and desires. Examples include savings rate, lending rate, deposit rates etc.
c) Banking regulations and Central Bank policies – refer to policies and laws, both local and international, that banks are set to follow to ensure stability and soundness of the banking system to protect depositors and prevent financial crises. Examples include cash reserve requirement, central bank rates , the repo and reverse repo, the interbank rate etc.

Table 5: Variables considered for the study

Variable	Definition
Exchange rate	It is the rate at which a foreign currency is bought or sold relative to the Kenya shilling. The foreign currency is normally the US Dollar
Repo	It is the interest rate at which the Central Bank of Kenya lends money to commercial banks.
Cash reserve requirement	this is the minimum amount set by the Central Bank of Kenya for commercial banks in terms of the liquid assets (cash) they hold.
Saving rate	this is the percentage of disposable personal income that a person or group of people save rather than spend on consumption.

4.2.1 The Arbitrage Pricing Theory

The table below shows the results from regressing the bank returns and the variables:

Table 6 : Regression results for APT

SYM.		α	Repo	C.R.R	Exchange Rate	Savings Rate
ABSA	Int.	0.9730815	0.0015581	-0.0139520	0.0004662	0.0087460
	S.E	0.1386146	0.0022509	0.0195549	0.0006146	0.0047989
COOP	Int.	0.9266313	0.0033760	-0.0094914	0.0006631	0.0067027
	S.E	0.1480795	0.0024046	0.0208901	0.0006566	0.0051266
DTK	Int.	0.8217190	0.0026286	0.0080149	0.0009215	0.0032311
	S.E	0.1256212	0.0020399	0.0177218	0.0005570	0.0043491
EQTY	Int.	1.033e+00	-1.207e-04	-9.349e-03	-8.233e-05	5.986e-03
	S.E	1.726e-01	2.803e-03	2.435e-02	7.654e-04	5.976e-03
HFCK	Int.	1.1723075	-0.0174357	0.0406257	-0.0009116	-0.0279278
	S.E	1.5199364	0.0246813	0.2144229	0.0067397	0.0526213
IMH	Int.	0.7487678	0.0012894	0.0153705	0.0012429	0.0052473
	S.E	0.1900936	0.0030868	0.0268172	0.0008429	0.0065812
KCB	Int.	1.0926561	-0.0011893	-0.0172459	-0.0004206	0.0103109
	S.E	0.1727154	0.0028046	0.0243656	0.0007659	0.0059795
NCBA	Int.	0.9887625	-0.0000965	-0.0109312	0.0003999	0.0052308
	S.E	0.1825698	0.0029646	0.0257558	0.0008096	0.0063207
SBIC	Int.	0.9532929	-0.0020857	0.0106038	0.0001149	-0.0005573
	S.E	0.1013753	0.0016462	0.0143014	0.0004495	0.0035097
SCBK	Int.	0.8375869	-0.0009666	0.0205080	0.0007040	-0.0017424
	S.E.	0.1121313	0.0018208	0.0158188	0.0004972	0.0038821

The α intercept (Int.) value reflects the expected value of the stock when there is no change in the factors affecting the banking sector. The β intercept (Int.) values, which are the values of factors, reflect the change in the expected returns of the stock for a unit change in the overall market return. The standard error, denoted by S.E, represents the

Table 7: Summary Statistics in APT Regression

SYMBOL	Residual standard error	Degrees of freedom	Multiple R^2	Adjusted R^2	F-Statistic on 4	P-Value
ABSA	0.06224	96	0.04447	0.004657	1.117	0.3531
COOP	0.06649	96	0.0395	-0.000521	0.987	0.4185
DTK	0.05641	96	0.04046	0.0004803	1.012	0.4052
EQTY	0.0775	96	0.01082	-0.03039	0.2626	0.2626
HFCK	0.6825	96	0.007842	-0.0335	0.1897	0.9433
IMH	0.08535	96	0.03273	-0.007576	0.812	0.5205
KCB	0.07755	96	0.03509	-0.005113	0.8728	0.4833
NCBA	0.08198	96	0.01632	-0.02467	0.3982	0.8095
SBIC	0.04552	96	0.02261	-0.01811	0.5552	0.6957
SCBK	0.05035	96	0.03236	-0.007963	0.8025	0.5265

The lower the residual standard error the more the model fits the data more closely. The degrees of freedom represent the number of independent data points available to estimate parameters. The higher the coefficient of determination (Multiple R^2), the more the model explains a larger portion of the variation in the dependent variable. The adjusted R^2 is a modification of the coefficient of determination to account for the number of predictors in the model relative to the sample size. The F-Statistic indicates that the model explains a significant amount of variance in the dependent variable compared to a model with no predictors. The p-value associated with the F- statistic indicates strong evidence against the null hypothesis. This means that the model is statistically significant.

4.2.2 Statistical Tests

A. Test for Stationarity

The test utilizes the Augmented Dickey-Fuller test. The ADF test tests the null hypothesis that a unit root is preset in a time series sample. H0: The data is non-stationary, and H1: The data is stationary, would be our alternative hypothesis.

Table 8: Results from the ADF test in APT

COMPANY	SYMBOL	Dickey-Fuller Value	Significance level	P-Value
ABSA Bank Kenya Limited	ABSA	-5.2834	0.05	0.01
The Co-operative Bank of Kenya Limited	COOP	-5.2472	0.05	0.01
Diamond Trust Bank Kenya Limited	DTK	-3.8808	0.05	0.0177
Equity Bank Limited	EQTY	-4.8026	0.05	0.01
HF Group PLC	HFCK	-4.4216	0.05	0.01
IMH Holdings Limited	IMH	-4.8969	0.05	0.01
Kenya Commercial Bank Limited	KCB	-4.0228	0.05	0.01083
NCBA Limited	NCBA	-5.3085	0.05	0.01
Stanbic Holdings Limited	SBIC	-4.0721	0.05	0.01
Standard Chartered Bank Limited	SCBK	-5.0337	0.05	0.01

Values less than -3.0 imply strong stationarity. Values between -2.0 and -3.0 imply moderate stationarity and values greater than -2.0 indicate weak stationarity. In this case, they are all showing strong stationarity as the values are less than the -3.0 threshold.

B. Test for Heteroskedasticity

Heteroskedasticity occurs when there is a disparity between the largest and smallest observed values of the dependent variable. The Breusch-Pagan test will be used to conduct this test.

Table 9: Results from the Breusch - Pagan Test

SYMBOL	BP Value	Degree of Freedom	P - Value
ABSA	0.9421	4	0.9184
COOP	8.9718	4	0.06181
DTK	2.094	4	0.7185
EQTY	3.3866	4	0.4953
HFCK	0.6748	4	0.9544
IMH	2.6008	4	0.6267
KCB	7.8452	4	0.09742
NCBA	5.6446	4	0.2273
SBIC	3.1553	4	0.5322
SCBK	4.5289	4	0.3391

If the p-value is less than 0.05, it suggests that heteroscedasticity is present, indicating that the variance of the residuals changes with the independent variables. If the p-value is greater than 0.05, it indicates that there is no significant evidence of heteroscedasticity. In this case, the model is homoscedastic, meaning that variance of the error terms is constant across observation making the model efficient.

C. Test for Autocorrelation

This refers to the degree of correlation between a variable and a lagged version of itself over successive time intervals. The Durbin-Watson test is used to show how closely related the data points are to their previous data points in a time series. The results are tabulated below.

Table 10: Results from the Durbin – Watson Test

COMPANY	SYMBOL	DW Value	P - Value
ABSA Bank Kenya Limited	ABSA	2.0315	0.4304
The Co-operative Bank of Kenya Limited	COOP	1.6333	0.01399
Diamond Trust Bank Kenya Limited	DTK	1.2242	9.536e-06
Equity Bank Limited	EQTY	1.7678	0.06494
HF Group PLC	HFCK	2.3833	0.9465
IMH Holdings Limited	IMH	1.6457	0.01639
Kenya Commercial Bank Limited	KCB	1.2403	1.374e-05
NCBA Limited	NCBA	1.7123	0.03621
Stanbic Holdings Limited	SBIC	1.5887	0.00767
Standard Chartered Bank Limited	SCBK	2.0566	0.481

For DW values above 2, they signify no autocorrelation. Values between 1.5 and 2 signify the possibility of positive autocorrelation and values below 1.5 signify strong positive autocorrelation. Moreover, p-values that are slightly above 0.05 suggest marginal evidence of autocorrelation. P-values that are very small confirm the presence of autocorrelation in the residuals. The p-values that are much greater than 0.05 indicate no significant evidence of autocorrelation in the residuals.

Banks such as The Co-operative Bank of Kenya Limited, Diamond Trust Bank Kenya Limited, IMH Holdings Limited, Kenya Commercial Bank Limited, and Stanbic Holdings Limited show significant evidence of positive autocorrelation in their residuals. Banks such Standard Chartered Bank Limited, HF Group PLC and ABSA Bank Kenya Limited as show no significant evidence of autocorrelation. Banks like NCBA Limited and Equity Bank Limited have marginal evidence of autocorrelation.

This means the statistical test results suggest a potential presence of autocorrelation, but the evidence is not strong enough to definitively conclude that autocorrelation exists.

D. Test for Multicollinearity

Multicollinearity occurs when some independent variables provide similar information leading to unreliable coefficient estimates which make it a challenge in making proper conclusions. The VIF test shall be used to check for multicollinearity and results tabulated below

Table 11: Results from the VIF Test

Repo	Cash Reserve Requirement	Exchange rate	Savings rate
1.379630	2.492279	2.128793	1.456776

A high VIF value (a value higher than 5 or 10) indicates that a predictor variable is highly correlated with other predictor variables, which can affect the stability and interpretability of the regression coefficients. In this case, our values are below 5 hence indicate that there is no case of multicollinearity.

4.3 Mean Absolute Deviation.

Table 12: Results from the MAD for CAPM and APT Models

SYMBOL	MAD - CAPM	MAD - APT
ABSA	0.06278961	0.0557079
COOP	0.06755994	0.06025117
DTK	0.07012086	0.06391159
EQTY	0.0816557	0.0726815
HFCK	0.1902815	0.1896443
IMH	0.07614825	0.07037647
KCB	0.08389624	0.0713172
NCBA	0.07918374	0.07091282
SBIC	0.05552233	0.04968697
SCBK	0.05482887	0.05081634
AVERAGE	**0.0821987**	**0.07553063**

Mean Absolute Deviation is a statistical measure that quantifies the average distance between each data point. In this case the CAPM model has a higher variability in the data points while the APT model has a lower variability in the data points. Therefore, from the results above, we can conclude that for the asset pricing of the banking sector in the NSE, the most appropriate model to be used would be the APT model. This is because it has the least MAD value of 0.07553063**.** The significance of this study is to show how banking policies, consumer behavior and monetary policy changes have a spill-over effect which is reflected in the asset prices.

CHAPTER 5: CONCLUSION

This study was aimed at comparing the two asset pricing models, that is CAPM and APT, in asset pricing in the NSE particularly the banking sector. To achieve this, secondary data from the banks trading in the NSE was collected from 2018 to 2024. Some of the factors that affected the banking sector were used for the APT regression and the NSE all Share Index was used for the CAPM regression.

The findings of this study were investigated using MAD, where the model with the least value is the most significant model. In this case, the APT model has the least MAD value of 0.07553063. The significance of this study is to show how banking policies, consumer behavior and monetary policy changes have a spill-over effect which is reflected in the asset prices. This implies that monetary policy makers, researchers, regulators and financial market participants can rely on the changes in the policies and regulations to assess where stock prices will go up or come down.

One of the limitations of the study included getting the data. Stock data especially from the NSE is not available freely on websites such as Yahoo finance. Therefore, some cost was involved in getting data from websites such as mystock.com and African markets. The other limitation was that for Bank of Kigali, they are not listed by the CMA as a bank trading in the NSE. Moreover, they began trading shares in the NSE in 2018 hence was not considered in this study.

For future researchers looking into comparing stock pricing models, they could consider similar research but into different sectors or all stocks in the NSE. Moreover, they could consider investigating is we need to adopt the APT model for asset pricing in Kenyan stocks.

In conclusion, this study provides a comprehensive understanding in the comparison of CAPM and APT models for the Kenya Banking sector and asset pricing.

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